ADDENDUM

TO: ALL HOLDERS OF CONTRACT DOCUMENTS
FROM: DIRECTOR ERIC E. MARABELLO, P.E.
SUBJECT: HO7565370 ADDENDUM NO. 5
F.A.P. NO. AC-NHPP-118-1(69)N
MD 32 FROM LINDEN CHURCH ROAD TO I-70
DATE: SEPTEMBER 6, 2018

Please be advised that the Maryland Department of Transportation State Highway Administration (MDOT SHA) has issued an addendum for Contract No. HO7565370. The Technical Proposal and Price Proposal Submittal Date for this contract is still scheduled for **September 20, 2018**.

The attention of prospective proposers is directed to the following revisions, additions and/or deletions to the Competitive Sealed Proposals Procurement Phase Two – Request for Proposals.

COMPETITIVE SEALED PROPOSALS PROCUREMENT PHASE TWO - REQUEST FOR PROPOSALS

Instructions to Proposers

Page No.	Description
5	REVISED right-of-way clearance date.
8	REVISED Federal Emergency Management Agency Conditional Letter of Map Revision (CLOMR) approval date.
30	REVISED Safety and Mobility rating criteria.

Performance Requirements

Page No.	Description
38	ADDED Guidance for Completing a Dam Breach Analysis for Small Ponds and Dams in Maryland to Performance Requirements Section 2 – Guidelines and References.
73	REVISED Traffic Data for MD 32 at I-70 ramps.

Contract Provisions

Page No.	Description
59-60	REVISED right-of-way clearance dates.

61A ADDED Reforestation Law permit.

61B-AAA ADDED Joint Permit modification.

88 REVISED Price Adjustment for Diesel Fuel to include additional work Categories.

NOTICE TO PROSPECTIVE PROPOSERS

The attention of the prospective proposers is directed to the following revisions, additions, and/or deletions to the Additional Information on ProjectWise:

ADDED revised CLOMR submission to the following location on ProjectWise:

pw:\\SHAVMPWX.shacadd.ad.mdot.mdstate:SHAEDMS01\Documents\Design-Build\HO7565370\I. Conceptual Stormwater Management and Drainage Information\4. CLOMR\Revised August 2018\

ADDED revised MDE Hydraulics and Hydrology report to the following location on ProjectWise:

pw:\\SHAVMPWX.shacadd.ad.mdot.mdstate:SHAEDMS01\Documents\Design-Build\HO7565370\I. Conceptual Stormwater Management and Drainage Information\2. Clydes Branch H&H MDE Report\ Revised August 2018\

ADDED issued plats to the following location on ProjectWise:

pw:\\SHAVMPWX.shacadd.ad.mdot.mdstate:SHAEDMS01\Documents\Design-Build\HO7565370\D. Right-of-Way\3. Proposed Right-of-Way Plats\

ADDED revised proposed right-of-way file to the following location on ProjectWise:

pw:\\SHAVMPWX.shacadd.ad.mdot.mdstate:SHAEDMS01\Documents\Design-Build\HO7565370\D. Right-of-Way\2. Proposed Right-of-Way files\

ADDED Joint Permit modification to the following location on ProjectWise:

pw:\\SHAVMPWX.shacadd.ad.mdot.mdstate:SHAEDMS01\Documents\Design-Build\HO7565370\E. Reforestation Permit & Wetland Plates\6. Original USACE and MDE Permits\

Questions relating to this Addendum No. 5 may be directed in writing to:

Mr. Eric E. Marabello, P.E.
Director, Office of Highway Development
Maryland Department of Transportation State Highway Administration
e-mail address: HO7565370_MD_32@sha.state.md.us

During the Proposal Phase, only e-mailed inquiries will be accepted. No requests for additional information or clarification to any other Administration office, consultant, or employee will be considered.

Eric E. Marabello, P.E.
Director, Office of Highway Development

This Addendum is issued to clarify, add to, delete from, correct and/or change the bid documents to the extent indicated and is hereby made part of the said bid documents on which the contract will be based. COMAR 21.05.02.08 requires that all addenda issued be acknowledged prior to submitting your bid. Failure to submit a completed addenda acknowledgement/ verification for all addenda may result in the bid being declared non-responsive.

ADDENDUM

TO: ALL HOLDERS OF CONTRACT DOCUMENTS
FROM: DIRECTOR ERIC E. MARABELLO, P.E.
SUBJECT: HO7565370 ADDENDUM NO. 4
F.A.P. NO. AC-NHPP-118-1(69)N
MD 32 FROM LINDEN CHURCH ROAD TO I-70
DATE: AUGUST 24, 2018

Please be advised that the Maryland Department of Transportation State Highway Administration (MDOT SHA) has issued an addendum for Contract No. HO7565370. The Technical Proposal and Price Proposal Submittal Date for this contract is still scheduled for **September 20, 2018**.

The attention of prospective proposers is directed to the following revisions, additions and/or deletions to the Competitive Sealed Proposals Procurement Phase Two – Request for Proposals.

COMPETITIVE SEALED PROPOSALS PROCUREMENT PHASE TWO - REQUEST FOR PROPOSALS

Instructions to Proposers

Page No.	Description
44	REVISED stipend amount.
46	REVISED stipend amount.
48	REVISED Compensation Payable amount in Stipend Agreement.

Performance Requirements

Page No.	Description
9	REVISED description of Surface Storm Drainage Design Scope of Services.
33	ADDED MASH to Guidelines and References.
70	REVISED pavement section for Roadway Element 2.
87	REVISED specification reference for Synthetic Fibers.
143	REVISED Reforestation requirement and anticipated Reforestation Impact area.

170-170B	ADDED description of Submerged Gravel Wetlands Requirements.
229	REVISED minimum service life of structural elements.
235	REVISED description of Plan Adjustments and Revisions.
236	DELETED description of Plan Adjustments and Revisions.

Questions relating to this Addendum No. 4 may be directed in writing to:

Eric E. Marabello, P.E.
Director, Office of Highway Development
Maryland Department of Transportation State Highway Administration
e-mail address: HO7565370_MD_32@sha.state.md.us

During the Proposal Phase, only e-mailed inquiries will be accepted. No requests for additional information or clarification to any other Administration office, consultant, or employee will be considered.

_____

Eric E. Marabello, P.E.
Director, Office of Highway Development

This Addendum is issued to clarify, add to, delete from, correct and/or change the bid documents to the extent indicated and is hereby made part of the said bid documents on which the contract will be based. COMAR 21.05.02.08 requires that all addenda issued be acknowledged prior to submitting your bid. Failure to submit a completed addenda acknowledgement/ verification for all addenda may result in the bid being declared non-responsive.

ADDENDUM

TO: ALL HOLDERS OF CONTRACT DOCUMENTS
FROM: DIRECTOR ERIC E. MARABELLO, P.E.
SUBJECT: HO7565370 ADDENDUM NO. 3
F.A.P. NO. AC-NHPP-118-1(69)N
MD 32 FROM LINDEN CHURCH ROAD TO I-70
DATE: JULY 19, 2018

Please be advised that the Maryland Department of Transportation State Highway Administration (MDOT SHA) has issued an addendum for Contract No. HO7565370. The Technical Proposal and Price Proposal Submittal Date for this contract is still scheduled for **September 20, 2018**.

The attention of prospective proposers is directed to the following revisions, additions and/or deletions to the Competitive Sealed Proposals Procurement Phase Two – Request for Proposals.

COMPETITIVE SEALED PROPOSALS PROCUREMENT PHASE TWO - REQUEST FOR PROPOSALS

Instructions to Proposers

Page No.	Description
17	REVISED date for submittal of Letter of Interest.
19	REVISED final date for submittal of Proposer inquiries.
21-21A	ADDED additional Alternative Technical Concept period and one-on-one meetings.
25	REVISED date for submittal of Technical Proposals.
26	REVISED date for submittal of Price Proposals.
30-30A	REVISED Safety and Mobility requirements.
33	REVISED Notice to Proceed date.

Performance Requirements

Page No.	Description
43	REVISED description of Roadway Performance Requirements.
94	REVISED description of Structure Specific Design and Construction Requirements.

Contract Provisions

Page No.	Description
460	REVISED submittal date for Technical Proposals and Price Proposals.

Questions relating to this Addendum No. 3 may be directed in writing to:

Eric E. Marabello, P.E.
Director, Office of Highway Development
Maryland Department of Transportation State Highway Administration
e-mail address: HO7565370_MD_32@sha.state.md.us

During the Proposal Phase, only e-mailed inquiries will be accepted. No requests for additional information or clarification to any other Administration office, consultant, or employee will be considered.

for Eric E. Marabello, P.E.
Director, Office of Highway Development

This Addendum is issued to clarify, add to, delete from, correct and/or change the bid documents to the extent indicated and is hereby made part of the said bid documents on which the contract will be based. COMAR 21.05.02.08 requires that all addenda issued be acknowledged prior to submitting your bid. Failure to submit a completed addenda acknowledgement/ verification for all addenda may result in the bid being declared non-responsive.

ADDENDUM

TO: ALL HOLDERS OF CONTRACT DOCUMENTS
FROM: DIRECTOR ERIC E. MARABELLO, P.E.
SUBJECT: HO7565370 ADDENDUM NO. 2
F.A.P. NO. AC-NHPP-118-1(69)N
MD 32 FROM LINDEN CHURCH ROAD TO I-70
DATE: JULY 13, 2018

Please be advised that the Maryland Department of Transportation State Highway Administration (MDOT SHA) has issued an addendum for Contract No. HO7565370. The Technical Proposal and Price Proposal Submittal Date for this contract has been POSTPONED from August 9, 2018 to **September 20, 2018**.

Questions relating to this Addendum No. 2 may be directed in writing to:

Eric E. Marabello, P.E.
Director, Office of Highway Development
Maryland Department of Transportation State Highway Administration
e-mail address: HO7565370_MD_32@sha.state.md.us

During the Proposal Phase, only e-mailed inquiries will be accepted. No requests for additional information or clarification to any other Administration office, consultant, or employee will be considered.

Eric E. Marabello, P.E.
Director, Office of Highway Development

This Addendum is issued to clarify, add to, delete from, correct and/or change the bid documents to the extent indicated and is hereby made part of the said bid documents on which the contract will be based. COMAR 21.05.02.08 requires that all addenda issued be acknowledged prior to submitting your bid. Failure to submit a completed addenda acknowledgement/ verification for all addenda may result in the bid being declared non-responsive.

ADDENDUM

TO: ALL HOLDERS OF CONTRACT DOCUMENTS
FROM: DIRECTOR ERIC E. MARABELLO, P.E.
SUBJECT: HO7565370 ADDENDUM NO. 1
F.A.P. NO. AC-NHPP-118-1(69)N
MD 32 FROM LINDEN CHURCH ROAD TO I-70
DATE: JUNE 1, 2018

Please be advised that the Maryland Department of Transportation State Highway Administration (MDOT SHA) has issued an addendum for Contract No. HO7565370. The Technical Proposal and Price Proposal Submittal Date for this contract is still scheduled for **August 9, 2018**.

The attention of prospective proposers is directed to the following revisions, additions and/or deletions to the Competitive Sealed Proposals Procurement Phase Two – Request for Proposals.

COMPETITIVE SEALED PROPOSALS PROCUREMENT PHASE TWO - REQUEST FOR PROPOSALS

Instructions to Proposers

Page No.	Description
6	REVISED name of SWM/ESC Approval Authority.
7	REVISED wetland mitigation requirements.
10-12A	REVISED RFP files provided on ProjectWise.
13	REVISED maintenance of project site to include pavement maintenance.
33	REVISED Contract Time page number within the Proposal Form.

Performance Requirements

Page No.	Description
12	REVISED name of SWM/ESC Approval Authority.
37	REPLACED Garrett County design references with Howard County design references.
43	REVISED responsibility for Interstate Access Point Approval development.
46	REVISED language concerning the construction of Access Road 4.

47	REVISED proposed access condition at River Valley Chase.
70	REVISED flexible pavement design for Roadway Element 1.
77-83	REVISED Structural Hydraulics performance requirements.
94	REVISED Structural Design requirements to incorporate Standard Structural Detail Plates.
96	REVISED height and width dimensions of Structure S3.
100	DELETED requirement for fixed bearing location for Structure S7.
142	REVISED Forest Impacts to match the Reforestation Law approval.
143	REVISED on-site reforestation to match the Reforestation Law approval.
165	REVISED name of SWM/ESC Approval Authority.
167	REVISED planting requirements for stormwater management embankments.
193-193A	REVISED utility relocations by others.
226	REVISED name of SWM/ESC Approval Authority.
231	REVISED name of SWM/ESC Approval Authority.
232	ADDED location specific stormwater management commitments.
235	REVISED name of SWM/ESC Approval Authority.
236	REVISED name of SWM/ESC Approval Authority.
241	REVISED name of SWM/ESC Approval Authority.
246	REVISED name of SWM/ESC Approval Authority.

Contract Provisions

Page No.	Description
94	REVISED listing of existing buildings to be demolished.
119	REVISED submittal durations due to multiple instances of the word 'construction'.

NOTICE TO PROSPECTIVE PROPOSERS

The attention of the prospective proposers is directed to the following revisions, additions, and/or deletions to the Additional Information on ProjectWise:

ADDED Community Concerns related to the Triadelphia Road bridge construction at the following location on ProjectWise:

pw:\\SHAVMPWX.shacadd.ad.mdot.mdstate:SHAEDMS01\Documents\Design-Build\HO7565370\U. Community Concerns\

ADDED PPMs D-77-13, D-79-19, and D-87-37 to the following location on ProjectWise:

pw:\\SHAVMPWX.shacadd.ad.mdot.mdstate:SHAEDMS01\Documents\Design-Build\HO7565370\P. Office of Structures, Draft Policy and Procedures Manual\1. Design PPM\

ADDED resilient modulus testing results to the following location on ProjectWise:

pw:\\SHAVMPWX.shacadd.ad.mdot.mdstate:SHAEDMS01\Documents\Design-Build\HO7565370\F. Appendices\1. Pavement and Geotechnical Data\

ADDED sample structures plans to the following location on ProjectWise:

pw:\\SHAVMPWX.shacadd.ad.mdot.mdstate:SHAEDMS01\Documents\Design-Build\HO7565370\P. Office of Structures, Draft Policy and Procedures Manual\3. Sample Plans

ADDED structural detail plates to the following location on ProjectWise:

pw:\\SHAVMPWX.shacadd.ad.mdot.mdstate:SHAEDMS01\Documents\Design-Build\HO7565370\P. Office of Structures, Draft Policy and Procedures Manual\4. Standard Detail Plates

Questions relating to this Addendum No. 1 may be directed in writing to:

Mr. Eric E. Marabello, P.E.
Director, Office of Highway Development
Maryland Department of Transportation State Highway Administration
e-mail address: HO7565370_MD_32@sha.state.md.us

During the Proposal Phase, only e-mailed inquiries will be accepted. No requests for additional information or clarification to any other Administration office, consultant, or employee will be considered.

Eric E. Marabello, P.E.
Director, Office of Highway Development

This Addendum is issued to clarify, add to, delete from, correct and/or change the bid documents to the extent indicated and is hereby made part of the said bid documents on which the contract will be based. COMAR 21.05.02.08 requires that all addenda issued be acknowledged prior to submitting your bid. Failure to submit a completed addenda acknowledgement/ verification for all addenda may result in the bid being declared non-responsive.

MARYLAND DEPARTMENT OF TRANSPORTATION

STATE HIGHWAY ADMINISTRATION

Maryland Department of Transportation

State Highway Administration
Baltimore, Maryland

Contract No. HO7565370
F.A.P No. AC-NHPP-118-1(69)N

Competitive Sealed Proposals Procurement Phase Two – Request for Proposals (RFP)
Design-Build

MD 32 from Linden Church Road to I-70

Howard County

Disadvantaged / Minority Business Enterprises are encouraged to respond to this Solicitation Notice.

The State Highway Administration will only be responsible for the completeness of documents, including all addenda, obtained directly from the Administration.
Failure to complete and include the Addendum Receipt Verification Form may cause the proposal to be irregular.

VENDOR I.D. NUMBER

_____

S.H.A. USE ONLY

MARYLAND DEPARTMENT OF TRANSPORTATION

STATE HIGHWAY ADMINISTRATION

CONTRACT NO. HO7565370

F.A.P. NO. AC-NHPP-118-1(69)N

Competitive Sealed Proposals Procurement Phase Two – Request for Proposals (RFP) Design-Build

Part I – Instructions to Proposers (ITP)

MD 32 – LINDEN CHURCH ROAD TO I-70

Howard County

Disadvantaged / Minority Business Enterprises are encouraged to respond to this Solicitation Notice.

MDOT SHA will only be responsible for the completeness of documents, including all addenda, obtained directly from MDOT SHA.
Failure to complete and include the Addendum Receipt Verification Form may cause the proposal to be irregular.

VENDOR I.D. NUMBER

_____

MDOT SHA USE ONLY

INSTRUCTIONS TO PROPOSERS

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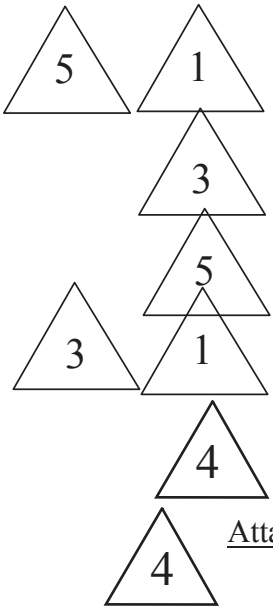

Attachments

- Competitive Sealed Proposals Stipend Agreement

1.0 INTRODUCTION

1.1 Design-Build Concept

The Administration is soliciting Technical Proposals and Price Proposals for the design and construction of improvements along MD 32 from South of Linden Church Road to I-70. This project is located in Howard County, Maryland. The basis of payment for this work will be "lump sum" which price shall include all costs associated with design and construction of the project in accordance with the requirements of this RFP.

The use of the term "Contractor" or "Design-Builder" within the Contract Documents furnished by the Administration shall be taken to mean Design-Build (D-B) Contractor. These terms are interchangeable.

The use of the term "Designer" or "Design-Build Engineer," within the Contract Documents furnished by the Administration, shall be taken to mean the Engineer working for the Design-Build Contractor. The use of the term "Engineer," within the Contract Documents furnished by the Administration, shall be as defined in Section GP-1.03 of the General Provisions for Construction Contracts.

1.1.1 Restrictions on Participation in Design-Build Contracts

An individual or entity that has received monetary compensation as the lead or prime design consultant under a contract with the Administration to develop the concept plan and/or have been retained to perform construction phase services on behalf of the state, or a person or entity that employs such an individual or entity, or regardless of design phase responsibilities has received in excess of $500,000.00 for services performed, may not submit a Technical Proposal or a Price Proposal for this procurement and is not a responsible proposer under COMAR 21.06.01.01. The Technical Proposal or Price Proposal from such an individual or entity will be rejected pursuant to COMAR 21.06.01.01 and COMAR 21.06.02.03.

The following is a list of consultants and/or subconsultants that have received monetary compensation under a contract with the Administration as the prime consultant to develop the concept plan, have been retained by the Administration to perform construction phase services on the behalf of the state for this procurement, or have received payment in excess of $500,000.00. SHA makes no representations regarding the completeness of the list:

- RK&K
- Prime AE
- Floura Teeter
- NMP Engineering
- Daniel Consultants
- The Wilson T. Ballard Company
- ESD Associates

§ 13-212.1 of the State Finance & Procurement Article contains various restrictions on participating in State procurements. Any questions regarding eligibility must be appealed to the Maryland State Board of Contract Appeals.

No official or employee of the State of Maryland, as defined under General Provisions Article of the Annotated Code of Maryland, whose duties as such official or employee include matters relating to or affecting the subject matter of this contract, shall during the pendency and term of this contract and while serving as an official or employee of the State become or be an employee of the Design-Build Team or an entity that is a subcontractor on this contract.

No Design-Build Team may use any persons meeting the above restrictions in any capacity, key staff or otherwise, on this Design-Build Contract. It is the responsibility of the Design-Build Team to identify any potential ethics issues concerning its former MDOT employees and seek an opinion from the State Ethics Commission regarding any potential conflicts of interest. The Design-Build Team shall provide certification in its cover letter that it is in compliance with State Ethics Laws prohibiting work on a matter in which a former MDOT employee participated significantly as a State Employee for the duration of this contract.

1.2 Project Overview

1.2.1 Description of Work

This is a Fixed Price/Best Design Design-Build contract. The contract price is fixed at $85,121,014.00 million. The contract will be awarded as a best value selection to the Proposer from the Reduced Candidate List (RCL) that provides the best combination of qualifications in Phase One and technical solutions in Phase Two addressing the evaluation criteria established in the RFP. The general scope of the work is the design and construction of MD 32 from a two lane arterial to a four lane divided highway from south of Linden Church Road to I-70. The Design-Builder will be responsible for all work required to deliver the improvements that it proposes in its Technical Proposal for the fixed price of $85,121,014.00.

1.2.2 Project History

The need for improvements to MD 32 corridor has been identified since 1989 by the State and Howard County. Project planning activities began in the 1990's and the Federal Highway Administration approved the Final Environmental Impact Statement (FEIS) by a Record of Decision on November 18, 2005. The purpose from the MD 32 planning study is to improve safety and capacity throughout the corridor while attempting to minimize right-of-way impacts and environmental impacts. Project development activities have been phased as cited below due to funding constraints. The phases were prioritized based on crash experience, capacity, and operational issues.

- Burntwoods Road Interchange – construction was completed in 2008.
- Nixon Farm Mitigation Site – construction was completed in 2010.

- Linden Church Road Interchange – construction was completed in 2013.
- Wellworth Way Service Road – construction was completed in 2016.
- Phase 1 widening from MD 108 to north of Linden Church Road – construction is ongoing and expected to be complete by the end of 2018.
- Phase 2 widening and safety and operational improvements from south of Linden Church Road to I-70 is the scope of this contract.
- Interchanges at the MDOT SHA Dayton Shop, Rosemary Lane, MD 144, and I-70 are future planned phases per the FEIS.

A reevaluation of the FEIS based on the Phase II concept was approved by FHWA on October 24, 2017.

1.2.3 Project Goals

a) Provide a project that maximizes the project elements to improve corridor traffic operations and safety while being compatible with the future planned corridor improvements.

b) Provide a project that minimizes inconvenience to the community and the traveling public.

c) Provide a project that minimizes overall impacts (utilities, environmental resources, etc.) and provides proactive coordination.

1.2.4 Project Key Issues

1. MDOT SHA desires for the project to provide efficient and safe flow of traffic along MD 32 and the nearby roadway network. MDOT SHA's objectives are:

   - to reduce network delay for both the AM and PM peak periods for the 2040 design year when compared to the no build condition,
   - to ensure the signalized intersections, along with the basic, merge, diverge, and weaving sections, operate at a Level of Service E or better in the 2040 design year,
   - to reduce the crash rate for rear-end collisions, reduce the crash rate between MD 144 and the I-70 interchange, and reduce the overall corridor-wide crash rate,
   - and to be compatible to the maximum extent practical with the future planned corridor improvements.

2. MDOT SHA desires a project that is completed in a timely and efficient manner while minimizing the disruptions to the community and the traveling public.

3. Minimization of impacts and proactive coordination will be required to ensure this project is successfully completed. The Design-Build Team must have a well thought out and well executed plan.

1.2.5 Project Status

The current status of aspects of the project is as outlined hereafter.

1.2.5.1 Survey

Aerial photogrammetry at 1" = 50' was prepared from photographs. A contour surface model and topographic base map were prepared on the basis of this photogrammetry. Supplemental data collected surveys were performed along portions of the roadways to refine pavement elevations, ditch inverts, service access roads, potential SWM facilities, and pipe culverts. The data from these supplemental surveys was incorporated into the plan and the surface. This information is available in electronic format on ProjectWise. All surveys were performed in the Maryland State Plane Grid, NAD 83/91 and NAVD 88.

The Design-Builder must obtain all additional survey data necessary for their design, construction, and verification of surface model for all design activities.

1.2.5.2 Concept Plans

A set of conceptual plans showing the horizontal and vertical geometry for the highway construction has been prepared in Microstation V8i. Files are available in electronic format on ProjectWise for informational purposes only.

1.2.5.3 Cross-Sections

Field-surveyed cross-sections were not taken. Conceptual cross sections were prepared for the mainline and intersecting streets on the basis of the terrain model surface for the baseline, typical section and profile shown on the plans. These cross sections are being provided in electronic format on ProjectWise for informational purpose only. The Design-Builder must perform field-run cross-sections to complete design and construction activities to address design and/or construction issues and provide clarification where necessary. Cross-sections showing existing and proposed ground must be prepared by the Design-Builder using the appropriate computer software.

1.2.5.4 Geotechnical

The Administration has obtained soils borings and infiltration tests at selected locations along the project corridor and performing laboratory testing of the samples. The boring logs and laboratory test data are included on ProjectWise.

These studies were performed with reasonable care and recorded in good faith. The Administration considers the information Engineering Data and will stand behind its

accuracy at the location it was taken. The Administration assumes no responsibility in respect to the sufficiency of the studies for design. The Design-Build Team will need to perform additional geotechnical testing and analysis to complete the project. The Design-Build Team is responsible for performing a complete geotechnical program including additional borings, sampling, in-situ and laboratory testing, analysis, and design, as necessary to complete design and construction.

1.2.5.5 Utilities

All utility data of which the Administration is aware is reflected on the survey information. The Administration has had a utility designating service locate underground utilities which identified the existence of the utility at its horizontal location. Inaccuracies in information regarding the locations of an underground utility based on utility designation information shall be considered material only if the utility's actual centerline location is more than three (3) feet distant from the horizontal centerline location shown in that information, without regard to vertical location. Additional utilities may be present in the area.

Utility test hole data has been field collected by the Administration at single point locations. The utility's horizontal and vertical location has then been verified using accurate survey techniques. The Administration considers this information Engineering Data and will stand behind its accuracy at the locations that it is taken. The test hole data will be available on ProjectWise.

The Design-Builder is responsible for obtaining all information that will be required to complete the roadway design and construction. The Administration has conferred with the utility companies with facilities in this area concerning the potential impact of this roadway construction. The Design-Builder must coordinate and cooperate with other contractors that are expected to be relocating utilities during the construction of this Project. The Design-Builder is responsible for determining the status of all designs and relocations and for identifying all additional required relocations and for coordinating the design and construction of the utilities with the design and construction of the roadway improvements of this Project.

The Design-Builder will be responsible to obtain any additional utility data it determines necessary for design and construction of the project.

1.2.5.6 Right of Way

Approximately 300 feet of right of way was previously acquired by MDOT SHA along MD 32 south of Burntwoods Road and 150 feet wide north of Burntwoods Road. The right-of-way expands at interchanges and intersections. The Administration has identified additional right-of-way needed to design and construct the project. The Administration is developing plats and will acquire the right-of-way. It is anticipated that the total right-of-way clearing will be June 30, 2019.

5

The Design-Builder may prepare design plans, permit applications, and any other engineering documentation related to the project in advance of the right-of-way clear date. The Design-Builder may begin construction activity only on plans where the disturbance is entirely contained within right-of-way certified by the Administration to be in SHA's possession. The Design-Builder may not proceed with construction on any properties not within SHA possession until such time as the Administration issues a Right-of-Way Certification stating that right-of-way is clear for the construction package. The Administration may issue multiple Right-of-Way Certifications throughout the acquisition process. The Right-of-Way Certification(s) will only list those properties which have been cleared at the time of issuance.

The Design-Builder may revise the roadway alignment and other details of the project to alter the limits of construction or disturbance, subject to environmental constraints, but all construction must be contained within the Right of Way. The Design-Builder will be responsible for acquiring, at its expense, all other rights in land needed for construction staging, yarding, construction, or otherwise.

1.2.5.7 Permits

The following permits and/or approvals are anticipated to be required for this project:

1

- Stormwater Management Approval and Erosion and Sediment Control Approval (from SWM/ESC Approval Authority)
- National Pollutant Discharge Elimination System (NPDES) Permit (from MDE)
- Section 404 Individual Permit, Water Quality Certification and Nontidal Wetlands & Waterways Permit (from USACE and MDE)
- Reforestation Law Approval (from DNR)
- Letter of Map Revision (LOMR) (from FEMA)

Status of Stormwater Management and Erosion and Sediment Control Review:

A Stormwater Management (SWM) concept design was developed by the Administration solely to establish Right of Way needs. The Design-Build team is responsible to finalize all SWM design and obtain all approvals in compliance with the "Sediment and Stormwater Guidelines and Procedures Maryland State Highway Administration version 1.2".

No erosion and sediment control design has been developed by the Administration. The Design-Build Team is responsible for the preparation of final Erosion and Sediment Control Plans and obtaining final approvals.

Status of National Pollutant Discharge Elimination System Permit:

The Design-Builder shall submit a Notice of Intent (NOI) form to MDE to complete the public notice period. The ultimate responsibility of submitting the notice and any amendments thereto shall be on the Design-Builder. Any delays resultant of

obtaining NOI approval or amendments will be the sole responsibility of the Design-Builder.

Status of Nontidal Wetlands & Waterways Permit and Section 404 Individual Permit:

A Nontidal Wetlands and Waterways Permit and Section 404 Individual Permit were approved for the MD 32 corridor planning study. The administration has applied for a new Permit based on the impacts depicted in the Conceptual Plans. SHA anticipates approval from MDE and USACE prior to the submittal of the Technical Proposals and Price Proposals for this project. Any impacts that are outside the current LOD or are in excess of the current assessment will have to be permitted by the Design Builder. In such cases, the Design-Build Team is responsible for the complete process of preparing the documentation for these approvals and submitting this information to SHA-Environmental Programs Division (EPD), who will submit the modification request to the appropriate agency for approval. The Design-Build Team will have to provide services to obtain the final permit and any modifications to the permit.

The Administration has an approved Phase II Mitigation plan for the corridor impacts associated with the planning study. The MD 32 from Linden Church Road to I-70 project will result in wetlands impacts in excess of those permitted in the original corridor permit for the planning study design and mitigated in the Phase II Mitigation plan at Nixon's Farm. Accordingly, it will be the responsibility of the Design-Builder to Addendum the MD 32 Corridor Phase II Mitigation plan to provide wetland creation that accounts of the wetland impacts for the MD 32 from Linden Church Road to I-70 project, as well as the anticipated shortfall of the Nixon Farm's Mitigation Site. The Design-Builder will be responsible for all design, permitting, and construction required to construct the above mentioned mitigation site within the existing right-of-way.

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The Terrapin Branch reach from the MD 144 structure crossing to the Nixon Farm's Lane structure crossing provides the Administration an opportunity to perform environmental stewardship in an effort to gain Total Maximum Daily Load (TMDL) credits. Should the Design-Builder choose to perform the work, the Design-Builder will receive compensation for each linear foot of stream mitigation that can be performed on the Terrapin Branch. The Terrapin Branch stream mitigation is not included in the MD 32 Corridor impacts, and, should the Design-Builder choose to perform the work, the Design-Builder will be responsible for acquiring a separate Nontidal Wetlands and Waterways Permit and Section 404 Individual Permit for the work, as well as any other agency approvals required to perform the work. The linear foot compensation will be the total compensation to the Design-Builder for all design, permitting, and construction of the stream restoration.

Any resultant delays or changes to schedules or costs, whether direct, indirect or consequential, arising out of permit application and/or changes to the approved permit will be the responsibility of the Design-Builder.

Wetlands and waterways were identified and delineated within the project area. A copy of the delineation report is posted on ProjectWise. Surveyed boundaries of waterways, wetlands, and 25-foot wetland buffers are depicted on the Conceptual Plans, and will be provided to the Design-Build Team in electronic format as part of the Project Files.

Status of Reforestation Law Approval:

The Administration anticipates receiving the Reforestation Law Approval from DNR for the impacts for this project based upon the proposed activities in the conceptual plans prior to the submittal of Technical Proposals and Price Proposals. Any impacts that are outside the current LOD or are in excess of the current assessment will have to be permitted by the Design-Builder. In such cases, the Design-Build Team is responsible for the complete process of preparing the documentation for these approvals and submitting this information to SHA - Landscape Operations Division, who will then submit the modification request to DNR for approval.

Any resultant delays or changes to schedules or costs, whether direct, indirect or consequential, arising out of changes to the approved permit will be the responsibility of the Design-Builder.

Status of FEMA Letter of Map Revision:

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The Administration has applied for the FEMA Conditional Letter of Map Revision (CLOMR) based on the conceptual plan. SHA anticipates having an approved CLOMR for the impacts by June 28, 2019 based upon the proposed activities in the conceptual plans and subsequent revisions. The Design-Builder shall be responsible for obtaining the FEMA Letter of Map Revision needed for the project. The Design-Builder is responsible for all application fees associated with these permits.

1.3 RFP Package

The following materials are being provided to all prospective proposers:

A. Request for Proposals.

- Questions and Responses

The following materials are being provided in electronic format on ProjectWise. This material is considered Engineering Data and the Administration will stand behind its accuracy unless otherwise specified in the contract documents.

B. Survey/Topographic Files

- Topographic files

- Text files
- Existing Contour files
- Triangle files
- Environmental Features file
- Existing Surface files

C. Utility Files

- Existing Utility designation files
- Test Hole Information

D. Right-of-Way

- Existing Right-of-way files
- Proposed Right-of-way files
- Proposed Right-of-way Plats

E. Reforestation Impact Plans & Wetland/Waterway Permit

- Forest Impact Plans
- Forest Impact Design Files
- Draft Joint Permit Application & Wetland Plates
- Wetland Impact Plates Design Files
- Natural Resources Inventory and Forest Stand Delineation
- Original USACE and MDE Permits
- DNR Permit

F. Appendices

- Pavement and Geotechnical Data
- Existing and Proposed Traffic Data
- Traffic Control Device Design Request
- ITS Details
- POP Sign Details
- Existing Structure Inspection Report

- Structure Checklist
- Pavement and Geotechnical Design Guide Information
- OOTS TEDD Checklist
- OOTS TEDD Guidelines and Supporting Documents
- OOTS TEDD Shelf Typicals
- Safety Analysis
- Hazardous Material Survey

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The following materials are being provided in electronic format on ProjectWise. This material is considered Conceptual and the Administration makes no representation regarding its accuracy. The Design-Builder assumes all risk for the usage of these conceptual materials.

G. Conceptual Plan Sheets

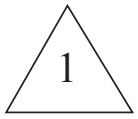
- Title Sheet
- Conceptual Roadway Roll Plans
- Structural Pre-TS&L Plans
- Conceptual Cross-Sections
- Conceptual Utility Plans
- Landscape Planting Zone Concept Plans

H. Conceptual Plan Design Files

- Roadway Design Files
- Horizontal Baseline
- Vertical Alignment file
- Shading file
- Border files
- Conceptual Potential SWM Area files
- Conceptual Cross Section files
- Geopak files
- Conceptual Drainage Files
- Utility Impact Matrix and Concept Files
- Landscape Planting Zone Concept Files

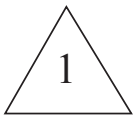
I. Conceptual Stormwater Management and Drainage Information

- o Conceptual Stormwater Management Report
- o Clydes Branch H&H MDE Report
- o Middle Patuxent River H&H MDE Report
- o CLOMR
- o Draft Preliminary Geomorphology Report



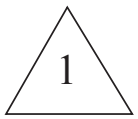
K. Wetland Creation and Stream Restoration Information

- o Wetland Mitigation (to be added by Addendum)
- o Nixon's Farm
- o Stream Restoration and Relocation



L. As-Built Plans

- o Roadway
- o Structures
- o Traffic Signals



The following materials are being provided in electronic format on ProjectWise. This material is considered necessary for the Design-Build Team to prepare a Technical Proposal and Price Proposal and/or finalize their designs.

N. Environmental Documents

- o Original FEIS
- o NEPA Reevaluation
- o Noise Study

O. Stormwater Management and Surface Drainage Information

- o NOI Form
- o Drainage Design Guideline
- o BMP Checklists and As-Built Certification Formats
- o SWM Report Format Guidelines
- o SHA BMP Identification Form
- o Water Quality Summary Sheet Format and Definitions

- Geotextile Guidelines
- MDSHA SWM Site Development Criteria
- SHA Standard SWM Details

P. Office of Structures, Draft Policy and Procedures

- Design PPM

- Plan PPM
- Sample Structure Plans
- Standard Detail Plates

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Q. Utility Owner Information

- Utility Owner Design Guidelines
- Utility Owner As-Builts
  - BGE-Electric
  - BGE-Gas
  - Columbia Gas Transmission
  - Comcast
  - Howard County Fiber Optic
  - Private Well and Septic Records
  - Verizon
- BGE-Electric Conceptual Relocation Design

R. Design Exceptions (to be added by Addendum)

S. Wetland Creation and Stream Restoration Permitting Guidance

- USACE Regulatory Sourcebook
- USACE Regulatory Guidance Letter
- MDE Phase II Mitigation Plan Checklist
- MDE Performance Standards and Monitoring Protocol for Permittee-Responsible Nontidal Wetland Mitigation Sites
- MDE Nontidal Wetland Mitigation Guidance

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T. Developer Plans

U. Community Concerns

In general, the Microstation files included on the ProjectWise are in conformance with the MDSHA Microstation V8 CAD Standards Manual.

It is likely that most Proposers will use plot drivers that differ from the drivers used to produce the provided plans. Some of the drawings screen existing features through level symbology color 250. The manipulation of the drawing files to produce any requirements (as found elsewhere in the RFP) for as-built plans will be the responsibility of the selected Design-Builder.

Proposers are also provided with a file index provided on ProjectWise. The file is a Word Document describing all the files and file names as outlined above.

1.1.4 Description of Work

The Design-Builder is required to perform all work to deliver the improvements it proposes in its Technical Proposal unless specifically noted in the RFP to be performed by others. The required engineering and construction services to be provided by the Design-Builder will include, but not be limited to:

- Roadway Design and Construction.
- Structural Design and Construction for All Culverts, Walls, and any and all other incidental structures specifically required for this project.
- Hydraulic Analysis, Design, Construction and Agency Approval for structures specifically required for this project.
- Temporary and Permanent Signing, Lighting, Signalization, Pavement Marking, and ITS Design and Construction.
- Roadside Landscape Planting, Stormwater Management Landscape Planting, Reforestation Design and Construction of the aforementioned, and Reforestation Permit Modification Approvals.
- Waterways and Wetland Permitting, As-built Certification and Design, Permitting and Construction of Mitigation.
- Utility Coordination for utility modifications regardless of whether designed and/or constructed by the Design-Builder or by others.
- Pavement and Geotechnical Engineering.
- Storm Water Management (SWM) Design, Approvals, Construction and As-Built Certification.
- Erosion and Sediment Control (E&S) Design, Implementation and Approvals (including NPDES Approvals).
- Engineering Studies and Reports required to meet the contract or permit requirements or to address any comments from the Administration or other agencies related to meeting or modifying the contract or permit requirements.
- General Coordination with Administration.
- Additional Data Collection (includes surveying, geotechnical, etc.).
- Produce Required Deliverables.
- Environmental Permit Activities (including obtaining permits as described herein).
- Community Relations as defined in PR 16 – Public Outreach Performance Requirements.
- Traffic Control Design and Implementation including the preparation of a Transportation Management Plan (TMP).
- Maintenance of project site(s) including pavement maintenance, mowing, watering, and dust control.

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- Obtaining all plan approvals and required permits and permit modifications from the appropriate regulatory agencies for any additional impacts to wetlands or waterways, roadside trees, stormwater management, erosion and sediment control, or any other impacts not authorized by the proposed permits and approvals.

- Implementation of any required mitigation or remediation for additional impacts not included in the permit or due to any non-compliance with the permit conditions.

- Any other items required to successfully complete the project.

2.0 PROPOSAL SUBMISSION REQUIREMENTS

2.1 Responsibilities of the Proposers

2.1.1 Review of RFP

Before submitting a proposal, the Prospective Proposer is responsible for examining the RFP and materials furnished to each Prospective Proposer. The Prospective Proposer is responsible for all site investigation and preliminary design necessary to submit proposals and accept responsibility that their Technical Proposal and Price Proposal is sufficient to complete all design and construction.

2.1.2 Site Investigation

The Administration is acquiring the Right of Way necessary to construct this project. All necessary Right of Way may not be acquired prior to Notice to Proceed. **As of the issuance of this RFP, the Administration has not advanced sufficiently in this process to permit Design-Builder's to inspect all of the project site. The Design-Builder is permitted to inspect the portions of the of the project site within the Administration's Existing Right-of-Way.** The Design-Builders invited to submit a Technical Proposal and Price Proposal must first examine all of the project site that is under Administration control. Examination of all other areas must be arranged with the owner.

The Prospective Proposer is solely responsible for all site conditions discoverable from a reasonable site examination. A reasonable site examination includes all utility and/or geotechnical investigation that the Prospective Proposer determines is necessary to properly price the Work. If the Prospective Proposer determines, before submission of the proposals, that additional utility designation, geotechnical and/or subsurface investigation or analysis are necessary to properly price the Work; it is the responsibility of the Prospective Proposer to perform such investigation and analysis at its expense. The Administration has performed a preliminary utility designation and geotechnical survey of the project site. The boring logs and test results have been included in the project files. The utility information is included in the data provided on ProjectWise. It is the Proposer's responsibility to verify that information as part of its utility and/or geotechnical investigation. The Price Proposal submission will be considered conclusive evidence that the Prospective Design-Build Team has determined that it has performed a reasonable site investigation to submit Price Proposal, necessary to design and construct the project.

All subsurface investigations performed by the Prospective Proposer, including sampling and laboratory testing, shall be performed by a Geotechnical firm experienced in subsurface investigations and in accordance with the 1988 AASHTO Manual on Subsurface Investigations, AASHTO Standards, the Maryland State Highway Administration Standard Specifications for Subsurface Explorations, MSMT Standards, the Maryland State Highway Administration Book of Standards for Highway and Incidental Structures, and ASTM Standards. The Prospective Proposer shall be responsible for utility clearance and any traffic control required for his investigation. The Prospective Proposer shall submit all Maintenance of Traffic concepts related to site

investigation to the SHA District 7 Traffic Division for approval. Any investigative methods that pose a safety threat to the traveling public shall not be used. Any borings taken in roadway or shoulder areas shall be backfilled before the area is re-opened to traffic. The Prospective Proposer shall restore to its current condition, any area of the site disturbed by his site investigation operations. If the Prospective Proposer encounters any abnormal conditions that indicate the presence of hazardous materials or toxic waste during his site investigation, he shall immediately suspend work in the area and notify the Administration. A Geotechnical Engineer who is registered in the State of Maryland shall supervise all subsurface investigations conducted by the Design-Builder.

2.1.3 Utility Coordination

Prior to submitting a Technical Proposal and Price Proposal, the Prospective Proposer must conduct utility research and coordination with all utility companies along with additional site research to determine:

a. What utility relocation work is planned, what is the status and anticipated schedule impact of this work.
b. What utility facilities actually exist within the project limits.
c. What additional utility relocation work must be included in their design and impact to the schedule that will result from the Design-Builder's activities.
d. What permitting modifications result from additional utility relocations.

The Technical Proposal and Price Proposal must represent a thorough consideration of these elements.

2.1.4 Additional Surveys

The Prospective Proposer may require additional survey or topographic information (including utility locations). The Design-Builder must account for these services within their project schedule and design submittals. It is the responsibility of the Prospective Proposer at its expense to obtain all additional information and the Administration accepts no responsibility for the lack of this information.

2.1.5 Duty to Notify if Errors Discovered

Proposers shall not take advantage of any error, omission, or discrepancy in the RFP or related materials, including all project information. If a Proposer discovers such an error, omission or discrepancy, he shall immediately notify the Administration in writing; failure to notify shall constitute a waiver of any claim based upon such error, omission, or discrepancy. After such notification, the Administration will confirm or modify the RFP in writing as the Administration determines may be necessary to fulfill the intent of the RFP.

2.2 Pre-Submittal Requirements

2.2.1 One-on-One Meetings

The Administration will hold one-on-one meetings with the Reduced Candidate List (RCL). The purpose of these meetings will be to discuss issues and clarifications regarding the RFP and/or the Proposer's potential Alternative Technical Concept (ATC) submittals. The Administration reserves the right to disclose to all Proposers any issues raised during the one-on-one meetings, except to the extent the Administration determines that, in its sole discretion, such disclosure would impair the confidentiality of an ATC or would reveal a Proposer's confidential business strategies. Each meeting will be held independently with each Prospective Proposer on the RCL.

The one-on-one meetings are subject to the following:

a. The meetings are intended to provide Proposers with a better understanding of the RFP.

b. The Administration will not discuss any Proposal or ATC with any Proposer other than its own.

c. Proposers are not permitted to seek to obtain commitments from the Administration in the meetings or otherwise seek to obtain an unfair competitive advantage over any other Proposer.

d. No aspect of these meetings is intended to provide any Proposer with access to information that is not similarly available to other Proposers, and no part of the evaluation of Proposals will be based on the conduct or discussions that occur during these meetings.

The Administration reserves the right to disclose to all Proposers any issues raised during the one-on-one meetings which require addenda to the RFP. The Administration, however, will not disclose any information pertaining to an individual Proposer's Proposal, ATCs, or other technical concepts to other Proposers.

2.2.2 Letter of Interest

A Letter of Interest (LOI), on official letterhead of the Design-Build Team, notifying the Administration whether or not the DB Team intends to submit a Technical Proposal and Price Proposal must be delivered no later than **September 13, 2018 prior to 12 noon (EST)**. The LOI must be delivered to the following email address:

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HO7565370_MD_32@sha.state.md.us

The LOI must be signed by individual(s) authorized to represent the Major Participant firm(s) and the lead Constructor firm(s). A Major Participant is defined as the legal entity, firm or company, individually or as a party in a joint venture or limited liability company or some other legal entity, that will be signatory to the Design–Build Contract with the Administration. Major Participant(s) will be expected to accept joint and several liability for performance of the Design–Build Contract. Major Participants are not design sub-consultants, construction subcontractors or any other subcontractors to the legal entity that signs the Design–Build Contract.

If the Design–Build contracting entity will be a joint venture, or some other entity involving multiple firms, all Major Participant firms involved must have an authorized representative sign the LOI.

2.2.3 Communications During Proposal Preparation

The Procurement Officer is the Administration's single contact and source of information for this procurement.

The following rules of contact will apply during the Contract procurement process, which begins upon the date of issuance of the RFP, and will be completed with the execution of the Contract. These rules are designed to promote a fair, unbiased, and legally defensible procurement process. Contact includes face-to-face, telephone, facsimile, electronic-mail (e-mail), or formal written communication.

The specific rules of contact are as follows:

1. Section 11-205 of the State Finance and Procurement Article, Annotated Code of Maryland, prohibits and penalizes collusion in the State procurement process.

2. Unless otherwise specifically authorized by the Procurement Officer, a Proposer may contact the Department and the Administration only through the Procurement Officer and only in letter format via e-mail and not orally. The Proposer's contacts with the Department and the Administration shall be only through a single representative authorized to bind the Proposer.

3. The Procurement Officer normally will contact a Proposer in writing through the Proposer's designated representative.

4. Neither a Proposer nor its agents may contact Department or Administration employees, including Department or Administration heads, members of the evaluation committee(s) and any other person who will evaluate proposals, regarding the project, except through the process identified above.

5. Any contact by a Proposer determined to be improper may result in disqualification of the Proposer.

6. The Administration will not be responsible for or bound by: (1) any oral communication, or (2) any other information or contact that occurs outside the official communication process specified herein, unless confirmed in writing by the Procurement Officer.

All requests for additional information or clarification of the RFP and any other communication concerning this project shall be submitted via e-mailed with return

confirmation receipt. No verbal requests or personal visits will be honored. All written contacts shall be addressed to the Procurement Officer:

Eric E. Marabello, P.E.
Director, Office of Highway Development
MDOT State Highway Administration
e-mail address: HO7565370_MD_32@sha.state.md.us

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During the Technical Proposal and Price Proposal Phase, as discussed in GP 2.09, Prospective Proposers on the RCL may make inquiries up to 4:00 p.m. (EST) on **September 6, 2018**. Inquiries received after that date and time will not be accepted. All responses to questions related to the Technical Proposal and Price Proposal Phase and any addenda to the RFP will be disseminated by email to the primary contact for those firms invited to submit Technical Proposals and Price Proposals.

2.2.4 Addenda

Interpretations, clarifications or modifications to this RFP will be made by Addenda. Only interpretations, clarifications and answers to the questions included in Addenda or such writings shall be binding on the Administration.

2.2.5 Request for Information (RFI)

Responses to all RFI's not part of an addendum, will be provided through email and shall be considered contractually binding. The Administration will provide a comprehensive list of questions and answers to the Reduced Candidate List 7 days prior to the Technical Proposal and Price Proposal due date.

2.2.6 Substitutions

Proposers are advised that, in order for a Proposer to remain qualified to submit a Technical Proposal and Price Proposal after it has been placed on the Reduced Candidate List, its organization, including all firms identified in its Technical Proposal, and Key Staff identified in the Statement of Qualifications, must remain intact for the duration of the procurement process. A Proposer may propose substitutions for participants after the Statement of Qualifications submittal; however, such changes will require written approval by the Administration, which approval may be granted or withheld in the Administration's sole discretion. Requests for changes must be made in writing no later than thirty (30) calendar days prior to the due date for submittal of Technical Proposals and Price Proposals.

2.2.7 Compliance with Applicable Law

In connection with this RFP and the Contract, Proposers shall comply with all applicable laws in all aspects in connection with the procurement process of this project and in the performance of the Contract.

2.2.8 Alternative Technical Concept Submittal and Review

ITP Section 2.2.8 through 2.2.13 set the process for the submittal and review of Alternative Technical Concepts (ATC) that conflict with the requirements for design and construction of the project, or otherwise require a modification to the technical requirements of the project. The process is intended to:

- Allow Proposers to incorporate innovation and creativity into the Proposals.
- Allow the Administration to consider Proposer ATCs in making the selection decision.
- Avoid delays and potential conflicts in the design associated with deferring of reviews of ATCs to the post-award period.
- Obtain the best-value for the public.

ATCs eligible for consideration hereunder are limited to those deviations to the requirements of the as-issued Contract Documents that result in performance and quality of the end product that are equal to or better than the performance and quality of the end product absent the deviation, as determined by the Administration at its sole discretion. **Equal to or better ATCs that include the application of practical design alternatives that will advance the project goals without compromising the performance, quality, and safety of the end product are encouraged.**

A concept is not eligible for considerations as an ATC if, in the Administration's sole discretion, it is premised upon or it would require:

- A reduction in project scope, performance, or reliability.
- The addition of a separate Administration project to the Contract (such as expansion of the scope of the project to include additional roadways).
- An increase in the amount of time required for Substantial Completion or Contract Time.

Any ATC that, if implemented, would require further environmental evaluation or permit modifications for the project, may be allowed, provided that the Proposer bears the schedule and cost risk associated with such additional environmental reevaluation or permit modifications. If the Proposer is not able to obtain the approvals necessary to implement the ATC, the Proposer is obligated to develop the project in accordance with existing approvals and without additional cost or extension of time.

If a Proposer is unsure whether a concept is consistent with the requirements of the RFP or if the concept would be considered an ATC by the Administration, the Administration recommends that the Proposer submit such concept for review as an ATC. The Proposer is also encouraged to submit standards or specifications that are approved for usage by other state Departments of Transportation as ATCs. If a concept is submitted as part of the Technical Proposal that the Administration considers to be an ATC, and the Proposer has not received ATC approval prior to submission of the Technical Proposal and Price Proposal, the Proposer will be required to revert back to the RFP requirements if selected.

The Proposer may submit an ATC for review by the Administration on or before **June 28, 2018 at 4:00 p.m.** (prevailing local time). Inquiries received after that date and time will not be accepted.

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An additional ATC period is being provided by the Administration. This period will begin on **July 23, 2018 at 8:00 a.m.** (prevailing local time), and end on **August 15, 2018 at 4:00 p.m.** (prevailing local time). Inquiries received after that date and time will not be accepted. During this additional ATC period the Proposer may submit new ATCs or previously submitted ATCs. This includes any ATC that was previously determined to be not accepted (including those which were re-submitted and response received), not accepted in its present form (including those which were re-submitted and response received), conditionally accepted (including those which were re-submitted and response received), or an ATC that alters a previously accepted ATC. Any ATC submitted during this time period should be submitted under new ATC number.

The Administration will hold mandatory ATC one-on-one meetings with the Reduced Candidate List (RCL) between July 31, 2018 and August 3, 2018. The purpose of these meetings will be to discuss issues and clarifications regarding the RFP, discuss issues and clarifications regarding the Administration's determination response on any previously submitted ATC and/or discuss the Proposer's potential Alternative Technical Concept (ATC) submittals for the additional ATC submittal period noted above. The Administration reserves the right to disclose to all Proposers any issues raised during the one-on-one meetings, except to the extent the Administration determines that, in its sole discretion, such disclosure would impair the confidentiality of an ATC or would reveal a Proposer's confidential business strategies. Each meeting will be held independently with each Prospective Proposer on the RCL. The one-on-one meetings are subject to the following:

A. The meetings are intended to provide Proposers with a better understanding of the RFP and previous Administration ATC determinations.
B. The Administration will not discuss any Proposal or ATC with any Proposer other than its own.
C. Proposers are not permitted to seek to obtain commitments from the Administration in the meetings or otherwise seek to obtain an unfair competitive advantage over any other Proposer.
D. No aspect of these meetings is intended to provide any Proposer with access to information that is not similarly available to other Proposers, and no part of the evaluation of Proposals will be based on the conduct or discussions that occur during these meetings.
E. The Administration will not discuss as part of this meeting any ATC submittal or resubmittal that is under review by the Administration at the time of the meeting.

All ATCs shall be submitted in writing via email only to HO7565370_MD_32@sha.state.md.us, with a cover letter clearly identifying the submittal as a request for review of an ATC. If the Proposer does not clearly designate its submittal as an ATC, the submission will not be treated as an ATC by the Administration

The Administration will review each ATC submitted. If an ATC is summarily accepted or not accepted, the Administration's comments will inform the Proposer that its technical concept appears to be generally acceptable, or the Administration will identify areas in which the approach appears to be incompatible with the project goals and requirements. If the Administration needs more information to determine whether or not the ATC will be accepted or not accepted, the Administration will submit written questions to the Proposer and/or request a one-on-one meeting in order to better understand the details of the ATC. The Administration may conditionally accept an ATC based on required revisions to a portion or portions of the ATC.

If an ATC is not accepted or conditionally accepted and the Proposer feels that the non-acceptance or the conditions for acceptance were due to an incorrect conclusion on the part of the Administration, it may re-submit the ATC for one additional review via email only to HO7565370_MD_32@sha.state.md.us. If a re-submittal is made, it shall be accompanied by a cover letter clearly identifying such submission as an ATC submitted for an additional review. Resubmission of an ATC will not entitle the Proposer to an extension of the Proposal due date.

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The Proposer shall advise the Administration in its ATC if it believes a one-on-one meeting is appropriate. This meeting is solely for the Administration to obtain additional information to determine whether or not the ATC will be accepted or not accepted and is at the sole discretion of the Administration.

The Administration will return its acceptance, non-acceptance, conditional acceptance, or additional questions pertaining to any specific ATC no later than two weeks after receipt of that ATC. If the Proposer does not receive a return response from the Administration within two weeks of the Administration's receipt of the ATC, the Proposer shall presume that the Administration has rejected the ATC. The non-acceptance of an ATC will not entitle the Proposer to an extension of the Proposal due date.

2.2.9 Content of ATC Submittal

Each ATC submittal shall include a sequential ATC number and shall include the following:

A) Description: Detailed descriptive information and other appropriate information as appropriate such as conceptual drawings, production details, standards, specifications, and a traffic operations analysis.

B) Location: The locations where, and an explanation of how, the ATC will be used on the Project.

C) Maintenance: Any change in routine maintenance requirements associated with the ATC, including ease of maintenance.

D) Design Life: Any change in the anticipated design life of the item(s) comprising the ATC.

E) Time Savings: Any reduction in the time period necessary to design and construct the Project resulting from implementing the ATC, including, as appropriate, a description of method and commitments.

F) RFP References: References to requirements of the RFP that are inconsistent with the proposed ATC, an explanation of the nature of the deviations from said requirements, and a request for approval of such deviations. Any requested deviation from the requirements from the RFP related to the ATC must be listed in this section.

G) Analysis: The analysis justifying the use of the ATC and why the deviation, if any, from the requirements of the RFP should be allowed.

H) Potential Impacts: A preliminary analysis of potential impacts (both during and after construction) including but not limited to user impacts, Right-of-Way, geotechnical, utilities, environmental permitting, local community, safety, and life-cycle project and infrastructure costs, including impacts on the cost of repair, maintenance, and operation.

I) Other projects: A description of other projects on which the ATC has been used, the degree of success or failure of such usage, and the names and contact information (including telephone numbers and e-mail addresses) of project owner representatives who can confirm such statements.

J) Added Administration Risk: A description of added risk to the Administration or third parties associated with implementing the ATC.

K) Added Design-Builder Risk: A description of added risk to the Design-Builder associated with implementing the ATC.

L) Additional Costs: An estimate of any additional Administration, Proposer, or third-party cost associated with implementation of the ATC.

M) Price Proposal Adjustment: An estimate of the Price Proposal adjustment should the ATC be approved and implemented.

N) Equal or Better: An analysis of how the ATC is equal or better in quality and performance than the requirements of the Contract Documents and how it would advance the project goals, as applicable.

O) Miscellaneous: Any additional information that would assist the Administration in the review of this ATC.

2.2.10 Determination By The Administration

The Administration will make one of the following determinations with respect to each properly submitted ATC:

A) The ATC is accepted for inclusion in the Proposal.

B) The ATC is not accepted for inclusion in the Proposal.

C) The ATC is conditionally accepted in its present form and may be included in the Proposal upon satisfaction, in the Administration's sole discretion, of identified conditions, clarifications, or modifications.

D) The ATC is not accepted in its present form, but may be accepted upon satisfaction, in the Administration's sole discretion, of certain identified conditions (such as additional information and/or a one-on-one meeting) which must be met or clarifications or modifications that must be made through a submittal of a revised ATC.

E) The submittal does not qualify as an ATC but may be included in the Proposal because it appears to be within the requirements of the RFP.

F) The Administration requires additional time to further review the ATC, and expects to provide a response to the Design-Builder on (Date).

Acceptance of an ATC will constitute a change in the specific requirements of the Contract Documents associated with the accepted ATC and for that specific Proposer. The Design-Builder will assume all risk for implementation of an ATC. Should the Design-Builder be unable to obtain required approvals for any ATC incorporated into the Contract Documents, or if the concept otherwise proves to be infeasible, the Design-Builder will be required to conform to the original RFP requirements. Each Proposer, by submittal of its Proposal, acknowledges that the opportunity to submit ATCs was offered to all Proposers, and waives any right to object to the Administration's determinations regarding acceptability of ATCs.

2.2.11 Incorporation Into Proposal

Proposer may incorporate zero, one or more accepted ATCs into its Proposal including conditionally accepted ATCs. If the Administration responded to an ATC by identifying conditions to acceptance, those conditions become part of the Contract Documents. Copies of the ATC submittal and the Administration's ATC acceptance letters for each incorporated ATC shall be included in the Technical Proposal.

Except for incorporating accepted ATCs, the Technical Proposal and Price Proposal may not otherwise contain exceptions to or deviations from the requirements of the RFP Documents.

2.2.12 ATC Confidentiality

ATCs properly submitted by a Proposer and all subsequent communications regarding its ATCs will be considered confidential. If a Proposer wishes to make any announcement or disclosure to third parties concerning any ATC, it shall first notify the Administration in writing of its intent to take such action, including details as to date and participants, and obtain the Administration's prior approval to do so.

2.2.13 One-On-One Meetings

Prior to or after submission of ATCs, the Administration may conduct one-on-one meetings with a Proposer to gain information or a better understanding regarding its ATC and to discuss issues and clarifications regarding the ATC. The Administration reserves the right to disclose to all Proposers any issues raised during the one-on-one meetings. However, the Administration will not disclose any information pertaining to an individual

Proposer's ATCs or other technical concepts to other Proposers.

3.0 Proposal Requirements

3.1 Organization of Proposal Submittal

Prospective proposers shall organize submittal of their Technical Proposal and Price Proposal to match the organization specified in this RFP.

a. Separate Proposal Packages

Proposal submissions shall consist of two separate sealed packages, a Technical Proposal as described in ITP Section 4.0 and a Price Proposal as described in ITP Section 5.0.

b. Technical Proposal

The Technical Proposal may be submitted in container(s) of the Prospective Proposer's choice provided that the material is neat, orderly, and incapable of inadvertent disassembly. Technical Proposal shall be submitted and bound using a three (3) ring binder with all pages are numbered consecutively. Each container shall be clearly marked as follows:

Prospective Proposer's Name

Technical Proposal

MD 32 from South of Linden Church Road to I-70
Contract No. HO7565370

Container ___ of ___

c. Location and deadline for submittal of Technical Proposal Submittal

3

Technical Proposals must be delivered no later than **September 20, 2018 prior to 12 noon** (EST). The proposal must be delivered to the following location:

Mr. Eric Lomboy
Director, Office of Procurement and Contract Management
Fourth Floor, C-405
707 N. Calvert Street
Baltimore, Maryland 21202

d. Number of Copies

One original and eight (8) copies of the complete Technical Proposal shall be submitted along with one (1) electronic copy PDF file on CD or flash drive and copies of the Administration's ATC approval letters for each incorporated ATC.

e. Price Proposal

The Price Proposal shall be submitted on the Proposal Form supplied by the Administration and shall be delivered in a sealed envelope capable of holding 8½" x 11" documents without folding and clearly marked as follows:

Prospective Proposer's Name

Price Proposal

MD 32 from South of Linden Church Road to I-70
Contract No. HO7565370

Container ___ of ___

f. Proposal Guaranty

The Proposal Guaranty shall be delivered with the Price Proposal in a sealed business-sized envelope clearly marked as follows:

Prospective Proposer's Name

Proposal Guaranty

MD 32 from South of Linden Church Road to I-70
Contract No. HO7565370

g. Location and Deadline for submittal of Price Proposal Submittal

3

Price Proposals must be delivered no later than **September 20, 2018 prior to 12 noon** (EST). The proposal must be delivered to the following location:

Mr. Eric Lomboy
Office of Procurement and Contract Management
Fourth Floor, C-405
707 N. Calvert Street
Baltimore, Maryland 21202

h. Number of Copies

A single original of the Proposal Guaranty and a single original of the Price Proposal shall be submitted as specified in this section. The Lump Sum Cost Breakdown shall also be submitted as outlined in TC Section 7.10.

3.2 Effect of Submitting Proposal

Signing of the Design-Build Proposal Submission Form and Price Proposal Form, and delivery of the Proposal represents (a) an offer by the proposer to perform the Work for the Price submitted within the time(s) specified in accordance with all provisions of this

RFP and (b) the Prospective proposer's agreement to all the provisions of the RFP and Contract governing requirements and procedures applicable through execution of the Design – Build Contract. **The Technical Proposal will become part of the Design – Build Contract.**

By so signing the above referenced terms and by delivering the Proposals, the Prospective Proposer makes the following affirmative representations.

a. The Proposer has reviewed all documents and undertaken all investigations that could significantly impact the cost, timeliness, quality, or performance of the Work. Specifically, the Proposer has (a) carefully examined the RFP and all documents included or referenced therein, (b) carefully examined all available reports and data related to subsurface conditions, (c) become familiar with all applicable federal, state and local laws and regulations, (d) visited the site and made all reasonable visual investigations, and (e) correlated the information obtained from the above examinations and investigations.

b. The Proposer has given the Administration written notice of all errors, omissions, or discrepancies in the RFP in accordance with Section ITP 2.1.5.

c. The Proposer has determined that the RFP are generally sufficient to convey an understanding of all terms and conditions that could significantly impact the cost, timeliness, quality, or performance of the Work.

3.3 Withdrawals and Resubmittals of Proposals

A proposer may withdraw Proposals after delivery, provided the request for such withdrawal is made in writing or in person before the date and time set for submission of Proposals. The proposer may revise and resubmit a Proposal so withdrawn before said date and time.

3.4 No Public Opening

There will be no public opening of Proposals. After the Proposal Date, all Proposals will be opened in the presence of two or more Administration employees and reviewed for completeness. A register of Proposals will be prepared that identifies each Proposer.

Neither the identity of any Proposer nor the register of Proposals will be publicly disclosed until after the Procurement Officer makes a determination recommending award of the Contract.

4.0 Technical Proposal Requirements

General: The Technical Proposal submittal shall contain concise narrative descriptions and graphic illustrations, drawings, charts, plans and specifications that will enable the Administration to clearly understand and evaluate the capabilities of the Design - Build team and the characteristics and benefits of the proposed technical solutions.

Notwithstanding anything to the contrary elsewhere in the Contract Documents, the Administration shall have no responsibility in the event the Design-Builder's Technical Proposal fails to meet the requirements of the Contract Documents, regardless of whether: (a) the Administration modified the Contract Documents to permit the Design-Builder to implement an ATC; (b) the Administration accepted Design-Builder's Technical Proposal; or (c) any other action or interaction of the Administration is alleged by the Design-Builder.

No Price Information: No price information of any kind shall be included in the Technical Proposal submittal.

Proposal Organization: Organization of the Technical Proposal shall comprise five parts, meet the specified page limitation, and correspond to the outline as follows:

- Cover Letter
- Safety & Mobility
- Project Schedule & Project Management
- Well Managed Project
- Appendix

Format:

- Paper. The Technical Proposal submittal shall be submitted on 8.5"-by-11" paper printed back to back where practical. Charts, exhibits, and other illustrative and graphical information may be on 11"-by-17" paper, but must be folded to 8.5"-by-11", with the title block showing.

- Type Font and Margins. The type face of all narrative text shall be at least 12-pt, either Arial or Times New Roman font, and all page margins must be at least ½" from sides and 1" from top and bottom. All pages shall be sequentially numbered not including the cover letter.

- Page Limits. The Technical Proposal submittal shall be limited to the number of pages defined below. No page limit will be imposed on the appendices, although the size of the appendix should be kept within reason.

- Finding tools, such as tables of contents and page dividers shall be utilized to make the submittals easily usable.

4.1 Cover Letter (Limit 2 Pages)

The cover letter includes mandatory information requirements. The Cover Letter will not be part of the evaluations.

The cover letter must be addressed to:

Eric E. Marabello, P.E.
Director, Office of Highway Development
707 North Calvert Street
Baltimore, MD 21202

The submittal cover letter must be signed by individual(s) authorized to represent the Major Participant firm(s) and the Lead Construction firm(s). A Major Participant is defined as the legal entity, firm or company, individually or as a party in a joint venture or limited liability company or some other legal entity, that will be signatory to the Design–Build Contract with the Administration. Major Participant(s) will be expected to accept joint and several liability for performance of the Design–Build Contract. Major Participants are not design subconsultants, construction subcontractors or any other subcontractors to the legal entity that signs the Design–Build Contract.

If the Design–Build contracting entity will be a joint venture, or some other entity involving multiple firms, all Major Participant firms involved must have an authorized representative sign the cover letter.

The cover letter shall include the following:

a. Names, main role and license or certification information of all Major Participant firms and the Lead Construction and Design firms if not a Major Participant firm, and other firms that are now being committed to the design–build team. You must include at least your lead design firm and your lead constructor firm in the design–build team at this time.

b. The primary and secondary individual contacts for the Major Participant firm(s) with address, phone number, and E-mail address where all communications from the Administration should be directed for this RFP phase.

c. Include an affirmative declaration that indicates to the best knowledge and belief of each Major Participant Firm, including the lead design firm if not a Major Participant firm, the information supplied in the Technical Proposal is true and accurate.

d. Include a declaration that each Major Participant firm(s) and the Lead Design and Lead Construction firm, if not a Major Participant firm, are prepared to provide the necessary financial, material, equipment, labor and staff resources to perform the project.

e. Include a declaration by the Major Participants that signatories are affirming their intent to enter into a legal organization that shall constitute the Design-Build Team.

f. Include a certification that the Design-Build Team is in compliance with State Ethics Laws prohibiting work on a matter in which a former State employee participated significantly as a State Employee for the duration of this contract.

g. Include a general authorization for the Administration to confirm all information contained in the Technical Proposal submittal with third parties, and indicate limitations, if any, to such authorization.

h. Statement including the proposed legal structure of the Design –Build Contractor and Team.

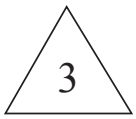
As an attachment to the cover letter and excluded from the page limitation for this section, provide documentation that the Lead Design firm has Professional Liability Insurance.

4.2 Safety and Mobility (Limit 18 Pages) - CRITICAL

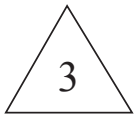
Goal 1: Provide a project that maximizes the project elements to improve corridor traffic operations and safety while being compatible with the future planned corridor improvements.

Value Statement: MDOT SHA desires for the project to provide efficient and safe flow of traffic along MD 32 and the nearby roadway network. MDOT SHA's objectives are:

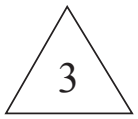
- to reduce network delay for both the AM and PM peak periods for the 2040 design year when compared to the no build condition,
- to ensure the signalized intersections, along with the basic, merge, diverge, and weaving sections, operate at a Level of Service E or better in the 2040 design year,
- to reduce the crash rate for rear-end collisions, reduce the crash rate between MD 144 and the I-70 interchange, and reduce the overall corridor-wide crash rate,
- and to be compatible to the maximum extent practical with the future planned corridor improvements.



A. Provide a narrative that describes your project and discuss how your project maximizes the number of continuous four-lane dualized roadway lane miles on MD 32 from the limits of the Phase I dualization (Linden Church Road) and extending north. This narrative desciption shall include the full replacement of the Triadelphia Road bridge over MD 32. Provide a discussion of the project emements you will provide within the limits of dualization, such as roadway typical sections, including number of lanes, lane widths, shoulder widths; intersection configurations and crossovers; access roads and access points; pavement sections; major drainage structures; bridge structures; noise barriers, and retaining walls, and how they will contribute to the project goals. Include discussion of any approved or conditionally approved ATCs that your Design-Build Team will incorporate. – CRITICAL



B. Within the limits of dualization, describe how the project will improve network traffic operations and reduce crashes. Include discussion of any qualitative and/or quantitative analyses. – SIGNIFICANT



C. Within the limits of dualization, identify any conditions in your project that do not meet the 10 AASHTO Controlling Criteria and describe how your project will mitigate for these conditions. – IMPORTANT

4.3 Project Schedule & Project Management (Limit 10 Pages) - SIGNIFICANT

Goal 2: Provide a project that minimizes inconvenience to the community and the traveling public.

Value Statement: The Administration desires a project that is completed in a timely and efficient manner while minimizing the disruptions to the community and the traveling public.

A. Provide your Design-Build Team's project schedule including the contractual completion date and the proposed design and construction packages. The contractual completion date the Design-Build Team is committing to must be provided and it shall match the date the Design-Build Team provides in its Price Proposal. – CRITICAL

B. Provide a discussion of your Design-Build Team's phasing and maintenance of traffic approach. Include any required detours or closures. – IMPORTANT

C. Provide a discussion of your Design-Build Team's phasing construction timeline for the Triadelphia Road bridge, including start and end dates for any detour activities and alternative measure traffic control measures that represent an improvement to the detour provided by the Administration. The start and end dates the Design-Build Team is committing to must be provided and shall be incorporated into the Initial Critical Path Method schedule. – SIGNIFICANT

4.4 Well Managed Project (Limit 8 Pages) – IMPORTANT

Goal 3: Provide a project that minimizes overall impacts and provides proactive coordination.

Value Statement: Minimization of impacts and proactive coordination will be required to ensure this project is successfully completed. The Design-Build Team must have a well thought out and well executed plan.

A. Provide a discussion of your Design-Build Team's approach to coordinating design and construction with potential utility relocations. Include any measures you will include through design and construction to avoid and minimize impacts to utilities. – CRITICAL

B. Provide a discussion of how your Design-Build Team will continue to avoid and minimize impacts to environmental resources such as wetlands, waters, forests, species, and historic and cultural resources. – IMPORTANT

C. Provide your Design-Build Team's plan for customer outreach during design and construction. Include the roles the Design-Builder will fulfill and the roles the Design-Build Team expects the Administration to fulfill. – IMPORTANT

4.5 Appendix

Copies of all addenda letter and responses to RFIs issued by the Administration shall be included in the Appendix. Copies of the Proposer's ATCs and the Administration's ATC approval letter for each incorporated ATC shall be included in the Appendix. The Proposer may also include supporting information related to its Technical Proposal in the Appendix. This information, however, **will not** factor into the evaluation ratings and is considered reference information by the Administration.

5.0 Price Proposal Contents

5.1 General

Price Proposals will be accepted only from those Proposers invited by the Administration in writing to submit a proposal.

Price Proposals shall be submitted on a lump sum basis, and shall include all design, detail, construction, labor, materials, and all incidentals necessary to complete the details and construction of this project.

Alternate bids utilizing foreign steel will not be allowed for this contract.

5.2 Stream Restoration Incentive

See PR 13.7.

5.4 Erosion Sediment Control Incentive/Liquidated Damages Payment

The Design-Build Team is advised that both an incentive and a liquidated damage will be imposed on this contract related to their erosion sediment control and will be tied to the Quality Assurance Ratings. See Special Provisions 308.01.04, Quality Assurance Ratings contained within this RFP for the contract requirements.

5.5 Price Proposal Irrevocable

The Contractor's prices are irrevocable for 120 days following receipt of the Price Proposal or Best and Final Offer.

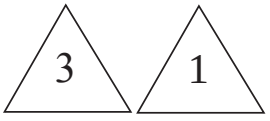
5.6 Proposal Guarantee

The Contractor's proposal guarantee shall represent 5% of the Price Proposal amount in accordance with the provisions of GP 2.07.

5.7 Liquidated Damages

In the event a complete usable facility is not provided by the calendar date, a liquidated damage will be charged in accordance with the provisions of GP 8.09. The dollar amount of liquidated damages is stated on page 42 of 44 in the Proposal Form of the Request for Proposals. The Administration will be the sole approving authority in determining when the project is considered a usable facility.

5.8 Contract Time



The Proposer shall establish the Contract Time for the project. The Contract Time shall be a calendar date and entered by the Proposer on page 42 of 44 in the Proposal Form of the Request for Proposals. This calendar date shall consider that the Notice to Proceed for the contract will be issued by the Administration on or before December 17, 2018 and consider all other contract requirements including concurrent utility relocations.

6.0 Proposal Evaluation and Selection

6.1 Best Value Process

The Technical Proposal will be evaluated on the pass/fail and technical evaluation factors identified in ITP Section 4.0. An evaluation committee (Committee) will determine the pass/fail status and overall technical rating of each Proposal. Once the overall technical rating is determined for each Technical Proposal, the Price Proposal results will be provided to the Committee. The Committee will then utilize the ratings for the Statement of Qualifications, the Technical Proposals, and the Price Proposals to perform a tradeoff analysis. The Evaluation Committee will prepare a recommendation to the Selection Official indicating which Proposal is the most advantageous to the State (i.e., represents the best value). The Selection Official, together with the Selection Committee, will then assess the Evaluation Committee's recommendation and make a final determination as to which Proposal is the most advantageous to the State considering the technical and price factors set forth in this document.

When determining which Proposer's submittal is the most advantageous to the State, the relative importance of the overall technical rating is substantially greater than the price.

6.2 Evaluation of Technical Proposals

The following elements of the Technical Proposal will be evaluated and rated on their content, accuracy and presentation.

- Safety & Mobility - CRITICAL
- Project Schedule & Project Management - SIGNIFICANT
- Well Managed Project – IMPORTANT

The relative importance of the technical evaluation factors and subfactors, when noted, will be weighted based on the following criteria:

- Critical – Factors or subfactors weighted as Critical are approximately three times the relative importance of Important.
- Significant – Factors or subfactors weighted as Significant are approximately two times the relative importance of Important.

While some factors and subfactors may have more relative importance than others, all of the Administration's goals are necessary for project success. Proposers are cautioned not to overemphasize an approach of certain goals at the expense of other goals.

6.2.1 Other

The pass/fail requirements include provision of all required forms included in the Proposal Package, properly completed and signed (if required).

6.2.2 Technical Proposal Evaluation Committee

The Administration will assemble Evaluation Teams and an Evaluation Committee consisting of key staff from appropriate offices within the Administration. The Evaluation Teams and Evaluation Committee will review the Technical Proposals to verify that all requirements of the RFP have been met, and to evaluate the proposals based on the evaluation factors.

6.2.3 Evaluation Process

Each Technical Proposal will be broken down into individual Evaluation Factor sections. Each Evaluation Team will only be given the section or sections for each specific Evaluation Factor or Factors they are rating and not the Technical Proposals in its entirety. Each Leader of the Evaluation Team will be part of the Evaluation Committee with other appropriate key staff within the Administration. This Evaluation Committee will review each Evaluation Factor and determine an overall Technical Rating for each Proposer.

6.2.4 Evaluation Results

The technical evaluation factors and the overall Technical Proposal will be rated by and adjectival (qualitative/descriptive) method. The following adjectival ratings shall be used in evaluation of each technical evaluation factor and the overall technical rating of the Proposal:

EXCEPTIONAL: The proposer has demonstrated a complete understanding of the subject matter and the Proposal advances the Project goals to an exceptional level. The Proposal communicates an outstanding commitment to quality by a highly skilled team in all aspects of the Work. The Proposal outlines a strong approach to mitigating project specific risks and inspires confidences that all contract requirements will be met or exceeded. The Proposal contains significant strengths

GOOD: The proposer has demonstrated a strong understanding of the subject matter and the proposal advances the Project goals to a high level. The Proposal communicates a commitment to quality by an experience team in all aspects of the Work. The Proposal defines an approach to mitigating project specific risks with little risk that the Proposer would fail to meet the requirements of the contract. The Proposal contains strengths that outweigh weaknesses.

ACCEPTABLE: The Proposer has demonstrated an adequate understaning of the subject matter and the Proposal meets the Project goals. The Proposal communicates a commitment to quality Work by a qualified team. Project specific risks have been identified and the Proposer has a reasonable probability of successfully completing the Work. The Proposal contains strengths that are offset by weaknesses.

UNACCEPTABLE: The Proposer has not demonstrated an understanding of the subject matter and the Proposal presents an approach which does not address the

goals of the Project. The Proposal fails to meet stated requirements and/or lacks essential information. The commitment to quality is not adequate, with Work performed by unqualified or unproven teams. Project specific risks are not addressed, and the Proposal generates little confidence that the Project requirements can be met. The Proposal contains deficiencies, significant weaknesses, and minor strengths, if any.

In assigning ratings the Administration may assign plus(+) or minus (-) suffix to further differentiate the strengths or limitations within the technical ratings of **EXCEPTIONAL**, **GOOD**, and **ACCEPTABLE** to more clearly differentiate the Proposals.

The term "weakness," as used herein, means any flaw in the proposal that increases the risk of unsuccessful contract performance. A significant weakness in the proposal is a flaw that appreciably increases the risk of unsuccessful contract performance. The term "deficiency" means a material failure of a proposal to meet an RFP requirement or a combination of significant weaknesses in a proposal that increases the risk of unsuccessful contract performance to an unacceptable level.

Any Proposal that receives a rating of **UNACCEPTABLE** in one or more technical evaluation factors will receive an overall Technical Proposal rating of **UNACCEPTABLE**.

The Technical Proposal will become part of the contract documents and all ideas provided to the Administration are expected to be included in the Price Proposals. The Administration or successful proposer may use ideas and approaches included in the Technical Proposal excluding proprietary or protected information.

6.3 Evaluation of Price Proposals

Price evaluations will be performed based on the Proposal Price as reflected in the Schedule of Prices, the Cost Breakdown as defined in TC Section 7.10, price accuracy, completeness and reasonableness.

Each Price Proposal shall specify the lump sum for which Work will be performed according to the RFP. The Design-Build Lump Sum for which the Work will be performed shall be fixed at $79,193,850.00. In addition, a lump sum breakdown will be required as part of the Price Proposal submittal as defined in TC 7.10. The lump sum breakdown shall be submitted in a format of the Design-Build Teams choice.

The Administration reserves the right to reject any Proposal if it determines that the Price Proposal is unacceptable, including a determination that the Proposal is significantly unbalanced or front end loaded to the potential detriment of the Administration.

An unbalanced Proposal is considered to be one (a) which is front-loaded or (b) for which the line item amounts or amounts shown in the Cost Breakdown do not reflect reasonable actual costs plus a reasonable proportionate share of the Proposer's anticipated profit, overhead costs, and other indirect costs which are anticipated for the performance of the items in question.

A Price Proposal shall be deemed unacceptable if the Administration determines, in its

sole discretion that it fails to conform to the conditions of the RFP in any manner. A Price Proposal may be unacceptable if it:

A) Supplies a Design-Build Lump Sum Price that does not match the price stipulated above.

B) Is significantly unbalanced relative to the scope of Work,

C) Does not provide all information in conformance with the RFP, and/or

D) Contains inaccurate, incomplete, and/or unreasonable prices on the Cost Breakdown.

6.4 Communications

The Administration may engage in communications with the Proposers after receipt of Proposals, allowing Proposers to provide clarifications to their Proposals or otherwise to address issues that might prevent the Proposal from being placed in the Competitive Range. This process will be initiated by delivery of a written request from the Administration to the Proposer identifying the information needed and a date and time by which the information must be provided. The Proposer shall provide the requested information in writing by the date and time indicated. If the requested information is not timely received, the Proposer's ratings may be adversely affected and/or Proposal may be declared unacceptable.

The Administration may waive technical irregularities in the proposal of the Proposer that does not alter the quality or quantity of the information provided.

6.5 Competitive Range

The term "Competitive Range" means a list of the most highly rated Proposals, based on initial Technical Proposal ratings and evaluations of Price Proposals that are judged by the Procurement Officer to be reasonably susceptible of being selected for award. The Competitive Range is based on the rating of each Technical Proposal and evaluation of each Price Proposal against all evaluation criteria.

Proposals that would not be included in the Competitive Range and would be excluded from further consideration include:

A) Any Proposal that, even after review of supplemental information or clarification provided by the Proposer in response to an Administration request does not pass the pass/fail evaluation factors;

B) A Proposal that, after the initial evaluation, is rated lower than "ACCEPTABLE-" for any technical evaluation factor; and/or

C) Any Proposal that includes a Price Proposal that is considered Unacceptable.

The Administration will determine the Competitive Range after a careful analysis of the Technical and Price Proposals.

6.6 Discussions

The Administration reserves the right to make an award without Discussions. However, the Administration may, at its sole discretion, conduct Discussions (that is written or oral exchanges) with the Proposers in the Competitive Range, with the intent of allowing the Proposers to revise their Proposals.

6.6.1 Purpose

If the Administration decides to engage in Discussions, the areas of Discussions may include the following:

A) Advising the Proposers of weaknesses, significant weaknesses, and/or deficiencies in their Proposals (relative to the RFP);

B) Attempting to resolve any uncertainties and obtaining any significant additional understanding concerning the Proposal;

C) Resolving any suspected mistakes by calling them to the attention of the Proposers as specifically as possible without disclosing information concerning other competing Proposals or the evaluation process;

D) Providing the Proposers a reasonable opportunity to submit any further technical or other supplemental information to their Proposals;

E) Facilitating execution of a contract that is most advantageous to the State, taking into consideration the technical and price factors discussed above.

6.6.2 Procedures

The following specific procedures will apply to Discussions:

A) Discussions will only be conducted with Proposers in the Competitive Range. If Discussions are held, they will be held with all Proposers in the Competitive Range;

B) Information disclosed by Proposers in the Competitive Range during Discussions will not be made public until after execution of the Contract;

C) Discussions may be written and/or oral, and more than one round of Discussions may be conducted; and

D) No disclosure will be made of any information derived from a Proposal of, or from discussions with, another Proposer.

6.6.3 Prohibited Contact

During Discussions, Administration personnel involved in the acquisition shall not engage in the following conduct:

A) Revealing a Proposer's technical solution, including unique technology, innovative and unique uses of commercial items, or any information that would compromise a Proposer's intellectual property to another Proposer;

B) Revealing a Proposer's price without that Proposer's permission. However, the Administration may inform a Proposer that its price is considered by the Administration to be unbalanced based upon the Scope of Work and may provide information regarding the analysis supporting that conclusion;

C) Revealing the names of individuals providing references information about a Proposer's past performance; or

D) Revealing selection information in violation of the Administration's procurement policies and the laws of the State.

6.7 Proposal Revisions

Although the Administration reserves the right to hold Discussions and request proposal revisions and Best and Final Offers (BAFO) when in the best interest of the State, the Administration is under no obligation to do so. The Administration may make its selection and award based on the initial Proposals as submitted.

At the conclusion of Discussions (if held), the Administration will request a proposal revision or BAFOs from all Proposers in the Competitive Range to provide Proposers an opportunity to revise their Proposals (both the Technical Proposal and Price Proposal), including correction of any weaknesses, minor irregularities, errors, and/or Deficiencies identified to the Proposers by the Administration following initial evaluation of the Proposals. The request for proposal revision or BAFOs will allow adequate time, as determined by the Administration, for the Proposers to revise their Proposals. Upon receipt of the proposal revisions or BAFOs, the process of evaluation will be repeated. The process will consider the revised information and re-evaluate and revise ratings as appropriate.

The Administration may require more than one series of proposal revision submissions followed by a request for a BAFO submission, but only if the Administration makes a written determination that it is in the State's best interest to conduct additional Discussions following receipt of proposal revisions or to change the Administration's requirements and require another BAFO submission.

6.8 Determination of Successful Proposer

In accordance with COMAR 21.05.03.03(F), award of the contract is to the responsible offeror whose proposal is determined to be the most advantageous to the State, considering the evaluation factors set forth in the Request for Proposals and the Price. The Administration has determined that the most advantageous to the State will be the Proposer with the best combination of SOQ Rating from Phase One, Technical Proposal rating from Phase Two, and Price evaluations, which the Administration determines will provide the most successful project. The Technical Proposal will be approximately three times the relative importance of the SOQ. Once the overall technical evaluations have been completed and the Price revealed to the Evaluation Committee, a fully integrated tradeoff analysis will be performed by the Evaluation Committee. A tradeoff analysis

can be as simple or complex as needed to differentiate which Proposer is the most advantageous to the State or provides the "Best Value." In performing this tradeoff analysis, the Evaluation Committee, chaired by the Procurement Officer, will consider the facts and circumstances of the procurement and utilize its technical judgment and discretion in considering strengths, weaknesses, and deficiencies of each proposal to determine a recommendation of most advantageous to the State. When determining which Proposer's submittal is the most advantageous to the State, the relative importance of the overall technical rating is substantially greater than the price. This recommendation will then be presented to the Selection Official who, along with the Selection Committee, will utilize their technical judgment and discretion to make a final determination of most advantageous to the State considering the technical and price factors and tradeoff analysis as set forth in the Request for Proposals. Award may be made to the offerer with a higher technical rating even if its Price Proposal is not the lowest. In the event that two overall technical ratings are the same (e.g. "GOOD" AND "GOOD"), price alone will not be used as the determining factor.

In order to be considered for award of the Contract, a Proposal must pass all the pass/fail factors, receive at least an "ACCEPTABLE" on all technical evaluation factors.

Any Proposal that receives a rating of "ACCEPTABLE-" or "UNACCEPTABLE" in one or more technical evaluation factors will not be considered for award of the Contract.

The Technical Proposal will become part of the contract documents and all concept ideas provided to the Administration are expected to be included in the Price Proposal, final plan, design and construction phases. The Administration or successful proposer may use ideas and approaches excluding proprietary or protected information.

NOTE: All materials, conferences, proposals, and other matters related to this project shall remain confidential until the contract is executed with the successful DB Team.

7.0 Contract Execution

7.1 Award and Execution of the Contract

All conditions of award and execution procedures will be in accordance with GP-Section 3 of the Specifications.

The Design-Builder will be given Notice to Proceed after Execution of the Contract has been completed. At this point, additional field investigation may continue and design work may proceed with payment to be made as outlined in TC Section 7.11.

The Administration understands that the successful Proposer will need to start design activities as soon as possible after notification of selection and prior to the issuance of the Notice to Proceed. The Administration understands this approach is an effort to maximize the available time for construction activities. The Administration also recognizes the benefits to the public by providing an opportunity to accelerate project activities and project completion. It is reasonable that these design activities should not place the Design-Builder at risk should the Administration not award the contract and issue a Notice to Proceed for events outside of the control of the Design-Builder.

The Administration will diligently process contract documents and procedures to Award and issue a Notice to Proceed within the shortest time frame possible. In the event that the Administration does not issue a Notice to Proceed to the selected Proposer for reasons beyond the control of the Proposer, the Administration will reimburse all actual documentable design costs incurred by the Design-Builder after notification of selection. To receive reimbursement, the Design-Builder must submit all related work product including, but not limited to, design calculations, plans, surveys, boring data, updated electronic files, personnel time sheets, and other materials to the Administration for its use.

Actual construction work may not begin until the additional requirements specified elsewhere in this RFP have been satisfied, including but not limited to receipt of permits, right-of-way acquisition, and pre-construction conference.

7.2 Scope Validation and Identification of Scope Issues

The purpose of the scope validation clause is to give the Design-Builder an opportunity to notify the Administration of issues that are discovered during the post-award review period that materially differ from what the Administration provided in the RFP Documents during the procurement process. If it is not reasonable for the Design-Builder to have discovered these issues prior to the Price Proposal Submission Date, and the issues materially impact the price or time to perform the work, then the Administration is willing to consider relief in accordance with GP Section 4: Scope of Work

The clause is not intended to serve as a vehicle for the Design-Builder to raise issues that would ordinarily arise during the final design iteration process. The RFP Documents on the Project are not represented to be complete. Consequently, Proposers are expected to

make a variety of assumptions as to what they view as necessary to finalize the design and provide the Administration with a firm contract price and schedule. The RFP Documents contain numerous general depictions of existing conditions which the Design-Builder is obliged to verify through field investigations and surveys before completing its final design of the Project and then integrating such design into its construction means and methods. It is the Proposer's responsibility to consider all of this during the proposal process in developing its price and schedule. The scope validation process does not envision that the final design development and related construction services (e.g., surveying, MOT transitions, etc.) would, on their own, create Scope Validation Items.

7.2.1 Scope Validation Period

The term "Scope Validation Period" is the period of time that begins on Design-Builder's receipt of the Administration's Notice to Proceed and extends for one hundred twenty (120) days from such date of receipt, unless otherwise stated. During the Scope Validation Period, Design-Builder shall thoroughly review and compare all of the then-existing Contract Documents, including without limitation the RFP Documents and the Proposal, to verify and validate Design-Builder's proposed design concept and identify any defects, errors, or inconsistencies in the RFP Documents that affect Design-Builder's ability to complete its proposed design concept within the Contract Price and/or Contract Time(s) (collectively referred to as "Scope Validation Items"). The term "Scope Validation Item" shall not be deemed to include items that Design-Builder should have reasonably discovered prior to the Price Proposal Submission Date.

7.2.3 Scope Validation Period for Non-Accessible Areas of the Site

The Parties recognize that Design-Builder may be unable to conduct some additional evaluations because it will not have access to certain areas of the Site within the Scope Validation Period set forth in Section 7.2.1 above. The Design-Builder shall notify the Administration at the pre-construction conference of all such non-accessible areas and the dates upon which such areas are expected to become accessible. If Administration agrees that such areas are non-accessible, then, for the limited purpose of determining Scope Validation Items that directly arise from evaluations of such areas, the term "Scope Validation Period" shall be deemed to be the thirty (30) day period after the date the specified area becomes accessible for purposes of conducting the evaluation.

7.2.4 Submission Requirements for Scope Issues

If Design-Builder intends to seek relief for a Scope Validation Item, it shall promptly, but in no event later than the expiration of the Scope Validation Period, provide the Administration in writing with a notice ("General Notice") of the existence of such Scope Validation Items, which General Notice shall generally explain the basis for such Scope Validation Items. The General Notice shall include all Scope Validation Items pursued by the Design Builder. Within twenty-one (21)

days of the General Notice of a Scope Validation Item, Design-Builder shall provide the Administration with documentation that specifically explains its support for the Scope Validation Item ("Supporting Documentation"), which Supporting Documentation shall include, among other things: (a) the assumptions that Design-Builder made during the preparation of its proposal that form the basis for its allegation, along with documentation verifying that it made such assumptions in developing its proposal; (b) an explanation of the defect, error or inconsistency in the RFP Documents that Design-Builder could not have reasonably identified prior to the Price Proposal Date: and (c) the specific impact that the Scope Validation Item has had on Design-Builder's price and time to perform the Work. For the avoidance of doubt: (1) Design-Builder shall not be entitled to raise in its Supporting Documentation any Scope Validation Items that were not previously addressed in a General Notice; and (2) Design-Builder shall have no right to seek any relief for any Scope Validation Items that have not been specifically identified in a General Notice provided to Administration during the Scope Validation Period.

7.2.5 Resolution of Scope Issues

Within 30 days after the Administration's receipt of the Supporting Documentation described in Section 7.2.4 above, the Parties shall meet and confer to discuss the resolution of such Scope Validation Items. If Administration agrees that Design-Builder has identified a valid Scope Validation Item that materially impacts Design-Builder's price or time to perform the Work, a Change Order shall be issued in accordance with GP Section 4: Scope of Work. If Administration disagrees that Design-Builder has identified a valid Scope Validation Item that materially impacts Design-Builder's price or time to perform the Work, then Design-Builder's recourse shall be as set forth in TC Section 4.05: Dispute Resolution. Notwithstanding anything to the contrary in the Contract Documents or as a matter of law, Design-Builder shall have the burden of proving that the alleged Scope Validation Item could not have been reasonably identified prior to the Price Proposal Submission Date and that such Scope Validation Item materially impacts its price or time to perform the Work.

7.2.6 Design-Builder's Assumption of Risk of Scope Validation Items

The Parties acknowledge that the purpose of the Scope Validation Period is to enable Design-Builder to identify Project Scope that could not reasonably be identified prior to the Price Proposal Submission Date. Design-Builder acknowledges that the Scope Validation Period is a reasonable time to enable Design-Builder to identify Scope Validation Items that will materially impact Design-Builder's price or time to perform the Work. After the expiration of the Scope Validation Period, with the sole exception of those Scope Validation Items made the subject of a General Notice during the Scope Validation Period and subject to valid requests for Work Orders in accordance with Section 7.2.5 above, the Parties agree as follows:

1. Design-Builder shall assume and accept all risks, costs, and responsibilities of any Scope Validation Item arising from or relating to the Contract Documents, including but not limited to conflicts within or between the RFP Documents and Proposal;

2. Design-Builder shall be deemed to have expressly warranted that the Contract Documents existing as of the end of the Scope Validation Period are sufficient to enable Design-Builder to complete the design and construction of the Project without any increase in the Contract Price or extension to the Contract Time(s); and

3. Administration expressly disclaims any responsibility for, and Design-Builder expressly waives its right to seek any increase in the Contract Price or extension to the Contract Time(s) for, any Scope Validation Item associated with any of the Contract Documents, including but not limited to the RFP Documents.

7.2.7 Waiver of Rights

The failure of Design-Builder to meet the submission requirements required under Section 7.2.4 above for a Scope Validation Item, including but not limited to the times for providing notice and documentation of the Scope Validation Item, shall conclusively constitute a waiver of Design-Builder's rights to seek relief for such Scope Validation Item.

7.2.8 Failure of Technical Proposal to Meet Requirements of the Contract Documents

Notwithstanding anything to the contrary in ITP 7.2 or elsewhere in the Contract Documents, the Administration shall have no responsibility in the event Design-Builder's Proposal fails to meet the requirements of the Contract Documents, regardless of whether: (a) Administration modified the RFP Documents to permit Design-Builder to implement a technical approach; (b) Administration accepted Design-Builder's Proposal; or (c) any other action or inaction of Administration is alleged by Design-Builder.

7.3 Stipend

The Administration understands that firms invited to submit Price Proposals on Design-Build projects may incur higher than normal Price Proposal preparation costs in their engineering effort to submit responsive Price Proposals for the project. Such efforts are likely to involve geotechnical investigations, development of horizontal and vertical geometry, development of concept design plans, cross sections, field surveys, stormwater management investigation, preliminary storm drain design, development of extensive design details to establish materials and quantities to prepare and submit a price.

4 A stipend in the amount of $256,000.00 will be paid to each Proposer meeting at least one of the following terms and conditions:

(a) The Proposer (including any BAFO) was in the Competitive Range and was not the most advantageous to the State or was not selected for award;

(b) The Proposer was selected for award, but the Contract was not executed or it was terminated by SHA for its convenience prior to issuance of a notice to proceed for events outside the control of the Design-Builder and the Design-Builder is not seeking reimbursement for design activities undertaken after notice of selection;

(c) The Proposer was not in the Competitive Range, but it submitted an Alternative Technical Concept (ATC) approved by the Administration and that the Administration wishes to utilize the ATC in the final design.

Those firms invited to submit Price Proposals will be required to sign a contract with the Administration for payment of the stipend in exchange for electronic copy and hard copy of all documents used to develop the Price Proposal. The firm submitting the Proposal considered the most advantageous to the State shall not be eligible to receive the stipend.

In payment for the services covered by this Agreement, the Design-Build Team agrees that all materials, electronic files, marked up drawings, cross sections, quantity lists and other material used in the development and submission of the Price Proposal will become the property of the Administration and may be used in any manner at their discretion without any additional compensation to the Design-Build Team.

Three completed, signed originals of the enclosed Agreement must be submitted to Eric E. Marabello, P.E., Director, Office of Highway Development, in the time frame outlined in the Stipend Agreement, Section 2.2(a).

One original invoice signed (in blue ink) and two copies along with supporting engineering materials noted above must be submitted to Eric E. Marabello, P.E., Director, Office of Highway Development, in the time frame outlined in the Stipend Agreement, Section 2.3.

As noted in the Stipend Agreement, Section 2.3, Invoices and supporting engineering work for stipend payment shall not be submitted until notification from SHA that the contract has been awarded or there has been a cancellation of the procurement. Invoices must be received within 30 days of said notification by MDOT SHA to be honored for payment. Invoices received prior to notification from SHA will not be processed for payment.

Invoices shall contain the following information:

Date -

Invoice # - created by the Design-Build Team

Bill To: Maryland State Highway Administration
707 N. Calvert Street
Baltimore, MD 21202

Federal Tax I.D. number

Remittance Address

FMIS # - HO756B53

Contract Description – MD 32 from South of Linden Church Road to I-70

Construction # - HO7565370

Payment Amount - $256,000.00

Description of Work: example: "payment for Design-Build team to perform preliminary design work to prepare a proposal for contract"

STIPEND AGREEMENT

Contract No. HO7565370
Project Description: MD 32 from South of Linden Church Road to I-70

THIS STIPEND AGREEMENT (the "Agreement") is made and entered into as of the ___ day of _____, 201_, by and between the STATE OF MARYLAND, acting by and through the Maryland Department of Transportation, State Highway Administration (the "SHA"), and _____ ("Proposer"), with reference to the following facts:

A. On _March 30, 2018, the SHA issued a Request for Proposals ("RFP") for design and construction of the MD 32 from South of Linden Church Road to I-70 Design-Build Project ("Project"), pursuant to procurement authority granted in State Finance and Procurement Article of the Annotated Code of Maryland and the Code of Maryland Regulations ("COMAR"), Title 21. The Project will be owned and operated by the State Highway Administration (SHA or Administration), which owns all non-tolled state highways and bridges in the State of Maryland ("State"). The Administration is responsible for administration of design and construction of the Project.

B. The RFP requires each Proposer to complete and deliver a Stipend Agreement to the SHA within the time frame noted below in 2.2 (a).

NOW, THEREFORE, Proposer hereby agrees as follows:

1. Work Product.

1.1 The SHA hereby retains Proposer to prepare and submit, in response to the RFP a price proposal that conforms in all material respects to the requirements of the RFP, as determined by the SHA, are timely received by the SHA, and satisfy the provisions set forth in the RFP.

1.2 All work performed by Proposer and its team members pursuant to this Agreement shall be considered work for hire, and the Work Product (as defined below) shall become the property of the SHA without restriction or limitation on its use. Neither Proposer nor any of its team members shall copyright any of the material developed under this Agreement.

1.3 Proposer agrees that all Work Product is, upon receipt by the SHA, the property of the SHA. The term "Work Product" shall mean all submittals made by Proposer during the RFP process, including the Proposal, exchanges of information during the pre-proposal and post-proposal period. However, the term "Work Product" shall specifically exclude patented rights in previously existing proprietary technology.

1.4 In consideration for the SHA's agreement to make payment hereunder, Proposer agrees that the SHA shall be entitled to use all Work Product, without any further compensation or consideration to the Proposer, in connection with the RFP, the Contract Documents, the Project and future procurements by the SHA. Notwithstanding the foregoing, SHA shall not be entitled to use information submitted by Proposer to the SHA in which the

SHA determines is exempt from disclosure under the Maryland Public Information Act ("PIA"), Title 10, Subtitle 6, Part III of the State Government Article of the Annotated Code of Maryland, unless the RFP otherwise provides.

1.5 The SHA acknowledges that the use of any of the Work Product by the SHA or the Design-Builder is at the sole risk and discretion of the SHA and the Design-Builder, and shall in no way be deemed to confer liability on the unsuccessful Proposer.

2. <u>Compensation And Payment.</u>

2.1 Compensation payable to Proposer for the Work Product described herein shall be $256,000.00 if any of the following conditions are met:

(a) The Proposer was in the competitive range and was not the most advantageous to the State or was not selected for award;

(b) The Proposer was selected for award, but the Contract was not executed or it was terminated by SHA for its convenience prior to issuance of a notice to proceed for events outside the control of the Design-Builder and the Design-Builder is not seeking reimbursement for design activities undertaken after notice of selection;

(c) The Proposer was not in the competitive range, but it submitted an Alternative Technical Concept (ATC) approved by the Administration and that the Administration wishes to utilize the ATC in the final design.

2.2 In its sole discretion, the SHA may pay compensation to Proposer, in an amount to be determined by the SHA, for the Work Product described herein under the following conditions:

(a) For any Proposer meeting the criteria identified in Section 2.1, above.

Any amount paid under this subparagraph (a) will not exceed $256,000.00 and will be subject to audit of the costs incurred by the Proposer in preparing its Technical Proposal and Price Proposal. Auditors shall have access to all books, records, documents and other evidence and accounting principles and practices sufficient to reflect properly all direct and indirect costs of whatever nature claimed to have been incurred. Failure of the Proposer or its team members to maintain and retain sufficient records to allow the auditors to verify all or a portion of the claim or to permit the auditors access to the books and records of Proposer and its team members shall constitute a waiver of the right to be paid a stipend and shall bar any recovery hereunder.

Any Proposer wishing to apply for a stipend under this subparagraph (a) shall submit the completed Agreement to the SHA concurrently with the price proposals being submitted. Eligibility of receipt of a stipend is dependent upon meeting the conditions set forth in Section 2.1. of this Agreement and TC Section 2.12 of the RFP.

(b) If the procurement is cancelled prior to the Proposal Due Date, Proposers will be provided the opportunity, at their option, of delivering to the SHA the Work Product of their Proposal preparations to date. There is no specific format required for such Work Product. Those Proposers that choose to deliver their Work Product may be paid an amount that the SHA deems to be appropriate consideration for the Work Product. No portion of the stipend amount will be paid in the event a Proposer chooses not to deliver its Work Product. Any amount paid under this subparagraph (b) will not exceed the amount identified in Section 2.1 and will be subject to the audit criteria in Section 2.2 (a).

2.3 Any payment of compensation owing hereunder will be made (i) within 30 days after receipt of a proper invoice submitted to the SHA under this Section 2.3 or (ii) if an award is made. Such invoice and supporting engineering work shall not be submitted until one business day after the earlier to occur of (a) notice by SHA that award of contract has occurred, or (b) cancellation of the procurement. **Invoices must be received within 30 days of said notification by SHA to be honored for payment.**

3. Indemnities.

3.1 Subject to the limitations contained in Section 3.2, Proposer shall indemnify, protect and hold harmless the SHA and its directors, officers, employees and contractors from, and Proposer shall defend at its own expense, all claims, costs, expenses, liabilities, demands, or suits at law or equity arising in whole or in part from the negligence or willful misconduct of Proposer or any of its agents, officers, employees, representatives or subcontractors or breach of any of Proposer's obligations under this Agreement.

3.2 This indemnity shall not apply with respect to any claims, demands or suits arising from use of the Work Product by the SHA or its contractors.

4. Compliance With Laws.

4.1 Proposer shall comply with all federal, state, and local laws, ordinances, rules, and regulations applicable to the work performed or paid for under this Agreement and covenants and agrees that it and its employees shall be bound by the standards of conduct provided in applicable laws, ordinances, rules, and regulations as they relate to work performed under this Agreement. Proposer agrees to incorporate the provisions of this paragraph in any subcontract into which it might enter with reference to the work performed pursuant to this Agreement.

4.2 The Proposer agrees (a) not to discriminate in any manner against an employee or applicant for employment because of race, color, religion, creed, age, sex, marital status, national origin, ancestry or disability of a qualified individual with a disability; (b) to include a provision similar to that contained in subsection (a) in any subcontract except a subcontract for standard commercial supplies or raw materials; and (c) to post and to cause subcontractors to post in conspicuous places available to employees and applicants for employment, notices setting forth the substance of this clause.

5. Assignment.

Proposer shall not assign this Agreement without the SHA's prior written consent. Any assignment of this Agreement without such consent shall be null and void.

6. Miscellaneous.

6.1 Proposer and the SHA agree that Proposer, its team members, and their respective employees are not agents of the SHA as a result of this Agreement.

6.2 All words used herein in the singular form shall extend to and include the plural. All words used in the plural form shall extend and include the singular. All words used in any gender shall extend to and include all genders.

6.3 This Agreement, together with the RFP, as amended from time to time, the provisions of which are incorporated herein by reference, embodies the entire agreement of the parties with respect to the subject matter hereof. There are no promises, terms, conditions, or obligations other than those contained herein or in the RFP, and this Agreement shall supersede all previous communications, representation, or agreements, either verbal or written, between the parties hereto.

6.4 It is understood and agreed by the parties hereto that if any part, term, or provision of this Agreement is by the courts held to be illegal or in conflict with any law of the State of Maryland, the validity of the remaining portions or provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the Agreement did not contain the particular part, term, or provisions to be invalid.

6.5 This instrument may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

6.6 This Agreement shall be governed by and construed in accordance with the laws of the State of Maryland.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

STATE OF MARYLAND by STATE HIGHWAY ADMINISTRATION

WITNESS/ATTEST:

_____

_____

Approved for Execution:

_____

Authorized Signature

Director, Office of Highway Development

Date:_____

Approved as to form and legal sufficiency:

_____

Assistant Attorney General

[Signature for Corporations/LLCs]

WITNESS/ATTEST:

_____

_____
Proposer Name

By_____(Seal)

Title:_____

_____
Printed Name

_____
Printed Name

_____
Federal ID # or Social Security #

MARYLAND DEPARTMENT OF TRANSPORTATION

STATE HIGHWAY ADMINISTRATION

CONTRACT NO. HO7565370

F.A.P. NO. AC-NHPP-118-1(69)N

Competitive Sealed Proposals Procurement Phase Two – Request for Proposals (RFP) Design-Build

Part II – Performance Requirements (PR)

MD 32 –LINDEN CHURCH ROAD TO I-70

Howard County

Disadvantaged / Minority Business Enterprises are encouraged to respond to this Solicitation Notice.

MDOT SHA will only be responsible for the completeness of documents, including all addenda, obtained directly from MDOT SHA.
Failure to complete and include the Addendum Receipt Verification Form may cause the proposal to be irregular.

VENDOR I.D. NUMBER

_____

MDOT SHA USE ONLY

PERFORMANCE REQUIREMENTS

TABLE OF CONTENTS

PR 1.0 DESIGN-BUILD - DESIGN AND CONSTRUCTION SCOPE OF SERVICE

This project includes, but is not limited to the following items of work, which the Design-Build Team shall perform and provide. This section sets forth provisions that are design and construction related; however, this section also impacts construction activities and other work.

Specific design and construction criteria are discussed separately following this section.

1.1 General Requirements

The Design-Build Team shall complete all design and construction work in two phases, Phase IV - Final Design and Phase V – Partnering during design and construction, Review Shop Drawings, Revisions, Redesign Under Construction, As-Built Plans and provisions for expert court testimony.

The Design-Build Team shall provide the services and perform tasks described in this Request for Proposals in compliance with the policies and procedures of the Administration and requirements set forth in "Volume II -Specifications for Consulting Engineers' Services," dated April 1986, Sections as follows:

A) Section V Highway Design - (Phase IV)

B) Section VI Structure Design - (Phase IV & V) Parts I through III

C) Section VII Surveys and Plats (Phase IV)

D) Section VIII Traffic Engineering (Phase IV)

E) Section IX Landscape Architecture

F) Section XI Critical Path Method

The Design-Build Team shall comply with all Federal, State and local laws, ordinances and regulations applicable to the activities and obligations associated with this project.

1.2 Design Personnel Identified in Proposal

The designer and design subcontractors shall utilize the key personnel identified in their Statement of Qualifications (SOQ) to manage the project and supervise engineers and technicians in completing the design in a timely manner to permit construction activities. **Changes in key staff identified in the SOQ must be approved in writing by the Administration, and replacement personnel must have equal or better qualifications than the key personnel identified in the proposal.** The format for replacement staff resumes must be in the same format as required for the SOQ including requirements thereof. The Administration shall be the sole judge as to whether replacement staff members are acceptable.

1.3 Qualified

The Design-Build Team shall have experienced personnel qualified in the development of plans,

specifications and estimates for the following: Highway Design; Hydrologic/Hydraulic Engineering (including stormwater management, erosion & sediment control); Structural Engineering; Geotechnical/Pavement Engineering; Arboriculture and Landscape Architecture including roadside planting, SWM planting and Reforestation; Wetland and Stream Mitigation and Restoration (including permitting); Traffic Engineering including signing, marking, lighting, signalization, and traffic control. The Design-Build Team shall be knowledgeable in coordinating utility designs, utility connections, working with other agencies and the public as outlined in Performance Requirements (PR) 9 and PR 16.

1.4 Design Constraints

The Design-Build Team shall construct the project within available right of way. This includes the final Project, as well as any and all work required to maintain drainage and traffic during construction (including detour roads) and any and all work required to control erosion and sediment laden water. The Design-Build Team may have to use features not shown on the Concept Plans to keep work in the right-of-way, including but not limited to mechanically stabilized embankment slopes, retaining walls, drainage pipes, etc.

1.5 Design Exceptions

Any elements of design that fall below the design standards listed in PR 2 will require a design exception or design waiver.

The Design-Build Team shall submit the design exception or waiver request to the Administration's Director, Office of Highway Development, and receive written approval before proceeding with the design. Requests for design exceptions or waivers that affect construction underway or complete shall not be a basis for approval of the exception.

- The request will explain and justify the use of the proposed design and include the following information (at a minimum):
- A description of existing conditions, including existing design values and design speeds.
- A description of AASHTO or other design standards that would normally be applied.
- A description of the actual design values proposed.
- A description of R/W impacts, environmental considerations or other factors that justify the exception.
- A 3-year crash history within the area an exception is being sought.
- A description of any potential mitigating features.

The Administration reserves the right to deny design exceptions or waivers that, in its judgment, are unsafe, otherwise contrary to normal practice, and/or inconsistent with the project or community goals.

1.6 Quality of Design and Construction

1.6.1 Design Quality Control Plan

The Design-Build Team shall develop a Design Quality Control Plan (DQCP). The DQCP must be a complete and clear plan to achieve a high quality design, including all related elements and lower tier subcontractors/Design-Build Teams. The DQCP shall present both the overall organization plan for design quality control and detailed plan elements to meet the CPM requirements for this project. The DQCP must include an organization structure and reporting requirements that demonstrate that quality control personnel have sufficient independence to allow them to be primarily concerned with quality, as opposed to the schedule and budget. As a minimum, the DQCP shall include calculations, plans, specifications, design coordination, construction coordination for material activity and document control.

The Design-Build Team must adhere to the approved DQCP throughout the duration of the project.

The DQCP must be available for review and discussion at the first partnering meeting.

1.6.2 Responsibility of Design-Build Team

The Design-Build Team's Lead Design Firm shall be fully responsible for performing a complete, coordinated, economical, timely, fully functional quality design, including survey and geotechnical elements, all in compliance with the RFP. The Design-Build Team shall follow the DQCP.

The Design-Build Team' Lead Design Firm shall include a complete check of all design and other calculations, plans and specifications in this plan. This check shall include both the overall concept and various element coordination check and the detail check of the calculations for each plan and specification. The design and the check shall be performed by experienced design professionals, licensed in the State of Maryland that have not participated in any of the design up to the checking process. These individuals may be employed either by the Designer or by another design firm other than the Lead Design Firm.

1.7 Calculation Certification

The Design-Build Team shall provide the following certifications concerning the calculations:

1.7.1 Designer

Within 30 days of the Notice of Award the corporate officer responsible for quality for the Design-Build Team and the Designer shall certify that the calculations, plans, specifications and other technical documents for which they are responsible shall be prepared in conformance with the DQCP.

1.7.2 Checker

Within 30 days of the Notice of Award, the corporate officer responsible for quality for the Design-Build Team and all organization(s) that will check the calculations shall certify, in writing, that the design check shall be performed in conformance with the DQCP.

1.7.3 Transmittals

On the transmittal for each submittal of calculations, plans, specification, shop drawings, as-builts and other technical documents, the Design-Build Team, Lead Design Firm (as appropriate) and the checker shall certify that the documents were prepared and checked in conformance with the DQCP.

1.7.4 Conclusion of Work

At the conclusion of the Work and with the transmittal of the Record Documents to the Administration, the corporate officer responsible for quality for the Design-Build Team, the Lead Design Firm, and all organizations that have checked the documents shall sign, seal, and certify in writing, that all calculations, plans, specifications and technical documents, for which they were responsible, were prepared in conformance with the DQCP.

1.7.5 Professional Seals

All calculations, plans, specifications and other technical documents transmitted to the Administration shall be signed and sealed by both of the Professional Engineers licensed in the State of Maryland who are responsible for the design and checking of that document. Landscape plans shall be prepared, signed, and sealed by a Landscape Architect licensed in the State of Maryland. Reforestation plans and application shall be signed and sealed by either a Maryland Licensed Landscape Architect, Licensed Forester, or a qualified professional that is certified by the MD DNR/Forest Service. The certifications at the start and conclusion of the Work, required in Section PR 1.30.03, shall also be sealed by a Professional Engineer licensed in the State of Maryland and signed by the corporate representative of the Design-Build Team, Lead Design Firm and checker(s).

1.7.6 Design Quality Management

The Design-Builder shall utilize the services of an Independent Design Quality Management (IDQM) Firm to review all design elements to ensure they are in compliance with the Contract requirements and the DQCP. The IDQM Firm will be responsible to sign and certify that all design submittals are in conformance with the Contract requirements prior to construction. This is in addition to the additional certifications and seals required of the Lead Design Firm. The IDQM Firm certifying compliance with the Contract requirements must hold similar Professional Licensure as required by PR 1.7.5.

1.8 Highway Engineering

The Design-Build Team shall prepare roadway, typical section, drainage, geometry, superelevation, profile, maintenance of traffic, erosion sediments control and special detail plans as part of the highway construction plans using the latest CADD Standards and as outlined in PR 3 – Roadway Performance Specification.

1.9 Pavement Engineering

The Design-Builder shall be responsible for all pavement engineering for all Roadway Elements for the Project as outlined in PR 4 – Pavement Performance Specification.

The Design-Builder will have the flexibility to make Project changes that produce benefits or savings to the Administration or for the Design-Builder without impairing the essential functions, characteristics, or quality of the Project, such as safety, traffic operations, ride, long term durability, desired appearance, maintainability, environmental protection, drainage, and other permitted constraints.

1.10 Structural Engineering

The Design-Build Team shall develop all structural calculations, details, reports and plans for all the culverts (those meeting MD SHA criteria for classification of a Small Structure), retaining walls, bridges, and any other incidental structure specifically design for this project as outlined in PR 5 – Structural Performance Specification. All plans developed shall meet the prescribed CADD Standards and drafting requirements outlined in the Office of Structures Policy and Procedure Memorandums.

1.11 Traffic Engineering

The Design-Build Team shall prepare signing, marking, lighting, signal, and Intelligent Traffic System plans using the latest CADD Standards available from the SHA Office of Traffic & Safety (OOTS) as outlined in PR 6 – Traffic Performance Specification.

All catalog cuts and working drawings pertaining to traffic items shall be reviewed and approved by the Design-Build Team. The primary review shall be undertaken by the Lead Design Firm with a secondary review undertaken by the IDQM Firm. Once reviewed and accepted by the Lead Design Firm and the IDQM Firm, they shall be stamped as accepted by each firm and submitted to the SHA. A final review will be undertaken by SHA. Comments or approval will be provided in no more than 7 calendar days, beginning the day after receipt of the submittal. Once reviewed and approved by SHA, the structural shop drawings shall be stamped as approved with the stamped plans being designated as the documented approval. No construction activities are permitted in conjunction with any structural shop drawings that have not been approved by SHA.

The Design-Build Team shall maintain all existing traffic control devices operations throughout the project limits. All traffic control device modifications to existing and/or temporary signals shall be reviewed and approved by the Office of Traffic & Safety Traffic Engineering Design Division.

1.12 Roadside Landscape Planting and Reforestation

The Design-Build Team shall prepare landscape and reforestation plans as outlined in PR 7 – Landscaping Performance Specification. Plans shall include schedules of all materials proposed for use.

1.13 Geotechnical Engineering

The Design-Build Team shall conduct supplemental subsurface explorations, analyses, design and construction for all geotechnical components of the Project in accordance with all applicable criteria and standards cited herein and in accordance with PR 8 – Geotechnical Performance Specification.

1.14 Utility Relocations and Permits

The Design-Build Team shall be responsible for coordination of all activities during design and construction with regard to utilities and permits as outlined in PR 9 – Utility Design and Relocation Performance Specification.

1.15 Stormwater Management (SWM) Design and Erosion and Sediment Control Approvals

The Design-Build Team shall design SWM in accordance with the criteria established in PR 11 – Drainage, Stormwater Management, and Erosion and Sediment Control Performance Specification and PR 14 – Environmental Performance Specification.

The Design-Build Team shall ensure that copies of the most current approved plans are available to all personnel involved in the construction and inspection of the project. The Design-Build Team shall be responsible for coordinating all reviews and approval submissions with the appropriate review entities.

1.15.1 Stormwater Management and Erosion and Sediment Control Review and Approval

The Design-Build Team is responsible to make any necessary adjustments to the initial stormwater management concept design and to finalize the SWM design for all approvals. The final design shall be acceptable to the SWM/ESC approval authority.

The Design-Build Team shall design ESC in accordance with the criteria established in the Drainage, Stormwater Management, and Erosion and Sediment Control Performance Specification.

The Design-Build Team shall be responsible for producing a completed set of ESC plans for the roadway construction activity. These plans shall be submitted to the SWM/ESC approval authority in conformance with the contract requirements for review and final approval when deemed appropriate.

A Pre-Permitting meeting must be held once the notice of selection has been made. This meeting will be scheduled by the Administration upon request by the Design-Build Team and will include the Design-Build Team's H&H Engineer, Project Design Manager,

Construction Manager, E&S Manager, IDQM Firm H&H Engineer; representative of the SWM/ESC authority, and Administration's Highway Hydraulics Division Project Manager and Design Project Manager. The purpose of the meeting is to preview and discuss the Design Build team's approach to completing SWM/ESC design and obtaining approvals, the SWM and erosion and sediment control concepts developed by the Design-Build Team, submission schedules proposed by the Design-Build Team, approval timeframes, submission requirements and the SWM/ESC approval authority's quality expectations.

The Design-Build Team's Lead Design Firm's Professional Engineer licensed in the State of Maryland must review and certify by signature that the Stormwater Management and Erosion and Sediment Control plans have met the SWM/ ESC requirements prior to any submission to SWM/ESC approval authority for review.

Submissions for SWM/ESC approval must be delivered directly to the SWM/ESC approval authority with a copy to the SHA Highway Hydraulics Division and SHA Project Design Manager. Electronic copies of the submission including checklist, application, plans and reports as applicable must be provided through Projectwise along with a hard copy of all information delivered directly to the SWM/ESC approval authority. Comments or approval will be provided within 28 calendar days beginning the day after receipt of the submittal. A signed and sealed title sheet shall be submitted to the SWM/ESC approval authority prior to final approval. Review time for submissions to the SWM/ESC approval authority shall not be the basis of a claim or time extensions against the Administration.

The Concept SWM report suggests certain locations of SWM facilities. Other types of facilities may be used, but they shall meet all requirements of the 2000 Maryland Stormwater Design Manual (and any subsequent revisions) and must be approved by the Administration's Highway Hydraulic Division. Once approval is gained from the Administration, the Design-Build Team shall acquire all other approvals and necessary permits.

1.15.2 MDE Dam Safety Division Small Pond Review and Dam Safety Approval

All ponds, culvert crossings (in relation to the roadway embankment), and sediment traps designed must be checked for MDE Dam Safety Division Review Criteria. Summary sheets for each pond and sediment trap for Dam Safety requirements will be submitted to the SWM/ESC approval authority. Refer to section B.1.2 in the MDE 2000 Maryland Stormwater Design Manual, Volumes 1&2. If one or more ponds fall under MDE Dam Safety Division Small Pond Review Criteria, the pond design must be submitted to MDE Dam Safety Division. Approval from Dam Safety Division shall be required before any E&S or SWM package will be approved by the SWM/ESC approval authority. Submissions shall be made directly to MDE Dam Safety Division.

The SHA-HHD and the SWM/ESC approval authority shall be concurrently copied on all correspondence, including comment letters, phone conversation transcripts, transmittals, reports, plans revisions to plans and report, computations, and/or point-by-point response letters; delivered to MDE Dam Safety Division.

Review time for submissions to MDE Dam Safety Division shall not be the basis of a claim

or time extensions against the Administration.

1.15.3 MDE Plan Review Division Small Pond Review

All ponds, culvert crossings (in relation to the roadway embankment), and sediment basins/ traps designed must be checked for Pond Code 378 criteria. Summary sheets for each pond or sediment trap of Code 378 requirements will be submitted to the SWM/ESC approval authority. Refer to section B.1 in the MDE 2000 Maryland Stormwater Design Manual, Volumes 1&2. If one or more ponds fall under Code 378 criteria, the pond design must be submitted to MDE Plan Review Division. Approval from MDE plan review division shall be required prior to SWM/ESC final approval.

The SHA-HHD and the SWM/ESC approval authority shall be concurrently copied on all correspondence, including comment letters, phone conversation transcripts, transmittals, reports, plans, revisions to plans and report, computations, and/or point-by-point responses delivered to MDE Plan Review. SHA will provide an expedited reviewer to help facilitate the small pond review, but Final approval will still be required from MDE staff.

Review time for submissions to MDE Plan Review Division shall not be the basis of a claim or time extension against the Administration.

1.15.4 Stormwater Management (SWM) Site Development Criteria Review and Approval

All stormwater management facilities shall be designed in accordance with the SHA Stormwater Site Development Criteria Review Guidelines, prepared by the Administration's Highway Hydraulics Division.

The SWM facilities shall be designed with the input of a licensed landscape architect and shall adhere to the accepted standards for the profession concerning aesthetics and site planning. This includes not only planting but also grading, landforms, site layout, safety criteria and choice of materials.

The SWM facilities shall integrate well visually with the surrounding environment, developments, communities, roadways, and corridor landscaping. This means that facility types, outfall structure designs, detailing, colors, planting palette, landforms, surface area shapes, and fencing (if required) should be consistent or complementary.

1.15.5 Stormwater Management (SWM) As-Built Certifications

The Design-Build Team shall provide an SWM As-Built (AB) Inspector to inspect the various stages of construction for each SWM facility and provide documentation to the Administration that certifies that the SWM facilities have been constructed as specified in the Contract Documents including certification that the constructed SWM facilities provide the functionality as designed. The AB Inspector shall be a licensed Professional Engineer or Land Surveyor in the State of Maryland with experience in SWM design and construction.

The As-Built Certification Package shall be prepared according to the special provision, 300 – Stormwater Management Facility As-Built Certification, included in this package. Copies of As-built Certification shall be maintained at the Administration's field office at all times for verification and compliance until it is complete and submitted for approval. The As-Built Certification signature block, checklists and tabulations are also included on ProjectWise.

The Design-Builder shall submit the completed As-Built Certification Package to SHA's Construction Project Engineer and once concurred by the Construction Project Engineer, it shall be submitted via the SHA toolkit system or mailed to:

Highway Hydraulics Division Chief, Mail Stop C-128
Maryland State Highway Administration
707 North Calvert Street
Baltimore, Maryland 21202

Highway Hydraulics Division may provide comments or request additional information to suffice as necessary for submission to the SWM/ESC approval authority for final acceptance. SHA's construction engineer, Highway Hydraulics Division or SWM/ESC Approval Authority may require corrective action to the constructed facility prior to final acceptance in order to ensure the constructed facility functions as intended. Any and all corrections shall be completed and all updated information; including the updated as-built certification; shall be provided in a timely fashion for review and approval.

1.16 Surface Storm Drainage Design

The Design-Build Team shall design all surface drainage conveyances (including but not limited to open channels, stream relocations, inlets, closed storm drainage systems, cross culverts, and pipes under entrances and driveways) in accordance with the Drainage, Stormwater Management, and Erosion and Sediment Control Performance Specification.

Waterway Construction (COMAR 26.17.04) review and approval is required for waterway impacts. Deliver submittals for MDE approval to the Administration for review and coordination with MDE. The Administration has established a review and approval process with MDE for the project. Under that process, the Administration will review and comment on the Design-Builder's plans and, once satisfied that the plans will meet MDE requirements, the Administration will coordinate with MDE to obtain formal approval of the Design-Builder's Waterway Construction plans and calculations.

1.17 Noise Abatement

Noise abatement is not required on this project.

1.18 Engineering Studies

The Design-Build Team shall be responsible for engineering studies as required to determine solutions to any unforeseen situations that may be discovered during this project, and submission of these studies to the Administration for approval. These studies shall be prepared as per the

"Volume II -Specifications for Consulting Engineers' Services".

1.19 Design Review and Coordination

It is the Design-Builder's sole responsibility to provide Design Plans, Project Specifications and Working Drawings enabling the development of a finished product in accordance with the Contract Documents. As part of this, the Design-Builder is responsible for the Design Quality Management including Design Quality Control and Design Quality Assurance. This will include the Design-Builder providing both a Lead Design Firm and an Independent Design Quality Management (IDQM) Firm who have no contractual relationship. The Lead Design Firm shall be responsible for the Design Quality Control and the IDQM Firm responsible for the Design Quality Assurance and review and certification that all design submittals are in compliance with the Contract Documents.

The Lead Design Firm shall develop its Design Quality Control Plan (DQCP) for review and approval of the IDQM Firm. Upon approval, it shall be forwarded to the Administration for concurrence.

All design shall be developed by the Lead Design Firm in accordance with this DQCP. Once the Design Quality Control process has been completed, the Lead Design Firm shall provide the design package to the IDQM Firm who will perform an independent review to conform the design package meets the requirements of the Contract Documents. The IDQM Firm shall document all submissions from the Lead Design Firm and all reviews it performs on Projectwise. The Administration will review this documentation to further ensure the design review process and submissions are in compliance with the DQCP and Contract Requirements. The Administration may provide additional review comments as it deems necessary. **Note: All Structures submittals for Type, Size, and Location, Foundation Report, Structure Details, and Final Plans for all bridges, retaining walls, and box culverts required for this project shall be submitted concurrently to the IDQM Firm and the Administration. The Administration will provide formal comments on each submittal within 21 calendar days, beginning the day after acknowledgment of receipt of the submittal.**

In the event that there is an ambiguity in the interpretation of the Contract Requirements between the Lead Design Firm and the IDQM Firm, it shall be immediately raised to the SHA's project design manager for resolution.

Subsequent to the completion of a design package which is Ready for Construction, it shall be signed and sealed as required by the Lead Design Firm and signed and certified by the IDQM Firm and submitted to the Administration. All permits and modifications do not need to be received to submit to the Administration. Administration approval of the design package will not be required to begin construction. However, all permits related to the design package must be received, any environmental reevaluation (if necessary) completed, and the Administration must have certified that any right-of-way required for the design package is in the possession of the Administration. Upon submission of a certified design package from the Design-Builder, the Administration may provide further review as determined necessary to ensure the design package is in compliance with the Contract Requirements. The Administration will require a minimum 7 calendar day notice for submission of a completed design package and will provide any

comments noting non-compliance with Contract Requirements within 21 calendar days, beginning the day after acknowledgement of receipt of the submittal. The Design-Builder shall provide a maximum of 20 copies of each Ready for Construction design package and any subsequent revisions for Administration field personnel.

1.20 Additional Services

The Design-Build Team shall be responsible for all necessary field surveys required for the project, which shall conform to Maryland Grid System NAD 83/91 and NAVD 88.

1.21 Environmental Permits

The Design-Build Team shall procure all other approvals, permits and licenses pay all charges, fees and taxes and give notices necessary or appropriate for the execution of the Work. This includes approvals for on-or off-site staging, stockpiling areas, disposal sites and borrow pits.

The Administration has submitted a JPA with a Phase I Mitigation Plan to the USACE and MDE. It shall be the Design-Builder's responsibility to submit a JPA Amendment(s) in order for the Design-Builder to receive the required final wetlands and waterway permits. Though the Administration will coordinate with the regulatory agencies; it is the Design-Builder's sole responsibility for obtaining all required permits and providing sufficient and permittable information. The Design-Builder shall fully deliver (design, permit, and construct) wetland, waterways, forest, and stream mitigation as part of this Design-Build contract. The Design-Build Team shall also develop all required information and submittals as discussed in PR 13.3.

If the Design-Build Team determines that additional trees must be removed, the Design-Build Team shall request a field review with the LAD/LOD and is responsible for providing the Administration with all information requested. If the Administration concurs with the request, it shall be the responsibility of the Design-Build Team to obtain and comply with the terms of the modified permit(s) from MDNR at no additional cost.

A. As part of this RFP, the Administration will be providing the following permits and approvals by Addendum based on the proposed activities:

    1) US Army Corps of Engineers (USACE) Corridor Permit and MDE Non-Tidal Wetlands and Waterways Permit

    2) Reforestation Site Review Permit (from Maryland Department of Natural Resources, DNR)

    3) MDE Hydology and Hydraulics Approval

    4) Federal Emergency Management Agency (FEMA) Conditional Letter of Map Revision (CLOMR)

    5) Phase I Mitigation Approval/Acceptance for Wetland Mitigation

B. The Design-Builder shall obtain the following permits and/or approvals:

1) Phase I Mitigation Approval/Acceptance for Stream Relocations

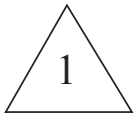
2) Phase II Mitigation Plan Approval

3) MDE Nontidal Wetlands and Waterways Permit Modification

4) Water Quality Certification

5) Final USACE Permit

6) MDE Dam Safety Approval (if required by MDE)



7) Erosion and Sediment Control Approval (from SWM/ESC Approval Authority)

8) Stormwater Management Permit (from SWM/ESC Approval Authority)

9) NPDES Permit (from MDE)

10) Letter of Map Revision (LOMR) from FEMA. All floodplains in Howard County are classified as floodways and any proposed increase or decrease in the floodplain elevation will require a LOMR. The Design-Builder is responsible for all application fees associated with this permit.

11) Surface Water Appropriation Permit (from MDE) will be required if the Design-Builder intends to use water from the streams for any purpose other than rerouting the water with stream diversion

12) All other approvals, permits and licenses, pay all charges, fees and taxes and give notices necessary or appropriate for the implementation of the Project beyond those obtained by the Administration. This includes but is not limited to approvals for on or off-site staging, stockpiling areas, disposal sites and borrows pits.

1.22 Phase V Services

Phase V services consist of partnering during design and construction, checking shop drawings, redesign under construction, revisions, as-built plans, and provisions for expert court testimony.

The Design-Build Team shall provide all services and perform tasks described in compliance with the requirement policies of Administration as stipulated throughout this resume and "Volume II -Specifications for Consulting Engineers' Services".

1.23 Construction Personnel Identified in Proposal

The Design-Build Team, all key staff and construction-related key personnel, and all other Major Participants identified in the proposal shall be utilized in the same manner and to the same extent set forth in the SOQ and for the duration of the project. **Changes regarding the Design-Build Team shall not be allowed. Changes regarding key staff, construction-related key**

personnel and all other Major Participants require prior written approval by the Administration. Requests for such changes must be submitted to the Administration in writing and replacement personnel must have equal or better qualifications than the key personnel identified in the SOQ. The format for replacement staff must be the same format as required for the SOQ including the requirements thereof. The Design-Build Team acknowledges that any such changes are for the convenience of the Design-Build Team alone and shall not increase the Design-Build Team's Price or change the project schedule. The Administration will approve such requests only if it determines that such change will not detrimentally affect the long term quality, durability, maintainability, timeliness of the Work.

1.24 Conformance with Contract and Proposal

All construction, construction-related work, and all other work must conform to the Contract, to the Technical Proposal submitted by the Design-Build Team and to the construction plans prepared by the Design-Build Team.

1.25 Check Shop Drawings

The Design-Build Team shall check all shop drawings for hydraulic structures, non-standard drainage structures and all other designed structures prior to manufacture and/or placement of such structures. The Lead Design Firm and the IDQM Firm shall check all such shop drawings and stamp their approval prior to sending approved shop drawings to the Administration. The shop drawings for larger hydraulic structures and designed structures should be submitted to the Administration according to TC-4.01, Working Drawings. The approved shop drawings for hydraulic structures, non-standard drainage structures (including stormwater management) along with the necessary structural computations shall be submitted to Ed Johnson; Office of Highway Development, C-102, Maryland State Highway Administration, 707 North Calvert Street, Baltimore, MD 21202.

All shop drawings relating to the temporary and permanent structures (bridges, retaining walls, and culverts) shall be reviewed in accordance with *SHA OOS PPM No. OP-82-34 (G), Checking of Working Drawings, Form Plans and/or Erection Plans* and Section 499. The primary review shall be undertaken by the Lead Design Firm with a secondary review undertaken by the IDQM Firm. Once reviewed and accepted by the Lead Design Firm and IDQM Firm, they shall be stamped as accepted by each firm and submitted to the SHA. A final review will be undertaken by SHA. Comments or approval will be provided in no more than 7 calendar days, beginning the day after receipt of the submittal. Once reviewed and approved by SHA, the structural shop drawings shall be stamped as approved with the stamped plans being designated as the documented approval. No construction activities are permitted in conjunction with any structural shop drawings that have not been approved by SHA.

The Design-Build Team shall correct any errors or omissions found by the Administration at no additional cost to the Administration.

The Design-Build Team shall challenge all the work of the detailer, approving that, which is correct, or most appropriate and red lining and commenting on incorrect or less appropriate details or design. The importance of this approach is emphasized since inferior detailed design

could negate the benefits of quality general design. Each shop drawing shall bear the official stamp of the Design-Build Lead Design Firm Engineer, attesting to their review and approval by the Lead Design Firm. This work is to be done under the supervision of and shall be the responsibility of a Maryland Registered Professional Engineer.

1.26 Conformance with Approved Plans and Specifications

1.26.1 Construction Plans and Project Specifications

All work shall be done in conformance with the details and dimensions shown on the approved Final Plans and Specifications, and shall meet the requirements in the specifications/special provisions approved as a part of the Final Plans and Specifications submission and portions thereof.

1.26.2 Plan Revisions after Approval of Final Plans and Specifications

All plan revisions made after Final Plans and Specifications approval shall have approval of the IDQM Firm prior to implementation.

1.26.2.1 Revisions

Redesigns after Final Plans and Specifications approval shall be superimposed on the original project plans in green. Old design details, dimensions and notes shall not be erased, but X'd out in green. The date that the revision was made shall be indicated in the title block of each revised plan sheet. Submission to the Administration shall follow the process outlined in PR 1.19.

1.26.2.2 As-Built Drawings

Field changes/variances from the details and dimensions shown on the plans shall be superimposed on the approved set of drawings in green. Old details, dimensions and notes shall not be erased, but X'd out in green. Each revision must be identified with a Hexagon with the letter A in the center. This symbol is available in MD SHA's CADD Standards. The date that the revision was made shall be indicated in the title block of each revised plan sheet. The As-Built Plans shall reflect any field revision made during construction.

The Design-Build Team shall submit one comprehensive set of As-Built plans at the completion of the project that are signed and sealed by the Engineer. The comprehensive set of As-builts will include an index sheet and a key plan which graphically represents and annotates each phase of the plan submittal if there are multiple submittals. The comprehensive set of as-builts will be assembled and numbered consecutively, beginning with sheet one of the first submittal and ending with the last sheet of the final submittal. The index and key plan will allow for more easily understood and navigable drawings within the overall project limits in the future.

The Stormwater Management Facility As-Built Certification will be a separate

submittal as described in PR 1.15.5.

The Wetlands and Stream Restoration As-Built Certification will be a separate submittal as described in Special Provision 300 Stream Restoration As-Built Certification and Inspector Design-Build.

1.26.2.3 Computer Files

The Design-Build Team shall also submit Black and White images, at 200 DPI-TIF and PDF files, of the As-Built Plans on CD ROM. The As-Built plans shall be scanned starting with the Title Sheet. The file names will be the Construction Contract Number, followed by a dot (.), followed by a sequential number beginning with 1001. The sequential number must correspond with the plan sheet numbering. This number is followed by another (.) and then the TIF and PDF extension. Example: HO7565370.1001.tif. All scanned TIF and PDF images will be scanned in such a way that they do not appear upside down upon opening. The cover of the CD ROM shall be labeled with the SHA contract number, date, route number, and project description.

1.26.2.4 Permits

The Design-Build Team shall obtain approvals from the appropriate regulatory agencies as listed in PR 13.1.5, and for any changes in design and/or construction activities that affect any permit conditions.

1.27 Coordination with Other Contractors

The Design-Build Team shall coordinate all design and construction, including that of any subcontractors, with other designers, contractors, the utility companies, governmental agencies, Howard County; Administration personnel, and operating personnel concerning site access, establishment and use of temporary facilities, work schedules, and other elements of the specified work, which require interfacing with others.

The Design-Build Team must coordinate all work that is currently being constructed under HO1415170 (MD 32 from MD 108 to Linden Church Road).

It is anticipated that various utility companies will relocate their underground and overhead facilities prior to and during the construction operations. See PR 9 Utility Design and Relocation Performance Specification for further details.

1.28 Community Relations

The Design-Build Team will establish a program of public contact for conducting effective relationship with the community and businesses that are in proximity to construction areas. This program shall meet the requirements outlined in PR 16, submitted to the Administration within 45 days of Notice to Proceed and included as part of the Lump Sum Price for this Contract. As part of this program, the Design-Build Team shall establish and maintain continuing liaison with persons occupying property or doing business in the immediate area of the work site for the

purpose of minimizing inconveniences resulting from construction. The plan will detail how the Design-Build Team intends to keep the property owners and businesses informed of the work schedule and include a program for notifying them at a minimum of every 30 days of what will occur within the next 30 days. The Design-Build Team's Technical Proposal shall also name a Public Relations Officer who is responsible for this work and who the Administration and citizens can contact for project information and answers to project related questions. See PR 16, Public Outreach Performance Specification, for all the requirements.

1.28.1 Toll Free Telephone Number

The Design-Build Team shall establish a toll free telephone number. This telephone number shall be used for the public to contact the Design-Build Team in the case of an emergency. The Design-Build Team shall maintain a log of all calls made to the number, including date, time, name of caller, reason for call, caller's address and phone number. These logs shall be accessible to SHA for review and submitted every two months once the phone line is made available to the public. The Design-Build Team shall respond in person or by telephone within one hour of the time of the call and shall arrange for resolution of any issues as soon as possible. The Design-Build Team shall post the toll free telephone number prominently within the project limits and the Administration project field office. The telephone number shall be shown on all flyers distributed on the project.

1.28.2 Public Relations Materials

All public relations materials, advertisement, flyers, and meeting handouts and graphics shall be approved by the Administration's Project Manager and Office of Customer Relations and Information prior to public release.

1.29 Administration Services

The Administration will provide the following services:

1.29.01 General Administration Services

A. Provide CADD standards, engineering standards, design criteria, as-built plans, existing R/W plats and prints of other design projects for use as examples or guides.

B. Provide erosion and sediment control standard sheets, traffic design standard details, Maintenance of Traffic (MOT) standard plates, etc.

C. Provide accident statistics and other traffic data Average Daily Traffic (ADT), Design Hourly Volume (DHV), percentage of trucks, etc.

D. Provide overall management and liaison services related to project phases.

E. Coordinate times and places of all of the Design-Build Team's community and public meetings.

F. Provide existing Right-of-Way plats and/or Right-of-Entry agreements.

G. Acquire Right-of-Way for roadway construction as determined by the Administrations design concept plans.

1.29.02 Traffic Services

The Administration's Office of Traffic and Safety (OOTS) will provide the following:

A. Design charts for ground mounted sign supports and foundations.

B. Copies of existing standard sheets; however, these may require some revisions by the Design-Build Team.

C. Engineering standards, design criteria, and copies of the past design projects for use as examples or guides.

D. Functional operation and requirements for the traffic signals.

E. Once notified by the Design-Build Team when each service drop is needed, SHA may arrange the final electrical service request letters when directed by the utility company.

F. SHA will supply all controllers and cabinets and the related internal equipment, the required traffic signal mounted signing and the ground mounted W3-3 signs only. The Design-Build Team shall install all SHA traffic signal supplied equipment.

1.29.03 Structural Services

The Administration's Office of Structures (OOS) will provide the following:

A. Copies of existing structural detail sheets; however, these may require some revisions by the Design-Build Team.

B. Engineering details, design criteria, and copies of the past design projects for use as examples or guides.

C. Structural detail plan sheets for inclusion in plans for submission by the Design-Build Team based on the list of required details provided by the Design-Build Team.

1.29.04 Construction Inspection

The Administration will follow its normal construction inspection policies and procedures. However, measurement of quantities will serve to verify that the plan and specification requirements are met and for other purposes at the discretion of the Administration. The Design-Build contract does not alter the authorities of the Administration's District Engineer, Project Engineer, or construction inspection personnel in their Administration of

the construction contract.

1.29.05 Conduct Pre-Construction Conference

The Administration will conduct the conference and take minutes. Representation at the conference shall include:

1.29.05.1 Preconstruction Conference Attendees

- A responsible officer of the Design-Build Team;
- The Project Manager;
- The SHA Construction Project Engineer;
- The SHA Design Project Manager;
- Public Affairs Representative;
- Maryland DNR and SHA Landscape Operations representative;
- SHA Landscape Architecture representative;
- A responsible officer of any major subcontractors;
- SHA Environmental Programs Division (EPD) Independent Environmental Monitor;
- EPD Regional Environmental Coordinator;
- EPD representative;
- SHA Highway Hydraulics Division representative;
- SHA Office of Structures representative;
- MDE Compliance representative;
- District Utility Engineer, and
- Howard County Representatives.

1.29.05.2 Pre-Construction Conference Topics

The Design-Build Team should be prepared to discuss the following issues at the conference (at a minimum):

- Designation of responsible personnel;

- Design Quality Control Plan;
- Correspondence/communication;
- Distribution of contract documents;
- Approval of subcontractors;
- Tree Impact Minimization and Avoidance Report;
- Locations and protections devices of forested areas.
- Stake out and approval of tree protection devices and fence locations.
- Progress schedule (design and construction);
- Critical work sequencing;
- Permits and licenses;
- Submission schedule;
- Submittal of Shop Drawings, project data and samples;
- Itemized schedule listing dates by which other submissions will be forwarded to the Administration;
- Major equipment, deliveries and priorities;
- Site utilization plans;
- Office and storage area;
- Construction constraints;
- Coordination of all interface activities;
- Training;
- Availability of utilities/need for temporary services;
- Procedures for maintaining Record Documents;
- Material submittals and approvals;
- Processing of field decisions and change orders;
- Close-out procedures;

- Review of miscellaneous procedures;
- Safety;
- Utility relocations, and
- Utility connections to all existing and proposed Traffic Control Devices.

1.29.06 Conduct Progress Meetings

The Administration will conduct progress meetings on a regular basis, as scheduled at the project initiation meeting and pre-construction conference. The Design-Build Team shall prepare all meeting minutes and distribute them to attendees and team members for review and comment within one week. Additional progress meetings may be necessary at the discretion of the Administration to maintain coordination of design and construction activities. Representatives at the meetings shall be qualified and authorized to act on behalf of the entity each represents.

1.29.06.1 Progress Meeting Attendees

- The Design-Build Manager, Design-Build Project Manager and associates as needed,
- The Administration's Project Engineers, Construction, Design and associates as needed,
- Subcontractors as appropriate to the agenda,
- Utility companies, and other concerned parties as appropriate.

1.29.06.2 Progress Meeting Topics

The meetings will serve as a forum to establish and maintain close coordination of work activities, resolve problem issues and expedite construction operations. Schedules, change orders, work activities, DQCP reviews, and other issues will also be addressed.

1.29.07 Permits

As part of this RFP, the Administration is providing the permits and approvals based on the proposed activities. See PR 1.21, Environmental Permits, for a list of the permits that have been obtained by the Administration and a list of Permits that are the responsibility of the Design-Builder.

1.30 Deliverables

Deliverables will be produced in both the design and construction phases. They include construction documents, reports, public relations materials, design exceptions and property owner

information.

1.30.01 Plans

At a minimum, the following separate plan sheets shall be produced for this project.

- Title Sheet
- Index of Sheets
- Abbreviations Sheet
- Typical Section Sheets
- Superelevation Sheets
- Pavement Detail Sheets
- Miscellaneous Detail Sheets
- Geometry Sheets
- Intersection Detail Sheets
- Gore Detail Sheets
- Roadway Plan Sheets
- Roadway Vertical Profile Sheets
- Maintenance of Traffic Plan Sheets
- Storm Drain Profiles with 25 year hydraulic gradeline shown and Structure Schedules Sheets
- Drainage Details Sheets, including ditch type/linings, outfall protection, and non-standard structures
- Stormwater Management Plans and Details
- Erosion and Sediment Control Plans and Details
- Stream Diversion Plans and Detail Sheets
- Wetland and Stream Mitigation Plan Sheets
- Landscape/Reforestation/SWM Planting Plan Sheets

- Structure Plans and Details
- Culvert Extension Plans, Elevation and Details
- Retaining Wall Plans, Elevation and Details
- Traffic Signalization Plans
- Interconnect Plans (if applicable)
- Signing and Pavement Marking Plans
- Intersection/ Interchange Lighting Plan Sheets
- Grading Tables
- Cross Sections

1.30.01.1 General Requirements

The Design-Build Team shall deliver upon request and at no additional cost hard copies of maps, plans and drawings as well as electronic copies of all computer files. This includes Microstation files used to develop the design and drafting of this project. These files must be logically indexed and labeled to enable Administration personnel to use at any time.

1.30.01.2 Contract Plans and Specifications

The Design-Build Team shall provide contract plans and any required specifications, in accordance with "Volume II Specifications for Consulting Engineers" and this RFP. The Design-Build Team will develop specifications for construction that identify the details of the proposed work. The intent is that the work will be done in accordance with the Standard Specifications, project specific Special Provisions, the "standard" Special Provisions, and the Special Provisions Inserts which are normally included in an Administration advertised RFP. All of these "standard" Special Provisions Inserts and Special Provisions are included in this RFP even though the work items to which they apply might not be included in this project. The intent is that if the item is included in the construction, then these "standard" Special Provisions and Special Provisions Inserts will apply.

The specifications to be prepared by the Design-Build Team and submitted to the Administration for review and approval will, in addition to all of the specifications mentioned above, include any specifications developed by the Design-Build Team that supplement or modify what is provided in the RFP.

Throughout the design phase, the Design-Build Team shall prepare and update 50 scale reproducible maps of the design to be used for meetings, briefings, etc. Where needed for added clarification, 20 scale reproducible maps shall be

provided for use by the Administration. The scale of the roadway plans should be 50 scale unless more detail is needed.

The Design-Build Team shall provide the Administration with sufficient data to answer property owners' and other requests for information concerning the project's effects, status, etc.

1.30.01.3 Drafting and CADD Standards

The Design-Build Team shall utilize SHA supplied Microstation files, including data collector survey and photogrammetry in their design and drafting. The Design-Build Team shall utilize the Microstation drafting software packages Version V8i or later, and/or Inroads/Geopak. All of the design and drafting will utilize all Administration CADD Standards including but not limited to feature tables, file-naming standards, parameter files, font libraries, cell libraries and color tables.

1.30.01.4 Stormwater Management (SWM) and Surface Drainage Plans

The following items shall be included in the design plan documents:

- Pipe profiles and structure schedules for all storm drain systems and culverts.
- Profiles shall be at a scale of 1 in. = 30 ft. horizontal and 1 in. = 3 ft. vertical. The 25-year hydraulic gradient and existing and proposed ground, proposed pipe, existing and proposed utilities, proposed outlet protection, and existing structures shall be shown on all storm drain profiles.
- Details for all non-standard drainage structures.
- SWM Systems including details, profiles, grading and layout plans, planting plans and BMP ID numbers.
- Side, median and outfall ditch elevations, offsets, section geometry, and surface treatments.
- A BMP As-Built Certification sheet shall be developed for each SWM facility (see PR 1.15.5). Examples of the checklists and tabulations are included in this package and checklists for other types of facilities may be available from the Administration, Highway Hydraulics Division, upon request. The Design-Build Team may expand the checklist as necessary.
- Hazardous material spill containment plans as necessary.
- Underdrain connections, locations (including linear filter cleanouts), and outlets.

- Cross culvert locations, headwater pool areas, and channel changes required to adjust streams to culverts.

- Spring box and outlet locations and configurations.

1.30.01.5 Erosion and Sediment Control (ESC) Plans

The Design-Build Team shall develop ESC Plans that include the following in addition to the highway plan requirements.

- Plans for both initial and final phases of the construction are required. Plans for interim phases may also be required by the SWM/ESC approval authority to ensure adequate controls throughout project duration. These interim phase plans shall be coordinated with traffic control stages. The plans require one foot contouring for all phases at the same scale as the roadway plans.

- The initial phase plan shall detail the implementation of erosion and sediment control measures necessary to complete the clearing and grubbing and the initial stages of the Traffic Control Plan (TCP).

- The final phase shall detail the control measures required to move to final grade and accommodate interim traffic control phases.

- Plans shall provide a detailed description of the Limit of Disturbance (LOD). A schedule of stations and offsets shall be provided with stations and offsets established at a minimum of 50 foot intervals and at all break points in between.

- Larger scale drawings (1 in. = 200 ft.) shall be included in the plans depicting off-site drainage areas, sensitive environmental resource areas such as wetlands, woodlands, streams, and locations of major diversions and sediment controls.

- Maintenance of stream flow and maintenance of storm drain flow plans as required.

- This plan will be coordinated with the MDE Non-Tidal Wetland and Waterways Division to ensure compliance with ESC measures in areas subject to waterway construction permits. The Design-Build Team shall be responsible for all revisions due to MDE review and comment.

- The plans shall be sealed and signed by a Maryland Registered Professional Engineer.

1.30.01.6 Traffic Control Plans

The Design-Build Team shall prepare detailed Traffic Control Plans (TCPs) as

required for various stages of construction showing traffic patterns, signs, barricades, etc. These plans will be developed at a scale of 1 in. = 20 ft. or 1 in. = 50 ft. and shall layout in detail each phase of construction as coordinated with the erosion and sediment control and landscape plans. Final TCPs may include cross-sections, temporary signals and/or signal phasing modification plans and interim drainage. All existing highway lighting systems, sign lighting and traffic signals are to be kept fully operational throughout the construction period. In the event some or all of the existing lighting must be taken out of service, consideration should be given to temporary lighting systems and maximizing usage of new lighting systems. All lane closures shall be as outlined elsewhere in this RFP.

1.30.01.7 Structure Plans

All structure plans developed by the Design-Build Team shall conform to the following requirements:

Title Block information in accordance with Maryland State Highway, Office of Structures PPM P-79-16(G).

All views in accordance with Maryland State Highway, Office of Structures PPM P-75-7(4).

All lettering in accordance with Maryland State Highway, Office of Structures PPM P-76-9(G).

1.30.01.9 Utility Map

The Design-Build Team shall develop a utility map graphically showing all existing utilities within proposed Right-of-Way. This map shall be at the scale of the roadway plans. Existing utilities are to be clearly indicated and labeled. Connections between valve boxes, manholes, poles, etc., are to be shown and labeled with the type of existing service (i.e. 2" electric, fiber optic, etc.). This map is to be kept current with all proposed utility relocations shown and made available for review and use by Administration and Utility Company staff. Existing utilities are to be shown and clearly labeled on plans, profile and cross-sections.

1.30.01.10 Roadside Landscape and Reforestation Plans

The Design-Build Team shall prepare landscape and reforestation plans with a scale appropriate for the project, but not less than 1"=30'. Plans shall include schedules of all materials proposed for use, and shall be submitted to the Administration, Landscape Architecture Division and Landscape Operations Division, for review and approval. Roadside Landscape and Reforestation plans should include the following information:

- Vicinity map of site location for both on-site and off-site reforestation areas

- Density and quantity of plantings area provided for mitigation
- Limit of Disturbance
- Tree preservation fence line
- Plans should include environmental/surface features, extending at least 100' beyond Property Line or Right-of-Way of adjacent parcels. Ownership and parcel numbers should be identified for each adjacent parcel
- A schedule of materials, indication plant quantities for each type and size of plant material, proper nomenclature for plant species, root of materials; B&B or Container Grown (CG), and proposed spacing
- Defined limits of mowing and limits of mulching where applicable
- Critical Root Zones for individual significant or specimen trees, as defined by the Maryland Department of Natural Resources: Measured from the center of the tree's trunk; 1.5 foot of radius per inch of DBH (Diameter at Breast Height)
- Tree preservation details including but not limited to fencing, fertilizing, root aeration, signage, and root pruning/sequencing of construction indicating any additional requirements for tree preservation not identified in the specifications.

1.30.01.11 Wetland and Stream Mitigation and Creation Plans

The Design-Build Team shall prepare wetland and stream mitigation plans with a scale appropriate for the project. Plans shall be submitted to the Administration for review and concurrence. Wetland and Stream Mitigation Plans should include the following information:

- Vicinity map of site location
- Sheet layout
- Geometry
- Proposed conditions including but not limited to, proposed grading contours and structures
- Typical proposed cross sections
- Cross Sections every 50 feet along alignment

- Details – including but not limited to stream structures, bioengineering, planting, etc.
- Stream profile showing existing and proposed ground, proposed structures, existing structures and/or utilities, and any other pertinent information
- Density, and quantity of planting materials per stratum per planting area
- A schedule of materials, indication plant quantities for each type and size of plant material, proper nomenclature for plant species, root of materials; B&B or Container Grown (CG), and proposed spacing
- Limit of Disturbance
- Plans should include environmental/surface features, extending at least 100' beyond Property Line or Right-of-Way of adjacent parcels. Ownership and parcel numbers should be identified for each adjacent parcel
- Any additional requirements from the USACE or MDE needed for approval of the mitigation site including, but not limited to, the information in the Phase I and Phase II checklists.

1.30.02 Cross Sections

The Design-Build Team shall prepare cross-sections cut at even 50 foot stations, at driveways, and at critical stations for clarity along the baseline of construction at a scale of 1 in. = 10 ft. horizontal and vertical. Cross sections shall be provided for the mainline and side roads. Cross-sections shall show: existing ground, proposed grade, roadway slope, curb/gutter, existing and proposed right-of-way and easements, traffic barrier, proposed and existing traffic control device and sign structure foundations, grading limits, pavement section and all existing and proposed storm drains, swales, storm water management facilities, noise walls, and all utilities. Cross-sections shall have the P.G.E.(s) and all proposed ditches and swale inverts labeled with offsets and elevations. Cross-sections shall have all existing and proposed (including relocated) utilities and storm drains drawn to scale at the correct offset and elevation, and have type, size, and invert elevation (if known) labeled. Cross-sections shall be placed on sheets measuring 22 in. x 34 in. with grid lines spaced at 0.1 in. horizontal and 0.1 in. vertical. Each section shall be identified by the baseline name, station and a datum elevation. Elevations shall be shown in the Maryland Grid System Datum, NAVD 88.

The cross sections should be annotated according to SHA Highway Design Policy and Procedures Manual including offset and elevation for all significant figures.

Existing and proposed utilities, proposed drainage conveyances including pipes, drainage structures, cross culverts and ditches shall be drawn on to the cross-sections. The cross-

sections will be used by the Administration to verify adequate cover at pipes and clearance at utilities.

Interim and final cross sections containing drainage design components and annotations shall be submitted for use in the Administration's review of drainage design.

Cross-section will be needed for any Wetland and/or Waterways Mitigation per Maryland Nontidal Wetland Mitigation Guidelines and References outlined in PR 2. All baselines for Wetland and/or Waterways Mitigation shall be referenceable to the baseline of the roadway project.

1.30.03 Reports

The Design-Build Team shall perform engineering computations and/or analysis and maintain all backup data. This data must be available to the Administration at all times; and clear, legible copies shall be furnished to the Administration upon request. Stormwater Management reports, drainage reports, geotechnical report and field inspections reports, computations, and maps shall be submitted to the Administration for review and/or approval and placement in permanent files. These computations shall be for the total project and in accordance with Administration procedures. Design Exceptions shall be documented in report form and submitted to the Administration.

1.30.03.1 Stormwater Management (SWM) Report

Upon completion of the project, the Design-Build Team shall submit two (2) copies of the approved, final SWM Report to the SHA HHD. During the review and approval process, the report can be submitted in phases. Electronic and Hard Copies of all items within the report are required.

1.30.03.1.1 SWM Report Format

- The report and accompanying mapping shall be compiled according to the SHA HHD SWM Design Report Standard Format (included in this package).
- The report shall be written in a clear, well organized, and concise manner with all pages numbered and dated.
- The report shall be placed in 8½ by 11 inch, 3-hole binders that allow for insertion of revisions and removal of old data.
- Revisions to report as required. The date of the revision shall be placed on all pages and pages to be added, replaced or removed shall be designated. Revisions shall be 3-hole punched for easy placement in the reports. A document shall be submitted with each report detailing all of the changes.
- The final approved report, including all mapping and exhibits, shall be converted to PDF formatted file(s). The electronic file(s)

shall be delivered to the Administration for their records.

1.30.03.1.2 SWM Report Contents

The SWM report shall contain the following:

- A signed SWM/ESC Checklist for each phase of approval (ie site development approval, final approval) with all the available items
- A SWM/ESC transmittal form.
- A SWM/ESC submittal letter.
- A thorough discussion explaining the extent of improvements at each outfall and the proposed quantitative and qualitative control methods of SWM, including reasons why other methods were not selected.
- An explanation of hydrologic/hydraulic analysis methodologies used. Final supporting computations, maps, schematics, cross-sections, details and computer outputs shall be included for each outfall location.
- Outfall stability analysis, including photographs of each outfall and receiving channel.
- Computations for riprap sizing and outlet protection.
- Maps and schematics clearly showing the location of subareas, structures, existing land use, time of concentration paths, soil types and SWM facilities. Maps shall be included in pockets within the report.
- Computer printout sheets in 8½ inch x 11 inch format. These sheets shall be clearly labeled for cross-reference to the supporting data and points of analysis.
- MDE Pond Summary Sheets.
- SHA Water Quality Summary Sheet (WQSS) submitted to the Administration, Highway Hydraulics Division, for signature. See PR 11 for more details. Maps detailing the impervious areas added, impervious areas treated, pavement removed, redevelopment areas, and areas where existing treatment is lost.
- MDE SWM Waiver Applications that differ from those submitted with the Concept SWM Report. These shall be submitted to the Administration, Highway Hydraulics Division, for signature.
- SHA BMP Identification Forms (included in this package) with SHA BMP numbers indicated. The Design-Build Team is responsible to obtain BMP numbers for all SWM facilities from the Administration, Highway Hydraulics Division.

1.30.03.2 Surface Drainage Report

Upon completion of the project, the Design-Build Team shall submit two (2) copies of the Surface Drainage Report to the SHA HHD. The Surface Drainage Report shall include all drainage design computations performed according to the Administration's Highway Drainage Manual, drainage area mapping and schematics necessary to complete the design of the stormwater conveyances for the project.

All drainage computations shall be performed using the appropriate design charts within the Administration's Highway Drainage Manual and shall include clear references for all tables and charts used.

Culvert Analysis reports, when necessary for Waterway Construction Permit review and approval, shall be included as an attachment to the Surface Drainage Report and shall follow the format described below. The content shall be dictated by the MDE comment letter, approval or subsequent requirements issued by MDE in their review process.

1.30.03.2.1 Surface Drainage Report Format

- All the pages within the report shall be numbered and dated.
- The report shall be placed in an 8½ by 11 inch, 3-hole binder that allows for insertion of revisions and removal of old data.
- Revisions to report as required. The date of the revision shall be placed on all revised pages. Pages which are added or removed shall be indicated as such. Revisions shall be 3-hole punched for easy placement in the reports. A document shall be submitted with each report detailing all of the changes.
- The final approved report, including all maps and exhibits, shall be converted to PDF format file(s). The electronic file(s) shall be delivered to the Administration for their records.

1.30.03.2.2 Surface Drainage Report Contents

The report shall include, but not be limited to the following:

- Storm sewer design computations including schematics, inlet drainage area maps, 2 year inlet spacing, 10 year capacity, spread, 25 year hydraulic gradients, and structural design for non-standard drainage structures.
- Culvert analysis including 2, 10, 25 and 100 year frequency storms and design storms.
- Ditch computations and drainage area maps for ditch capacity, freeboard and lining stability.
- Evaluation of outfall stability, and outfall protection design,

including photographs.

- Any deviations from the guidelines and Administration approvals for the deviations.
- Culvert service life verification.
- Inspection documentation and evaluation of existing drainage structures, storm drains and culverts not being replaced.

1.30.03.3 Erosion and Sediment Control (ESC) Report

The ESC Report shall contain all computations for the ESC design and can be either a separate report or can be included in the SWM report. The ESC Report shall conform to SWM Report formatting described above (PR 1.30.03.1.1).

The ESC Report shall contain the following:

- Drainage area maps to control devices for each phase.
- Computations for sizing control devices.
- Plans and procedures for converting sediment control devices into stormwater management facilities.
- Tracking of E&S quantities throughout the duration of the project.
- Identification of and placement of controls in sensitive areas.

1.30.03.4 Final Geotechnical Reports

The Design-Builder shall prepare Final Geotechnical Reports as described in PR 8 – Geotechnical Performance Specification.

1.30.03.5 Pavement Report(s)

Interim Pavement Report(s) and FWD Result Report(s) shall be prepared as outlined in PR 4 – Pavement Performance Specification.

1.30.03.6 Tree Impact Minimization and Avoidance Report

A report shall be prepared that shows the tree and forest locations and describes the alternative measures that the Design-Build Team proposes to use to avoid or reduce impacts to these trees and forest, including alignment or typical section modifications or protective measures as stated in Administration's 2008 Standard Specifications, Section 120. This report will be reviewed and approved in conjunction with the grading plans.

1.30.03.7 Wetland Creation and Stream Restoration Reports

A final Phase I and Phase II report shall be prepared per USACE and MDE requirements.

A Stream Restoration Design Report shall also be provided. The Report shall include, but is not limited to, project description and background, watershed and

stream existing conditions, mitigation design approach and techniques, design discharge analysis and determination, rock sizing and hydrologic and hydraulic modeling including FEMA requirements.

PR 2 GUIDELINES AND REFERENCES

All Project services shall be provided in accordance with these specifications and the relevant requirements of the Guidelines and References listed in Table 1 unless otherwise stipulated in these specifications. Unless noted, the most recent version as of the date of issuance of this RFP for each Guideline and Reference shall apply. Guidelines and references in Table 1 are listed alphabetically by Author or Agency and the order is not intended to imply a priority of one document over any other. Should the requirements in any Guideline conflict with those in another or any other requirement in the Contract Documents, the strictest requirement as determined by the Administration shall govern. It is the Design-Builder's responsibility to obtain clarification for any unresolved or perceived ambiguity prior to proceeding with design or construction.

Table 1

Design-Build Guidelines and References

Author or Agency	Title
AASHTO	A Guide for Transportation Landscape and Environmental Design
AASHTO	A Policy on Design Standards Interstate System
AASHTO	A Policy on Geometric Design of Highways and Streets
AASHTO	DARWin Pavement Design Software
AASHTO	Guide for Design of Pavement Structures - 1993
AASHTO	Guide for the Development of Bicycle Facilities
AASHTO	Guide for the Planning, Design, and Operation of Pedestrian Facilities
AASHTO	Guide Specifications for Structural Design of Sound Barriers
AASHTO	Highway Safety Design and Operations Guide
AASHTO	LRFD Bridge Design Specification, 7th Edition
AASHTO	M288 - Geotextile Specification for Highway Applications
AASHTO	M320 - Performance-Graded Asphalt Binder
AASHTO	M323 - Superpave Volumetric Mix Design
AASHTO	Manual for Assessing Safety and Hardware, 2nd Edition
AASHTO	Manual for Condition Evaluation of Bridges, 2nd Edition
AASHTO	Manual on Subsurface Investigations, 1st Edition
AASHTO	R25 - Superpave Volumetric Design for Hot-Mix Asphalt
AASHTO	Roadside Design Guide, 4th Edition
AASHTO	Roadway Lighting Design Guide

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AASHTO	Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 3rd Edition for traffic signal structures 4th Edition for sign structures (overhead, cantilever, and ground mounted)
AASHTO	Standard Specifications for Transportation Materials and Methods of Sampling and Testing, 35th Edition
AASHTO	T 194 - Standard Method of Test for Determination of Organic Matter in Soils by Wet Combustion
AASHTO	T 88 - Standard Method of Test for Particle Size Analysis of Soils
AASHTO/AWS	D1.5M/D1.5: Bridge Welding Code
ACI	ACI 318 - Building Code Requirements for Structural Concrete
ACOE	HEC-RAS Software, Version 4.1.0
ADA	Americans with Disabilities Act Accessibility Guidelines
ANSI	ANSI A300 (Part 1) - American National Standard for Tree Care Operations - Tree, Shrub and Other Woody Plant Management - Standard Practices (Pruning)
ANSI	ANSI A300 (Part 2) - American National Standard for Tree Care Operations - Tree, Shrub and Other Woody Plant Management - Standard Practices (Soil Management)
ANSI	ANSI A300 (Part 3) - American National Standard for Tree Care Operations - Tree, Shrub and Other Woody Plant Management - Standard Practices (Supplemental Support Systems)
ANSI	ANSI Z133.1 - Safety Requirements
ANSI	ANSI Z60.1 - American Standard for Nursery Stock
ASTM	Annual Books of ASTM Standards
ASTM	D4694 - Standard Test Method for Deflections with a Falling-Weight-Type Impulse Load Device
ASTM	D6433 - Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys
ASTM	E274 - Standard Test Method for Skid Resistance of Paved Surfaces Using a Full-Scale Tire
ASTM	E501 - Standard Specification for Standard Rib Tire for Pavement Skid-Resistance Tests

ASTM	E950 - Standard Test Method for Measuring the Longitudinal Profile of Traveled Surfaces within an Accelerometer Established Inertial Profiling Reference
ASTM	Standards in Building Codes
ATSSA	Quality Guidelines for Temporary Traffic Control Devices and Features
CFR	Code of Federal Regulations (CFR)
COMAR	Code of Maryland Regulations (COMAR)
COMAR	COMAR 15.20.07 – Agricultural Operation Nutrient Management Plan Requirements
COMAR	COMAR Maryland's Lawn Fertilizer Law
DNR	Article 5-103 - Reforestation
DNR	COMAR 08.07.02 - Roadside Tree Care
DNR	COMAR 08.19 - Forest Conservation
Dunnicliff	Geotechnical Instrumentation for Monitoring Field Performance
EPA	Clean Water Act Section 404 Compensatory Mitigation Requirements
FEMA	44 CFR Part 10 - Environmental Considerations
FEMA	44 CFR Part 9 - Floodplain Management and Protection of Wetlands, October 2011
FEMA	Conditional Letter of Map Revision (CLOMR)
FHWA	"Bridge Rails" Memorandum
FHWA	23 CFR 940.11 - Project Implementation
FHWA	Durability of Geosynthetics for Highway Applications
FHWA	FHWA NHI-01-031 - Subsurface Investigations (Geotechnical Site Characterization)
FHWA	FHWA-ED-88-053 Checklist and Guidelines for Review of Geotechnical Reports and Preliminary Plans
FHWA	FHWA-HI-97-013 - Design and Construction of Driven Pile Foundations – Volume I
FHWA	FHWA-HI-97-014 - Design and Construction of Driven Pile Foundations – Volume II
FHWA	FHWA-HI-98-034 - Geotechnical Instrumentation

FHWA	FHWA-NHI-00-043 - Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Design and Construction Guidelines
FHWA	FHWA-NHI-05-037 - Geotechnical Aspects of Pavements
FHWA	FHWA-NHI-09-087 - Corrosion/Degradation of Soil Reinforcements for Mechanically Stabilized Earth Walls and Reinforced Soil Slopes
FHWA	FHWA-NHI-10-016 - Drilled Shafts: Construction Procedures and LRFD Design Methods
FHWA	FHWA-RD-03-031 - Distress Identification Manual for the Long-Term Pavement Performance Program
FHWA	FHWA-SA-91-048 - Laterally Loaded Pile Analysis Program for the Microcomputer, (COM624P) Version 2.0
FHWA	FHWA-SA-94-035 The Osterberg Load Cell for Load Testing Drilled Shafts and Driven Piles
FHWA	FHWA-SA-97-070 - Micropile Design and Construction Guidelines
FHWA	FHWA-SA-98-074 - DRIVEN 1.0 User's Manual: A Program for Determining Ultimate Vertical Static Pile Capacity
FHWA	FHWA-SA-98-086 - Ground Improvement Technical Summaries Volume I
FHWA	Geosynthetic Design and Construction Guidelines,
FHWA	Geotechnical Engineering Circular No. 1: Dynamic Compaction
FHWA	Geotechnical Engineering Circular No. 2: Earth Retaining Systems
FHWA	Geotechnical Engineering Circular No. 4: Ground Anchors and Anchored Systems
FHWA	Geotechnical Engineering Circular No. 5: Evaluation of Soil and Rock Properties
FHWA	Geotechnical Engineering Circular No. 6: Shallow Foundations
FHWA	Geotechnical Engineering Circular No. 7: Soil Nail Walls
FHWA	Geotechnical Engineering Circular No. 8: Design and Construction of Continuous Flight Auger Piles
FHWA	Ground Improvement Technical Summaries Volumes I and II
FHWA	Manual on Uniform Traffic Control Devices (MUTCD)
FHWA	NCHRP Report 350 - Recommended Procedures for the Safety Performance Evaluation of Highway Features

FHWA	NCHRP Report 553 - Crashworthy Work Zone Traffic Control Devices
FHWA	NCHRP Report 672 - Roundabouts: An Informational Guide, 2nd Edition
FHWA	Standard Highway Signs
FHWA	Traffic Noise Model, Version 2.5.
Howard County DPW	Howard County Design Manual - Volumes I thru IV

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IEEE	Guide for Concept of Operations Document
IEEE	Guide for Developing System Requirements Specifications
IEEE	Independent Verification and Validation
IEEE	National Electric Safety Code
IES	DG-5-94 Recommended Lighting for Walkways and Class 1 Bikeways
IES	RP-19-01 Roadway Sign Lighting
IES	RP-22-11, American National Standard for Tunnel Lighting
IES	RP-8-00, American National Standard Practice for Roadway Lighting
ITE	Manual of Transportation Engineering Studies, 2nd Edition
ITE	Traffic Engineering Handbook, 7th Edition
ITS MD	Maryland Statewide ITS Architecture
MDE	2000 Maryland Stormwater Design Manual, Appendix A, Landscaping Guidance for Stormwater BMPs
MDE	2000 Maryland Stormwater Design Manual, Volumes I and II
MDE	2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control
MDE	Antidegradation Review Checklist Major Linear Project Review Form
MDE	Antidegradation Applicant Review Checklist Enhanced Best Management Practices for Tier 2 Waters
MDE	Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated - Guidance for National Pollutant Discharge Elimination System

MDE	Clean Water Act Section 401, Water Quality Certification for MD 404
MDE	COMAR 26.08.02 - Water Quality
MDE	COMAR 26.08.02.10 - Water Quality Certification
MDE	COMAR 26.17 - Water Management
MDE	COMAR 26.17.01 - Erosion and Sediment Control
MDE	COMAR 26.17.02 - Stormwater Management
MDE	COMAR 26.17.04 - Construction on Nontidal Waters and Floodplains
MDE	Environmental Site Design Process & Computations
MDE	Environmental Site Design Redevelopment Examples
MDE	Guidance for Completing a Dam Breach Analysis for Small Ponds and Dams in Maryland
MDE	Maryland Nontidal Wetland Mitigation Guidance
MDE	Maryland's Waterway Construction Guidelines
MDE	National Pollutant Discharge Elimination System General Permit for Construction Activity
MDE	Performance Standards and Monitoring Protocol for Permitee-Responsible Nontidal Wetland Mitigation Sites
MDE	Phase II Mitigation Plan – Required Information
MDE	Stormwater Design Guidance – Addressing Quantity Control Requirements
MDE	Stormwater Design Guidance – Submerged Gravel Wetland
MDE/USACE	MDSPGP – 5 and Nationwide #27
NEMA	National Electrical Manufacturers Association Standards
NFPA	502: Standard for Road Tunnels, Bridges and Other Limited Access Highways
NFPA	70: National Electrical Code
NFPA	National Fire Protection Association
NRCS	Pond Code MD-378
NTCIP	National Transportation Communications for ITS Protocol
OSHA	29 CFR 1910 - Occupational Safety and Health Standards
OSHA	29 CFR 1926 - Safety and Health Regulations for Construction
SHA	2035 LOS Wiring Diagram – Design Forecast Volumes
SHA	ABSCOUR Program

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SHA	Accessibility Policy and Guidelines for Pedestrian Facilities Along State Highways
SHA	Accessible Pedestrian Signals Design Guidelines
SHA	Advance Street Name Sign Policy and Guidelines
SHA	Approved Proprietary Noise Barrier Systems
SHA	Articulating Traffic Detector Mount
SHA	Bicycle Policy and Design Guidelines
SHA	Book of Standards for Highways, Incidental Structures and Traffic Control Applications
SHA	Design Request Form Instructions and Guidelines
SHA	DMS Signface Layouts: CCTV
SHA	Exit Gore Sign Guidelines
SHA	Field Guide for Erosion and Sediment Control
SHA	Flagger Policy at Signalized Intersections
SHA	Form Single Lane Application Guidelines
SHA	Guidance for the Use of Portable Changeable Message Signs (PCMS) in Work Zones
SHA	Guidance on Maintenance of Traffic Alternatives Analysis (MOTAA)
SHA	Guidelines for Application of Rumple Strips and Rumple Stripes
SHA	Guidelines for the Use of Dynamic Lane Merging Strategies
SHA	Guidelines for Traffic Barrier Placement and End Treatment Design
SHA	High Visibility Apparel Policy
SHA	Highway Design Policy and Procedure Manual
SHA	Highway Drainage Manual Design Guidelines
SHA	Highway Drainage Manual
SHA	Highway Hydraulic Division Stormwater Management Facility Safety Policy for Design
SHA	Hinged CCTV Camera Pole Details
SHA	Integrated Vegetation Management Manual for Maryland Highways
SHA	Intelligent Transportation Systems (ITS) Design Manual
SHA	Landscape Design Guide
SHA	Lighting Guidelines
SHA	Line Striping Material Selection Policy

SHA	List of Qualified Detectable Warning Surface
SHA	List of Qualified Loop Sealants
SHA	List of Qualified Permanent Pavement Markings
SHA	List of Qualified Removable Preformed Pavement Marking Material for Maintenance of Traffic
SHA	Manual for the Inspection of Highway Right of Way in Karst Areas
SHA	Maryland High Voltage Line Act
SHA	Maryland Manual on Uniform Traffic Control Devices- (MD MUTCD)
SHA	Maryland Standard Sign Book
SHA	Maryland State Police Criteria for Use in Work Zones
SHA	Maryland Statewide ITS Architecture
SHA	MSMT 563 – Operation of the Inertial Profiler
SHA	NEMA Size 5 UPS Battery Cabinet Details (ITS-24 and ITS-25)
SHA	Office of Structures Guide for Completing Structure Inventory and Appraisal Input Forms
SHA	Office of Structures Manual on Hydrologic and Hydraulic Design
SHA	Office of Structures Policy and Procedure Manual (PPM) including Draft PPMs included in the Appendix which shall be considered final for this Contract
SHA	Office of Structures Structural Standards Manual, Volumes I and II
SHA	Office of Traffic and Safety Approved Product List for Temporary Traffic Control Devices and Miscellaneous Items
SHA	Office of Traffic and Safety Capacity/Queuing Analysis Procedures for Intersections
SHA	OOTS TEDD Traffic Control Devices Design Manual
SHA	Overhead DMS Structure and Access
SHA	Pavement and Geotechnical Design Guide, June 2016
SHA	Pavement Marking Material Selection Guidelines
SHA	Pedestal DMS Access System
SHA	Policy for the Use of Temporary Traffic Barrier in Work Zones
SHA	Preferred Plants List (PPL)
SHA	Quality Assurance Toolkit Field Manual

SHA	Recommended Procedure for Determining Types of Left Turn Phasing
SHA	Roadway Delineation Policy
SHA	Roundabout Design Guidelines
SHA	Roundabout Traffic Design Manual
SHA	Sediment and Stormwater Guidelines and Procedures for State Highway Administration
SHA	SHA Office of Structures Standards for Ground Mounted Concrete Noise Barriers
SHA	SHA-MSP InterAgency Work Zone Service Agreement
SHA	Special Provisions and Special Provision Inserts to the Standard Specifications
SHA	Specifications for Consulting Engineer's Services, Volume II, Section VIII
SHA	Standard Office of Traffic and Safety Shelf Typicals
SHA	Standard Specifications for Construction and Materials, 2017
SHA	Standard Specifications for Subsurface Explorations
SHA	Storm Water Management Safety Policy
SHA	Stormwater Management Site Development Criteria
SHA	Stormwater Management, Erosion and Sediment Control and Waterway Construction Permit Issues and Approaches
SHA	Stormwater NPDES Program – Standards Procedures Manual
SHA	Transportation Management Plans: Guidelines for Development, Implementation and Evaluation
SHA	Type 332/334 Cabinet Details
SHA	Type 332/334 Cabinet Foundation Detail
SHA	Turfgrass Management Guidelines, February 2012 US F&WS Native Plants for Wildlife Habitat and Conservation Landscaping Chesapeake Bay Watershed
SHA	Utility Policy
SHA	V004-10 Surveyor
SHA	Work Zone Lane Closure Analysis Guidelines
SHA	Work Zone Safety and Mobility Policy
SHA	Work Zone Safety Policy

SHA	Work Zone Safety Tool Box
SHA	Work Zones on 65/60 mph Roadways
SHA	Highway Noise Policy & Implementation Guidelines, Final
SHA/MDE	Application of Hydrologic Methods in Maryland
SHA/MDE	Stormwater Management Process Agreements and Interpretations
SHA/MDE	Stormwater Quality Management Banking Agreement
TRB	Accessible Pedestrian Signals: Synthesis and Guide to Best Practices, June 2007
TRB	Highway Capacity Manual, 5th Edition
TRB	TCRP Report 19 - Guidelines for the Location and Design of Bus Stops
USACE	33 CFR Part 332 Compensatory Mitigation Requirements
USACE	Clean Water Act Section 404 Permit Application and Authorization
USACE	National Wetland Plant List
USACE	Regulatory Guidance Letter – Minimum Requirements for Compensatory Mitigation Projects Involving Restoration, Establishment, and/or Enhancement of Aquatic Resources
USACE	Regulatory Sourcebook
USDA	The PLANTS Database (http://plants.usda.gov)
USDOT	National ITS Architecture

PR 3 ROADWAY PERFORMANCE SPECIFICATION

3.1 General

Design and construct roadways in accordance with the requirements of this specification, including performance requirements, standards and references, design and construction criteria, and required submittals.

This section is also intended to allow the flexibility to make Project changes that produce benefit of savings to the Administration and Design-Builder without adversely affecting the essential functions and characteristics of the Project in terms of safety, traffic operations, desired appearance, durability, ease of maintenance, environmental protection, drainage, and other permitted constraints.

3.2 Guidelines

Roadway design and construction shall be in accordance with this Roadway Performance Specification and the relevant requirements of the Guidelines and References in PR 2.

3.3 Performance Requirements

Design and construct all roadways to meet the following performance requirements:

3 1 A. Maximize the continuous dualization of MD 32 from a two-lane undivided arterial to a four-lane divided arterial from the limits of the MD 32 Phase I project (Linden Church Road) in the northerly direction.

B. Meet or exceed all Maryland Department of Transportation State Highway Administration, AASHTO, Authority Having Jurisdiction (AHJ) and other roadway design and safety guidelines as referenced in PR 2, outlined in these specifications, and in accordance with sound engineering principles.

C. All roadway components shall be constructed within the defined right of way and easements

D. Be compatible with the full build out of the MD 32 corridor as identified in the 2005 FEIS.

1 E. The ramp modifications depicted in the concept plans at the I-70 Interchange require the Design-Builder to coordinate with FHWA through MDOT SHA and the Design-Builder to prepare an Interstate Access Point Approval (IAPA) Coordination Letter. Reference the IAPA Guidelines for Maryland documents dated January 2016. Interchange modifications that differ from those depicted in the concept plans may result in a full scale IAPA submission, coordination, and approval by FHWA performed by the Design-Builder through MDOT SHA.

3.4 Design and Construction Criteria

The Design-Builder shall design and construct all roadway geometrics including horizontal alignment, vertical alignment, superelevation, cross slopes, lane widths, shoulder widths, medians,

and clear zone grading in accordance with the requirements of this section and the applicable guidelines for roadway design.

The Concept Plans show a conceptual design for the Project. These Concept Plans and supporting electronic files are included to illustrate the general scope of the improvements and may contain elements that require modification to meet the requirements of this Performance Specification. The

Design-Builder shall verify all information to ensure compliance with the requirements of this Performance Specification.

3.4.1 Design Criteria

MD 32 (Skykesville Road) Criteria	
Design Speed	60 mph
Posted Speed	55 mph and 50 mph
Functional Classification	Rural Other Principal Arterial
Terrain	Rolling
Maximum Superelevation	6%
Average Daily Traffic (ADT) in 2040	51,175
Design Hour Volume (DHV)	8%
Directional Distribution of DHV	73%
Percent Trucks - ADT	10%
Percent Trucks - DHV	9%

MD 144 (Frederick Road) Criteria	
Design Speed	45 mph
Posted Speed	40 mph
Functional Classification	Rural Major Collector
Terrain	Rolling
Maximum Superelevation	6%
Average Daily Traffic (ADT) in 2040	5,200

Interchange Ramp Criteria	
Design Speed	40 mph (25 mph for loops)
Posted Speed	N/A
Functional Classification	N/A
Terrain	Rolling
Maximum Superelevation	8%

Triadelphia Road Criteria	
Design Speed	35 mph
Posted Speed	30 mph
Functional Classification	Howard County – Major Collector
Terrain	Rolling
Maximum Superelevation	4%
Average Daily Traffic (ADT) in 2040	11,000

Local Road Criteria (Rosemary Lane, Access Road 4)	
Design Speed	30 mph
Posted Speed	25 mph
Functional Classification	Howard County – Local Road

Terrain	Rolling
Maximum Superelevation	4%

Residential Access Street Criteria (River Valley Chase)	
Design Speed	30 mph
Posted Speed	25 mph
Functional Classification	Howard County – Access Street
Terrain	Rolling
Maximum Superelevation	4%

Residential Access Place Criteria (Parliament Place, Stiles Way, Fox Chase Road, Vistaview Drive)	
Design Speed	30 mph
Posted Speed	25 mph
Functional Classification	Howard County – Access Place
Terrain	Rolling
Maximum Superelevation	4%

Shared and single driveway designs including turnarounds for dead-end streets shall follow the draft Howard County Design Manual, 2017 revision.

The presence of roadway lighting shall not reduce the requirements for vertical sight distance on sag curves.

3.5 Typical Section

Traffic barrier protection shall be provided along the outside of all roadways, and along the median of roadways where applicable, when clear zone requirements cannot be met. Refer to PR Section 3.10 for traffic barrier requirements.

Typical section elements shall be in accordance with the following criteria:

MD 32 – The typical section shall be a four-lane divided highway with paved shoulders and a grass median except where left-turn lanes are proposed. Lane and shoulder widths shall conform to AASHTO requirements. Rumble strips shall be provided on the inside and outside shoulders.

MD 144 – The typical section shall be a two-lane undivided highway. Lane and shoulder widths shall conform to AASHTO requirements.

Interstate Ramps – The typical section shall be a one-lane or a two-lane ramp with inside and outside paved shoulders. Lane and shoulder widths shall conform to AASHTO requirements. Where two-lane ramps are proposed, an alternate merge shall be used to taper back to the existing typical section.

Triadelphia Road – The typical section of Triadelphia Road shall be a two-lane undivided roadway with 12-foot travel lanes. A 6-foot shoulder and 5-foot sidewalk shall be provided in the westbound direction and an 8-foot shoulder shall be provided in the eastbound direction.

Local Roads / Residential Access Street Roads / Residential Access Place Roads – The typical section of local roads shall follow Howard County Standards.

Shared Driveways / Driveways – The typical section shall conform to Howard County Standards. The design of any shared driveway or driveway shall be coordinated with the property owner(s).

3.6 Design Exceptions

The following design exceptions will be acquired by the Administration:

1. For the existing grade (6%) on MD 32 near Rosemary Lane (from Sta. 436+70 to Sta. 444+00).
2. For the adverse superelevation on MD 32 through the intersection with MD 144 along the curve.

The Design-Builder is responsible for implementing any proposed mitigation noted in the Design Exceptions. No other Design Exceptions will be acquired by the Administration.

3.7 Cross Street and Intersection Improvements

Cross streets shall be constructed to the full cross street typical section within the limits of work required by the horizontal and vertical changes to the roadway. Cross streets shall be tapered to meet the existing typical section where the existing typical section narrows. The Design-Builder shall design and construct smooth transitions to tie into the existing roadways.

The Design-Builder shall provide access to all properties within the corridor. It is the Administration's desire to consolidate access in a manner that is consistent with the FEIS. Public roadways and driveways with direct access to MD 32 may be consolidated to reduce the number of access points along MD 32. At a minimum, Access Road 4 shall be constructed as described in PR 9.1.7.7 to allow utility relocations along the corridor. The Design Builder will be required to grade and stabilize Access Road 4 using the County's standards for a local road. The following criteria shall be met when consolidating access:

1

- Existing signalized intersections are located at MD 144 and the I-70 interchange ramps. No additional signalized intersections will be permitted within the project corridor. The preemption signal at the Dayton Shop shall be provided if an at-grade intersection is proposed.
- Acceleration and deceleration lanes shall be provided for all at grade intersections with public roadways. Intersections with public roadways that are spaced less than 1500 feet apart shall have continuous auxiliary lanes, with the first and last intersection meeting AASHTO requirements for acceleration and deceleration lane length.
- Left-turn accommodations at unsignalized intersections such as J-Turns shall be spaced

appropriately from a public roadway intersection considering the limits of nearby auxiliary lanes and the traffic weave length, and shall meet the requirements in the NCHRP Report 745. The left turn lanes at the J-Turns shall provide full deceleration and storage length. A turn around shall be provided to accommodate a WB-67 vehicle which will require providing extra widening of the pavement or "loons" beyond the normal shoulder. A full acceleration lane shall be provided adjacent to the "loons" in accordance with AASHTO requirements. The Design Build Team shall calculate the intersection sight distance for the mainline left turn with the vehicles crossing two lanes of opposing traffic following AASHTO Intersection Control Case B1 to give more time to execute U-turn maneuvers.

- Left turns from cross streets are prohibited if at-grade intersections are proposed; with the following exceptions:
  - Left turns from the Dayton Shop shall be provided for maintenance vehicles
  - Left turns at MD 144 and I-70 shall be maintained
- For all properties with modified access, no vehicle leaving private property shall have to travel more than 3 minutes, assuming travel speeds at posted speed limits and proposed current year average peak hour intersection delays, to access both directions of MD 32 at the location of the original access point through an interchange, intersection, or public access turnaround (i.e. J-Turns or similar design). Additionally, vehicles returning to properties with modified access shall have to travel no more than 3 minutes in addition to their pre-project commute to return to their property, assuming travel speeds at posed speed limits and proposed current year average peak hour inter section delays.
- 1 Access to River Valley Chase shall be right-in, right-out only. The entrance shall be designed to allow for emergency vehicles to enter the community from northbound MD 32. Roadway design shall incorporate elements to deter non-emergency roadway users from accessing River Valley Chase from northbound MD 32.

The Design-Builder shall provide at least two emergency vehicle turnaround locations. One between Linden Church and Triadelphia Road Bridge and one at the intersection with River Valley Chase / Parliament Place. The locations shown in the Concept Plans have been coordinated with Howard County EMS, any change in location must be approved by the Administration and Howard County.

3.8 Design Vehicle

The design vehicles shall be in accordance with the Maryland Department of Transportation Policy Manual:

Interstate – WB-67 (large semi-trailer, 53 ft. trailer). The design vehicle should be considered for through movements as well as turning movements at all interchanges along interstates.

Freeways/Arterials – WB-62 (large semi-trailer, 53 ft. trailer). The design vehicle should be used on all State routes (excluding interstates). If there is a state to state (MD and US Routes) intersection/interchange, turning movements should be designed to allow for a WB-62 to make all movements through the intersection/interchange. If truck volumes are high, wheel paths through the intersection should be paved.

Adjacent Public Roadways – Use a maximum design vehicle of a WB-50 for a state route to

county roadway (or vice-versa) movement, unless otherwise specified.

Commercial and Residential Access – WB-40 at a minimum but shall be designed according to the vehicles(s) that will utilize the access and coordinated with the property owners. Access to the Dayton Shops shall accommodate a WB-67.

Emergency Turn Arounds – Shall be designed to accommodate a Fire Truck with a 45-foot turning radius.

3.9 Pedestrian and Bicycle Facilities

Sidewalk shall be provided along the north side of Triadelphia Road between the entrance to 3901 Ten Oaks Road and the entrance to 13554 Triadelphia Road, including along the bridge over MD 32.

After construction of this project, bicycles are going to be prohibited on MD 32 south of Burntwoods Road. North of Burntwoods Road, shoulder widths shall not be reduced beyond the minimum required width for bicycle compatibility. For detailed guidance, refer to the requirements outlined in PR 6 Traffic Performance Specification and PR 2 for the SHA Bicycle Policy & Design Guidelines.

3.10 Roadside and Median Barriers

Use of any type of roadside barrier shall be minimized to the extent practicable in favor of a clear zone graded typical section. Where a roadside barrier or median barrier is warranted, traffic barrier protection shall be provided as required per PR 2.

Use of single face concrete barrier is subject to Administration approval and is generally to be avoided. Flaring of the barrier such that it reduces the width of the roadway including the shoulder is not permitted. All concrete barrier shall include two 3” diameter PVC conduits.

Permanent Sand Filled Barrels will not be allowed for permanent end treatments. Traffic barrier end treatments shall match the finish of the adjacent traffic barrier.

3.11 Access to SWM facilities

Maintenance vehicle access shall be provided to SWM and other facilities in accordance with PR 7 – Landscape and Reforestation Design and PR 11– Drainage, Stormwater Management, and Erosion & Sediment Control.

3.12 Construction Stakeout

Refer to SP – Section 107 – Construction Stakeout for Design-Build Projects.

3.13 Right-Of-Way and Easement Lines

The Design-Builder shall define right-of-way and easement lines of the Project for adjacent property

owners, promptly upon request. The Design-Builder shall reset any disturbed or destroyed property corner(s) adjacent to the project upon request from the owner. The Design-Builder shall provide fencing for any properties which have an existing fence disturbed by construction. The Design-Builder shall reset the existing fence or provide black vinyl coated chain link fence. The fence shall be reset or replaced on the same day it is taken down. Any existing fence damaged shall be replaced by the Design-Builder in-kind with the new fence of the same material and aesthetics. Removal, relocation, or replacement of an existing fence shall be coordinated with the owner of the fence and adjacent property owners who may be affected by the fence construction. Every effort should be made to accommodate the scheduling needs of the property owners during fence construction, especially those who have animals on the property.

3.14 MD 32 Dualization Limits

The southern limit of dualization shall begin where the MD 32 Phase 1 project ends, at approximately Milepoint 13.01, 1,320 feet north of the existing structure #1315900 (Linden Church Road). The Design-Builder shall design the horizontal alignment to tie into the Phase 1 project and shall remove the southbound crossover and grind, resurface and restripe the northbound lanes to remove the lane drop.

The northern limit of dualization shall be the existing southbound crossover, south of MD 144. The Design-Builder shall design the horizontal alignment to tie into the existing dualized typical section of MD 32 at this location and shall remove the southbound crossover. North of MD 144, the northbound and southbound pavement of MD 32 shall include pavement widening, grinding, resurfacing and restriping ending the limit of work at the northern intersection of the I-70 interchange.

PR 4 PAVEMENT PERFORMANCE SPECIFICATION

4.1 General

The Administration has provided pavement sections for various Roadway Elements in PR Section 4.6 of this RFP. The Design-Builder may utilize these pavement sections in accordance with PR Section 4.2 below. The pavement sections provided in PR Section 4.6 control any conflicts between them and the type of pavement improvement identified on the Concept Plans.

The Design-Builder may elect to design one or more alternate pavement sections, in accordance with PR Section 4.3, in lieu of utilizing the pavement sections in PR Section 4.6. The Design-Builder's pavement sections must be determined by the Administration, at its sole discretion, to be equal to or better than the sections provided in PR Section 4.6. The design and construction of alternate pavement sections shall be at no additional cost to the Administration.

The Design-Builder shall develop pavement sections for any Roadway element that is needed but not outlined in PR Section 4.6 of this RFP. The Design-Builder shall develop these pavement sections in accordance with PR Section 4.3.

It is the responsibility of the Design-Builder to determine patching quantities in the determination of their Price Proposal and assume all risks associated.

4.1.1 Guidelines and References

Design and construction of all pavements shall be in accordance with this Pavement Performance Specification and the relevant requirements of the Guidelines and References listed in PR 2.

4.2 Use of Pavement Sections Provided by SHA

4.2.1 General

The Design-Builder may use the pavement sections provided in PR Section 4.6.

4.2.2 Submittals

If the Design-Builder uses only the pavement sections provided in PR Section 4.6, the Design-Builder is required to submit the following, subject to review and approval as per PR Section 1.19:

(1) An Interim Pavement Report. This report shall state that the provided pavement sections will be used. If not all pavement sections provided in PR Section 4.6 are used, the report shall state for which Roadway Elements the provided pavement sections will and will not be used. Refer to PR Section 4.3 for submittal requirements if using pavement sections developed by the Design-Builder. This Interim Pavement Report may be submitted separately from those submitted under PR Section 4.3.

(2) The results of all provided soil borings and pavement cores shown in PR Section 4.6 shall be shown on the roadway plan sheets. Boring log information shall be shown on the roadway profile sheets. Laboratory and in-situ test data may be shown on separate plan sheets. A full-size set of plans with pavement section typicals and pavement details shall also be included.

4.3 Use of Pavement Sections Developed by the Design-Builder

4.3.1 General

Where permitted, the Design-Builder may elect to design one or more alternate pavement sections in lieu of utilizing the pavement sections in PR Section 4.6. The alternate pavement section shall not impair the essential functions, characteristics, or quality of the Project, such as safety, traffic operations, ride, long term durability, desired appearance, maintainability, environmental protection, drainage, and other permitted constraints.

The Design-Builder's pavement sections must be submitted to and determined by the Administration, at its sole discretion, to be equal to or better than the sections provided in PR Section 4.6. It is recommended, but not required, that any alternative pavement section is submitted to the Administration as an Alternative Technical Concept. Deferring approval until after award will be at the sole risk of the Design-Builder.

If a Roadway Element is not specifically identified in PR Section 4.6 to be mainline/shoulder/ramp/access road etc., then it shall be considered to be a mainline element designed for mainline traffic. Auxiliary lanes shall be designed for mainline traffic, unless otherwise provided in PR Section 4.6. Ramp sections end at the gore, unless otherwise provided in PR Section 4.6. All new shoulders shall use the design traffic per Pavement and Geotechnical Design – Revised Shoulder Guidance provided on Projectwise. All existing shoulders that will carry traffic shall be designed and improved as necessary to perform under the given loading and environmental conditions for the specified service life periods for travel lane traffic. All existing shoulders that will not carry traffic shall receive the same surface as the adjacent lane.

4.3.2 Requirements

4.3.2.1 Pavement Engineering

The Design-Builder shall be responsible for all pavement engineering for Roadway Elements for which PR Section 4.3.1 applies. The pavement engineering for the Project shall include, but is not limited to, the pavement investigation, pavement type selection, new pavement design, pavement rehabilitation design and material selection.

All of the pavement engineering functions shall be directed, supervised, signed and sealed by a Maryland Registered Professional Engineer with a minimum of 5 years of experience in pavement engineering.

4.3.2.2 Pavement Investigation

4.3.2.2.1 Preliminary Pavement Investigation

Any preliminary pavement investigation performed by the Administration is contained in PR Section 4.6. These studies, if performed, were completed in accordance with applicable standards and with reasonable care. The Administration assumes no responsibility with respect to the sufficiency of the studies for design, or their accuracy in representing actual pavement and subsurface conditions or existing thicknesses over the entire Project limits other than at the specific locations identified or sections tested.

4.3.2.2.2 Complete Pavement Investigation

The Design-Builder shall prepare and perform a complete pavement investigation program to obtain the data needed to fulfill any design requirements of the Project. The Design-Builder is responsible for supplementing the preliminary data with pavement data collected, tested and analyzed as part of the complete pavement investigation program. The pavement investigation shall be done with knowledge about and complimentary to the geotechnical subsurface exploration program. The complete pavement investigation shall be performed per the data requirements in the pavement construction and rehabilitation sections of the SHA Pavement Design Guide. The Design-Builder's complete pavement investigation may include, but is not limited to, the following items:

A) Review and evaluation of as-builts, existing construction and performance records;
B) Visual survey performed on all existing roadways following D 6433;
C) Pavement and soil borings;
D) Mainline and shoulder pavement cores of existing roadways;
E) In-situ sampling and test results;
F) Laboratory test results of field samples;
G) Complimentary data and results from the geotechnical subsurface exploration program;
H) Non-destructive structural deflection testing;
I) Data analysis of any and all field data collection; and
J) Pavement patching survey and estimate.

The complete pavement investigation shall be done under the direction and responsibility of the pavement engineer for the Design-Builder.

4.3.2.3 Pavement Type Selection

The Design-Builder shall provide either a rigid or flexible pavement structure for all new pavement construction according to the criteria set forth in this performance specification. The pavement shall have an initial structural design service life not less than what is specified in PR Section 4.6. The Design-Builder shall maintain a consistent pavement type throughout each Roadway Element.

4.3.2.4 Pavement and Subgrade Materials

All materials used on the Project shall meet or exceed the requirements established in the documents noted in PR Section 4.1.1 of this Pavement Performance Specification. No structural coefficient or pavement layer moduli improvement or structural benefit shall be considered through the incorporation of geosynthetic materials in the pavement structure. Geosynthetic Stabilized Subgrade may be used to improve the subgrade and is encouraged as a good foundation for construction of the pavement section.

4.3.2.4.1 Drainable Granular Pavement Base Materials

Materials containing any Recycled Asphalt Pavement (RAP) are not acceptable as a drainable granular pavement base material. Capping Borrow and Graded Aggregate Base (GAB) are acceptable materials to be used for a drainable granular pavement base material.

In addition to the above materials, materials meeting the following criteria are acceptable as a drainable granular pavement base material:

1) A crushed aggregate with less than 8% passing the No. 200 sieve, a Plasticity Index (PI) of 7 or less, and meeting the aggregate quality requirements for Graded Aggregate Base; and
2) Natural soils with less than 20% passing the No. 200 sieve, a PI of 7 or less, and meeting the aggregate quality requirements for Bank Run Gravel - Base.
3) Recycled Concrete Aggregate (RCA) as per Section 900.03.2 of the 2017 Standard Specifications for Construction and Materials.

4.3.2.4.2 Non-Specification Pavement and Subgrade Materials

The Design-Builder may elect to propose a pavement section that utilizes a pavement material not identified in the current Standard Specifications for Construction and Materials book. In this case, the Design-Builder shall submit the following items as part of or prior to their Interim Pavement Report with a copy to the Office of Materials Technology's Pavement & Geotechnical Division:

A) Material design specification;
B) Material strength and engineering properties;
C) Construction and placement specification;
D) Material quality control plan specification;
E) Long-term performance history; and
F) Where the material will be used, in the subgrade or part of the pavement section.

Justification and an explanation of the structural value coefficients shall be provided for a pavement material not identified in the Standard Specifications for Construction and Materials. Construction of the pavement sections using the subject material shall not occur until the design,

material and construction specifications, and material quality control plan have been through the Design-Builder's Design Management and Design Quality Assurance/Quality Control Plan.

4.3.2.4.3 Restricted Materials

The following materials shall not be used on the Project:

A) Rubber asphalt in asphalt materials;

B) Bottom ash; and

C) Slag, with the exception of blast furnace slag cement.

4.3.2.4.4 Recycled Materials

The Design-Builder may use Recycled Concrete Aggregate (RCA) or Recycled Asphalt Pavement (RAP) in conformance with the Recycled Materials Specification (SP 900.03) contained elsewhere in the documents.

Other recycled materials may be submitted for proposed use following the Non-Specification Pavement and Subgrade Materials requirements above with the following additional documentation:

A) Certification and test data demonstrating compliance with all MDE and EPA requirements for use of recycled materials.

B) Material Safety Data Sheets from the material supplier.

4.3.2.5 Pavement Analysis and Design

The Design-Builder shall design pavement sections in accordance with the requirements set forth in PR 2. In the SHA Pavement Design Guide, refer to chapters with "AASHTO 1993". The July 2008 AASHTO Mechanistic-Empirical Pavement Design Guide (MEPDG) shall not be used.

The Design-Builder may elect to use either flexible or rigid pavement sections, unless otherwise restricted in PR Section 4.6. The Design-Builder shall maintain a consistent pavement type and pavement section in terms of pavement materials and layer thickness for each Roadway Element throughout the limits of the Project. The pavement section is defined as the aggregation of the individual pavement layers. The pavement type and pavement section shall also be consistent for any given ramp and ramp shoulders. The Design-Builder shall design and provide a positive drainage system for either pavement type to adequately drain the entire pavement structure.

No flexible/rigid combination pavement (composite) shall be constructed for the Project, except as needed for narrow base-widening (less than 4' wide) or for replacement of curb and gutter that does not involve base-widening. If a rigid pavement is selected by the Design-Builder, the pavement shall be constructed with Jointed Plain Concrete Pavement (JPCP) with load transfer devices or with Continuous Reinforced Concrete Pavement (CRCP). The pavement constructed shall address surface and subsurface drainage giving due consideration to the prevention of water

becoming trapped in the granular base/subbase of the pavement.

The pavement section for the widening of any existing roadway element shall be designed to support the mainline traffic for that roadway element. In the case that the existing mainline pavement structure is composite, the pavement type for the widening shall match the existing surface type and be designed to support the mainline traffic for that roadway element.

Any construction on roadways not to be maintained by the State shall be designed and constructed in accordance to the standards and guidelines of the governing local municipality or other entity. The MDSHA Pavement Design Guide provides standard pavement sections that shall be used for driveways and bike paths.

4.3.2.5.1 Traffic

Refer to PR Section 4.6 for all traffic data to be used for pavement design purposes.

4.3.2.5.2 Pavement Design Criteria - General

The general design criteria necessary to develop the pavement design for each roadway element shall be in conformance with the criteria in PR Section 4.6. The Design-Builder shall design all pavements utilizing the "Desired Structural Coefficient" as specified in the "SHA Pavement Design Guide" in Section 4.07. The Structural Coefficient for Soil Cement Base Course shall be based on the 7 day Unconfined Compressive Strength (psi) and corresponding Modulus per Figure 2.8 of the AASHTO Guide for Design of Pavement Structures 1993.

4.3.2.5.2.1 New Flexible Pavement Design Criteria

The Design-Builder shall design and construct all flexible pavement sections with Superpave asphalt mix layers developed using the Superpave mix design criteria.

The Design-Builder shall design and construct each flexible pavement layer based on the minimum thicknesses allowed using the layered design analysis approach per Part II, Section 3.1.5 of the "1993 AASHTO Guide for Design of Pavement Structures." For purposes of determining the minimum layer thickness, the following maximum layer moduli shall be used:

1) Select Borrow, Capping Borrow, or Modified Select Borrow, Mr = 10,500 psi;

2) Cement Modified Subgrade, Mr = 10,500 psi;

3) Graded aggregate base, Mr = 25,000 psi;

4) Any bound pavement layer, Mr = 40,000 psi;

4.3.2.5.2.2 New Rigid Pavement Design Criteria

The Design-Builder shall design and construct all rigid pavement sections using JPCP or CRCP. The Design-Builder shall design all rigid JPCP pavements with the following design requirements:

A) Utilizing a Portland Cement Concrete (PCC) mix with equivalent or better longterm performance than SHA Mix #No.7 per Section 902;

B) An unreinforced rigid pavement with load transfer devices (dowels);

C) A maximum transverse joint spacing of 15 feet;

D) Dowel bars shall be placed at the transverse joint 12 inches on center;

E) Longitudinal joint tie bar design based on the other rigid pavement design parameters; and

F) A single $^{1}/_{8}$" wide saw cut one quarter the depth of the PCC layer shall be made to form the location for the transverse joint. No joint reservoir shall be formed, use MD 572.92 as a reference.

G) A joint spacing slab layout including the location of contraction and expansion joints shall be prepared and submitted by the Administration for review and approval.

The shoulders shall be rigid pavement and be tied to the mainline roadway. No more than three lanes shall be tied together in the longitudinal direction. If the mainline adjacent to the shoulder is paved two feet wider than the lane stripe (essentially putting the longitudinal joint in the shoulder), no tie bars are required.

4.3.2.5.2.3 Pavement Rehabilitation Design Criteria of Existing Roadways

The Design-Builder shall provide pavement improvements for all existing roadway elements. Regardless of the type of pavement improvement identified on the Concept Plans, all pavement improvements performed by the Design-Builder must meet all design criteria.

All existing State roadways that are identified roadway widening shall be designed in the same manner as new construction roadways. All existing State roadways that are identified for reconstruction may instead be rehabilitated provided that all design criteria are met. All existing State roadways that are identified for resurfacing shall be designed with an appropriate rehabilitation strategy in accordance with SHA Pavement Design Guide. The depth and materials of all permanent patches shall match the depth and materials of the existing pavement and in accordance with the SHA Pavement Design Guide. All non-state roadways shall be designed in accordance with the local agency standards or per the SHA Pavement Design Guide if no standards exist.

The Design-Builder shall perform a complete pavement investigation for all existing roadways within the limits of the Project. The Design-Builder shall provide the rehabilitation strategy and design for all existing pavement sections of roadway identified for resurfacing within the Project.

All proposed patching locations or criteria shall be submitted to the Office of Materials Technology for approval 5 business days prior to beginning patching work. The depth and

materials of all permanent patches shall match the depth and materials of the existing pavement and in accordance with the SHA Pavement Design Guide.

4.3.2.5.2.4 Temporary Pavement Sections for Maintenance of Traffic

If required for MOT, the Design-Builder shall provide a roadway pavement section capable of safely and structurally supporting mainline traffic. All temporary roadways shall be free of all medium or high severity distress during their operation. All distress and severity levels shall be as identified in D 6433-Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys. Any distress reaching medium or high severity level shall be repaired with 24 hours.

The Design-Builder shall evaluate the condition of any roadway or shoulder to be used to support maintenance of traffic during construction. This evaluation shall be done within the complete pavement investigation required of the Design-Builder. At a minimum, pavement cores of the existing roadway shall be obtained by the Design-Builder and the structural capacity validated through an appropriate analysis by the Design-Builder's pavement engineer. This shall be done in all cases where any existing roadway or shoulder will be used for maintenance of traffic purposes and is expected to have different traffic patterns than those that existed prior to the notice to proceed for the Project.

The Design-Builder's pavement engineer shall determine if the roadway has adequate structural capacity to support maintenance of traffic and what, if any, construction is required to provide a pavement structure capable of supporting mainline traffic volumes. The results of the pavement investigation along with the maintenance of traffic pavement design and structural improvements shall be provided to the Administration as part of the Design-Builder's design review process prior to moving any traffic on a roadway or shoulder that was not supporting mainline traffic prior to the notice to proceed for the Project.

Existing roadways used for maintenance of traffic, and new pavement constructed for maintenance of traffic that will ultimately be used as permanent shoulders or roadways, shall be restored to a suitable condition and meet the ultimate design requirements at the completion of the work. The Design-Builder shall be responsible for maintaining roadways used for maintenance of traffic.

Design requirements for temporary flexible pavement for Maintenance of Traffic pavements are identified in the SHA Pavement Design Guide. The same minimum and maximum subgrade strength identified in PR Section 4.6shall apply for temporary roadways.

4.3.2.5.3 Pavement Structure Drainage and Frost Protection

The pavement sections shall be of a sufficient depth to protect against pavement heaving due to frost. The depth of the pavements for frost protection purposes shall be as noted in PR Section 4.6. The frost protection pavement depth includes the surface layer, the granular and bound pavement base layers, and the granular and bound subgrade improvement layers.

The Design-Builder shall design and provide a positive drainage system to adequately drain the entire pavement structure. The pavement drainage system may include longitudinal underdrains, prefabricated edge drains, underdrain outlets, subgrade drains, a free-draining granular layer or

combination and variations thereof.

If underdrains are used, space outlets for longitudinal underdrains at intervals as required by the applicable guidelines. If the required spacing for outlets cannot be achieved, the Design-Builder shall submit in writing the location of each spacing issue, their justification for why they are unable to obtain the required spacing and the spacing they can achieve based on the following guidelines:

- For distances exceeding the required spacing but not exceeding 600 feet the Design-Builder shall use 8 inch longitudinal underdrain.
- For distances exceeding 600 feet but not exceeding 900 feet the Design-Builder shall use l0 inch longitudinal underdrain.
- Under no circumstances will outlets be allowed to be space greater than 900 feet apart.
- The size of the longitudinal underdrain will be the same for the entire length of longitudinal underdrain between two outlets.
- Underdrain outlets shall be the same size as the longitudinal underdrain it drains.

The Administration will review each location and respond in writing whether or not the Administration agrees that no suitable outlet point exists and approves the outline underdrain spacing detailed for each location. Determination of the suitability of an outlet point and approval of outlet spacing is at the Administration's sole discretion.

All pavement sections shall include, at a minimum, a 4" granular base layer in the pavement section to facilitate pavement drainage, and between the asphalt layer and any chemically stabilized base/sub-base/subgrade-stabilization. The use of open-graded granular layers shall require the use of properly designed aggregate or geosynthetic filters. Geotextiles used in subsurface drainage and separation applications shall be designed in conformance with AASHTO M288. The pavement drainage system shall be designed in a manner that will minimize the future maintenance of the system.

4.3.2.5.4 Subgrade

The Top of Subgrade shall be identified by the Design-Builder on the pavement details. Any material placed above the Top of Subgrade shall be considered part of the pavement structure. Any material placed below or other work below Top of Subgrade shall be considered a subgrade improvement.

4.3.2.5.4.1 Design of Subgrade for Pavements

Borings must extend a minimum of 10 feet below the proposed Top of Subgrade, and the spacing along the roadway alignment shall not exceed 500 feet. The minimum design subgrade resilient modulus (Mr) at the Top of Subgrade shall be 4,500 psi. When the native soils are not capable of providing the minimum design strength, a subgrade improvement strategy shall be included in the pavement design to reach the minimum strength requirement at the Top of Subgrade.

The Design-Builder shall specify the design subgrade strength, planned subgrade improvements, and as-needed subgrade improvements in the Interim Pavement Report. The same design subgrade

strength value shall be used throughout the entire area of each roadway element. In the case that a subgrade improvement is used throughout a significant portion of a roadway element, it shall be shown in the pavement details.

The Project shall be test rolled in accordance with Section 204.03.01(c) of the Standard Specifications for Construction and Materials, even if using a pavement section other than presented in PR Section 4.6. Passing test rolling shall signify that a section of subgrade has reached a stable construction platform and that the minimum subgrade strength of 4500 psi, has been achieved at the Top of Subgrade.

In the case that the Top of Subgrade does not pass test rolling, the Design-Builder shall improve the failed area to a point that it meets or exceeds the minimum required design subgrade modulus specified by the Design-Builder in the Interim Pavement Report. Additional test rolling of the failed area shall be performed after improvement to verify the minimum required design subgrade modulus has been achieved at the Top of Subgrade. FWD testing results and field notes shall be required to confirm the minimum subgrade strength was achieved and shall be included in the FWD Results Report. Falling-Weight-Deflectometer (FWD) testing is only required for design subgrade resilient modulus values greater than 4500 psi.

4.3.2.5.4.2 Acceptable Subgrade Improvement Strategies

Acceptable subgrade improvement strategies include both mechanical and chemical subgrade improvements and are identified in the Standard Specifications for Construction and Materials. Subgrade improvement techniques not included in the Standard Specifications for Construction and Materials require the following justification documentation for review by the Administration's in the Design-Builders design review process:

A) Material design specification;

B) Material strength and engineering properties;

C) Construction and placement specification;

D) Material quality control plan specification;

E) Long term performance history; and

F) Material Safety Data Sheets for any recycled material.

Construction of the subgrade improvements using the subject techniques shall not occur until the design, material and construction specifications, and material quality control plan have been reviewed through the Design-Builder's design quality process and in the Interim Pavement Report. The Design-Builder shall adhere to the approved material and construction specifications.

Subgrade improvement techniques proposed by the Design-Builder shall have a proven history of performance in similar applications. Subgrade improvements shall not utilize materials or construction practices that could endanger the safety of the public or be detrimental to the

environment in either the short or long term. Any subgrade improvement technique contained in the SHA Standard Specifications for Construction and Materials is considered acceptable without additional supporting documentation.

4.3.3 Submittals

For each Roadway Element that the Design-Builder designs, the Design-Builder is required to submit three reports:

(1) A Pavement Investigation Plan Report that details the pavement information that will be collected; and
(2) An Interim Pavement Report that details the information that was collected, and all analysis and designs.
(3) An FWD Results Report (only if FWD testing is done) that details the FWD testing pattern and results.

Multiple Roadway Elements may be combined for each of these reports. For Roadway Elements provided by the Administration that the Design-Builder uses, refer to PR Section 4.2.

All submittals shall be subject to review and approval as per PR Section 1.19.

4.3.3.1 Pavement Investigation Plan Report

The Design-Builder shall prepare a Pavement Investigation Plan Report for the pavement needs of each Roadway Element. The Pavement Investigation Plan Report shall include the type, details, frequency, and approximate location of testing needed to perform a complete pavement investigation.

The Pavement Investigation Plan Report shall also include a checklist detailing whether each required item was completed. A Report with an incomplete checklist will not be reviewed. If the Design-Builder wishes to exclude any required item from the complete pavement investigation, an explanation of why the testing is not needed must be included.

The review of the Pavement Investigation Plan Report shall be incorporated into the Design-Builder's Design Quality Plan. The review of the report will be completed within the appropriate design stage for each Roadway Element and a copy of the Pavement Investigation Plan Report shall be sent to the Office of Materials Technology's Pavement and Geotechnical Division.

4.3.3.2 Interim Pavement Report

The Design-Builder shall develop and submit an Interim Pavement Report for each Roadway Element of the Project at the Readiness for Construction Review or Interim Review Stage. The Interim Pavement Report shall come with a full size set of plans of the area covered by the report, a copy of any reports referred to in the pavement report, and contain the Design-Builder's plans for addressing the pavement design sections for the following:

A) New roadways for mainline, shoulders and ramps;

B) Pavement rehabilitation treatments;

C) Widening and reconstruction for existing roadways and other paved areas;

D) Roadway and pavement base/subbase drainage;

E) Other pavement related matters on the Project; and

F) Pavement Material selection.

The Design-Builder shall provide a pavement section for each Roadway Element in the Interim Pavement Report and shall submit it to SHA's Office of Materials Technology for review and comment. The Administration will use AASHTO's DARWin Pavement Design Software to evaluate the pavements designs submitted. A Pavement Engineer for the Design-Builder, who is a registered P.E., shall supervise all work and seal the Interim Pavement Report.

The Design-Builder shall obtain all information necessary to properly complete the Interim Pavement Report. The Interim Pavement Report shall include the design inputs and calculations used to develop the pavement sections.

The results of all soil borings and pavement cores, both the Administration's and the Design-Builder's, shall be shown on the roadway plan sheets. Boring log information shall be shown on the roadway profile sheets. Laboratory and in-situ test data may be shown on separate plan sheets. The recommendations contained in the Interim Pavement Report shall be incorporated into the plans and specifications developed for the Project.

The Interim Pavement Report shall contain pavement design items deemed important by the Design-Builder. The Interim Pavement Report shall contain, but is not limited to the following items:

1) Testing results from the Complete Pavement Investigation:

a) Summary of records review of as-builts, existing construction and performance records;
b) Pavement condition index (PCI) and distress summaries on all existing roadways following D 6433;
c) Location and result of pavement and soil borings;
d) Location and result of mainline and shoulder pavement cores of existing roadways;
e) In-situ test results;
f) Laboratory test results of field samples;
g) Location and result of non-destructive structural deflection testing;
h) Findings and summary of data analysis of any and all field data collection; and
i) Estimate of pavement patching needs.

2) Summary of critical design values and elements from the Complete Pavement Investigation:

   a) Records review analysis of each existing and new pavement section;
   b) Analysis and pavement design of all roadways;
   c) All design input requirements for AASHTO and SHA Pavement Design criteria;
   d) Traffic data, analysis and calculation of the equivalent single axle load (ESAL) for each roadway element;
   e) Structural capacity values (required, effective and original) for each roadway element;
   F) Structural pavement layer calculations used to develop pavement sections needed for the required structural capacity; and
   g) Design subgrade resilient modulus (Mr) or modulus of subgrade reaction.

3) Subgrade improvement - treatments and stabilization strategies;

4) FWD testing program guidelines and testing qualifications if effective design subgrade strength values are greater than the minimum values required;

5) Temporary pavement details and design/construction approaches to meeting performance requirements during maintenance of traffic operations;

6) Specific material selections for each pavement layer within the pavement section for each roadway element;

7) Rehabilitation techniques used for existing roadways:

   a) Selection criteria used in determining of pre-overlay treatments (patching and grinding needs) and the estimated quantity;
   b) Reasoning for selection of rehabilitation technique with respect to the pavement performance criteria;
   c) Structural improvement strategy for existing roadway;
   d) Functional improvement strategy for existing roadway;
   e) Existing roadway conditions; and
   f) Existing Design subgrade Resilient Modulus (Mr).

8) Specifications for all materials to be used in the pavement section for each roadway element;

9) Pavement drainage design and construction strategies;

10) Use of unique or innovative construction techniques, i.e. automated dowel bar insertion, intelligent compaction, etc;

11) Pavement details; and

12) Full-size set of plans with pavement section typicals and pavement details included.

The Interim Pavement Plan Report shall also include a checklist detailing whether each required item was completed. A Report with an incomplete checklist will not be reviewed. If the Design-Builder wishes to exclude any required item from the Interim Pavement Report, an explanation of why the item is not needed must be included.

Interim Pavement Plan Report Review Meeting. The Design-Builder shall conduct a review meeting with OMT-PAGD, OMT-EGD, OMT-Asphalt Technology, and OMT-Concrete Technology to discuss design intent, strategy, and review the Interim Pavement Plan Report. This meeting should occur concurrently with the initial IDQM review of the Interim Pavement Plan Report to allow for incorporation of OMT and IDQM comments into subsequent resubmissions. At a minimum, the Design-Build Team shall have their Design-Build Project Manager, Design Manager, Construction Manager, Geotechnical Engineer, and a member of the IDQM Firm present at the meeting. The Design-Builder shall prepare meeting minutes and distribute them to attendees for review and comments.

4.4 Pavement Construction

Construction of all pavement materials shall be in accordance with the Standard Specifications for Construction and Materials unless modified in this Pavement Performance Specification or in the specifications developed by the Design-Builder.

4.4.1 Construction of Pavement Subgrades

The Design-Builder shall be responsible for construction of a suitable and stable subgrade on which to place the pavement section. The Top of Subgrade shall be test rolled prior to placing the base course in the Pavement Section(s). Any movement in the Top of Subgrade during test rolling shall be an indication of unstable subgrade or the presence of unsuitable material. Unstable or unsuitable areas shall be treated as recommended in the Final Geotechnical Report. After treatment, the area shall again be test rolled. Any area still showing movement shall receive additional corrective treatment.

In the presence of surface water and/or within 3 feet below the proposed subgrade, the Design-Builder shall engineer the subgrade (e.g. Drainage Blanket, Subgrade drain) to handle the water and moisture conditions. In case of pumping of subgrade the D-B shall stabilize the subgrade prior to placement of sub base or base material.

FWD testing is required for cases where the design subgrade modulus is greater than 4500 psi, and shall occur after the Design-Builder has properly constructed and compacted the Top of Subgrade. The Design-Builder shall provide testing program guidelines and vendor qualifications for FWD testing in the Interim Pavement Report. The FWD testing program for subgrade resilient modulus shall adhere to the following test parameters and requirements:

A) ASTM D 4694 shall be followed in the data collection with the FWD.

B) No data collection shall occur on a frozen subgrade and ambient air temperature shall be greater than 40 degrees F.

C) The Design-Builder shall use a FWD testing vendor that can demonstrate at least 3 years worth of experience in FWD testing and analysis and submit that information with the Interim Pavement Report;

D) Load plate radius = 9 inches;

E) Minimum load applied = 4,000 pounds, maximum load = 9,000 pounds; and

F) All FWD data shall be collected and stored electronically and submitted as a package with the data analysis to verify subgrade resilient modulus strengths.

FWD set-up, load packages, spacing, and analysis shall be as specified in the following table:

ITEM	REQUIREMENTS	COMMENTS
Sensor Spacing	0", 12", 18", 24", 36", 48", 60"	Additional sensors are acceptable
Load Package	AA1B2	A = Seating Drop of 6,000 lbs. B = Seating Drop of 9,000 lbs. 1 = Recorded Drop of 6,000 lbs. 2 = Recorded Drop of 9,000 lbs.
Test Pattern	One per every 100 yd^2 of prepared subgrade in the mainline and shoulder, minimum of 5 tests.	
Analysis	$Mr = \frac{1.5pa}{\Delta_z}$	p = applied load (psi) a = radius of load plate (in) Δ_z = measured deflection (in)

The average subgrade strength as tested by the FWD must meet or exceed the design subgrade strength, no more than 20% of the test points may be below the design subgrade strength, and no individual point may be less than 80% of the design subgrade strength. The prepared subgrade shall be improved as appropriate to ensure that the design subgrade strength requirements are met. The limit of improvement may be modified through more frequent and additional FWD testing in the travel lane or shoulder in question.

The Design-Builder shall submit the results of all subgrade improvement testing including Falling Weight Deflectometer test results to the Administration's Pavement and Geotechnical Division within 72 hours of completion of the testing.

4.4.2 Removal of Pavement Markings

The Administration will allow the Design-Builder to eradicate all existing pavement markings that conflict with the Design-Builder's per Section 558. For areas where existing pavement markings have been eradicated, the Design-Builder shall overlay the entire pavement surface, from shoulder edge to shoulder edge, and reinstall permanent pavement markings. If milling, the depth shall be sufficient to remove the entire thickness of the existing surface layer of the pavement. The Design-Builder shall not install temporary pavement markings other than temporary marking tape on final roadway surfaces.

4.4.3 Repair of Damaged Pavement

The Design-Builder shall perform pavement repairs of all distressed areas related to the operations of the Project. Distressed areas shall be defined as any medium and high severity distress in existing pavement and any low, medium or high severity level for new construction or reconstruction pavement section. All distress and severity levels shall be as identified in D 6433-Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys. Any damage to the pavement in the Project or adjacent pavements caused by operations of the Design-Builder shall be repaired to the satisfaction of the Administration at the Design-Builder's expense. The depth and materials of all permanent patches shall match the depth and materials of the existing pavement and in accordance with the SHA Pavement Design Guide.
In addition, the Design-Builder shall perform patching and other necessary repairs to maintain traffic during all construction operations at no additional expense to the Administration.

4.5 Performance Criteria

The parameters that will be used to evaluate performance of all constructed pavements are:

A) Structural capacity;

B) Skid resistance;

C) Visual appearance; and

D) Ride quality.

These parameters will be evaluated by the Design-Builder in coordination with the Administration, during construction and at Final Administration Acceptance. If corrective action needs to be taken, the Design-Builder shall coordinate all such activities to minimize disruption to the traffic at no additional cost to Administration.

4.5.1 Structural Capacity

The structural capacity (thickness and strength) of 100% of all pavement sections shall be evaluated during the design and construction phase through the Design-Builder's Quality Plan. The parameters that will be evaluated include thickness, strength, and quality of materials. The thickness, strength, quality, and proper placement of materials shall be evaluated to ensure compliance with the Design-Builder's Design and Construction Quality Plans. Final Acceptance will require meeting or exceeding the design criteria as well as meeting proper construction requirements. The Design-Builder shall provide documented field evidence and/or data that confirms the design thickness for each pavement layer, and tack/bond between each layer was achieved after final construction. If the structural capacity is determined to be deficient by the Design-Builder or the Administration, the Design-Builder shall take corrective action at no expense to the Administration.

4.5.2 Skid Resistance

The Design-Builder shall construct a pavement surface that shall meet or exceed an average friction number of 45 for each travel lane to provide adequate skid resistance for each roadway element. The friction number of the roadway shall be collected and determined in accordance with "Standard Test Method for Skid Resistance of Paved Surfaces Using a Full-Scale Tire" (E 274) and "Specification for Standard Rib Tire for Pavement Skid-Resistance Tests" (E 501). The Design-Builder shall be responsible for the friction number data collection. The Design-Builder may elect to request the Administration to collect friction data. If the Design-Builder disputes the friction number collected by the Administration, the Design-Builder must collect the data through other means in accordance with this specification for justification of friction number dispute.

A friction number data test point shall be collected every two-tenths of a lane-mile for each travel lane, at a minimum testing frequency. The average of all test points collected for each roadway element shall meet or exceed a friction number of 45 with no single data point falling below 35. Roadway elements with pavements exhibiting values less than an average friction number of 45 or a single data point less than 35 shall require corrective action from the Design-Builder to provide average friction number values that exceeds 45 and is projected to provide that value for at least 5 years into the future. Data collection 5 years into the future shall not be required. The Design-Builder shall provide justification and evidence that the corrective action will provide the friction number of 45 for 5 years into the future. A flexible pavement constructed with a surface layer meeting the requirements of this specification with an approved high polish value aggregate source shall be considered as satisfying the skid resistance performance criteria.

4.5.3 Visual Appearance

The Design-Builder shall provide a pavement for each roadway element that is visually appealing and free of distress. The pavement surface shall have a consistent color and texture. The Design-Builder shall minimize the number of construction joints. The construction joints that do exist shall be visibly straight and performing as intended. The Design-Builder shall be required to provide a pavement surface that is free of any severity distress. All distress and severity levels shall be as identified in D 6433-Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys. A visual survey shall be done on a representative sample of the pavement per D 6433. The Design-Builder shall take corrective action to ensure the visual appearance is in accordance with this specification.

4.5.4 Ride Quality

Ride quality shall be evaluated in all travel lanes for each roadway element based on the SP 535 Pavement Surface Profile specification provided in the contract documents.

4.6 Project-Specific Data and Criteria

4.6.1 General

This section includes geotechnical, pavement data and pavement sections, and criteria for design. This section shall control any conflicts between PR Section 4.3 and this section.

4.6.2 Scope of Work

Based on the project Plans, the current scope of the project includes the following items of work:

- Rehabilitation of existing MD 32 and Ramps from NB MD 32 to WB I-70 within the project limits.
- Full-Depth construction of new MD 32 SB travel lanes and shoulders from Linden Church to I-70 (**Dualization of MD 32**).
- Base widening and full-depth reconstructing of existing MD 32 and other selected areas within the project limits.
- Full-Depth pavement base widening of MD 32 Ramps from NB MD 32 to WB I 70.
- Full-Depth construction of new access roads.
- Construction of bridges and Full-Depth reconstruction of their respective bridge approaches at Triadelphia Bridge over MD 32, Middle Patuxent Bridge and bridges No. 1302300 and No. 1302201 over Terrapin Branch.
- Full-Depth base widening and full-depth reconstruction of residential driveways within the project limits.
- Pavement removal at selected locations.

4.6.3 Roadway Elements

The following Roadway Elements have been identified:

1. Roadway Element 1: This includes:
   - Full-depth construction of two new travel lanes and shoulders on MD 32 SB to accommodate a divided highway with wide median.

2. Roadway Element 2: This includes:
   - Full-depth base widening of the existing MD 32 mainline, shoulders, acceleration/deceleration and turn lanes.
   - Rehabilitation of existing MD 32 Mainline between STA. 206+50± to 560+00±.

3. Roadway Element 3: This includes:
   - Full-depth base widening of the existing MD 32 Ramp F to I-70 EB, MD 32 Ramp H to I-70 WB, and Triadelphia Road.
   - Rehabilitation of existing MD 32 Ramp F to I-70 EB and MD 32 Ramp H to I-70 WB.

4. Roadway Element 4: This includes:
   - Full-depth construction of new Access Road 4.
   - River Valley Chase Road base widening.

5. Roadway Element 5: This includes:
   - Full-depth reconstruction of the bridge approaches for the following bridges:
     - Triadelphia Bridge over MD 32.
     - Middle Patuxent Bridge

- The MD 32 bridges over Terrapin Branch and No. 1302300 and 1302202 over Terrapin Branch.

6. Roadway Element 6: This includes:
   - Triadelphia Road base widening

7. Roadway Element 7: This includes:
   - Full-depth base widening and reconstruction of residential driveways connecting to the following roadways:
     - River Valley Chase.
     - Stiles Way.
     - Access Roads.
     - MD 32.

4.6.4 Pavement Sections

For Roadway Element 1, a concrete pavement section and an alternate asphalt pavement section are provided. The Design-Builder shall choose a pavement type for this Roadway Element. Note that for all provided pavement details, information and details from corresponding standards in the Book of Standards that are missing from the provided details still apply.

The Design-Builder may choose to design the pavement for each Roadway Element in accordance with PR Section 4.3. The chosen pavement type shall be consistent in all aspects for the entire Roadway Element. If the scope of work changes so that a roadway is to be constructed and no pavement sections are provided, the pavement shall be designed in accordance with PR Section 4.3.

4.6.4.1 Rehabilitation (Applies to all Elements with existing pavements):

The following rehabilitation sections shall follow the guidance of section 4.6.4.1. Use the materials listed below:

4.6.4.1.1 Patching:

Patch existing roadways within design elements per PR Section 4.3.2.5.2.3. The patching identification shall be in accordance with the SHA Pavement and Geotechnical Design Guide. Use the following material for patching:

5" Superpave Asphalt Mix 19.0 mm for Partial-Depth Patch, PG 64S-22, Level 2

Variable-Depth Superpave Asphalt Mix 19.0 mm for Full-Depth Patch, PG 64S-22, Level 2

Note: For full-depth patching match existing pavement thickness or 14", whichever is thicker.

4.6.4.1.2 Fine Milling:

Fine Milling is not required on this project except for tie-in purposes and for maintaining the required clearance under structures.

Fine Milling Asphalt Pavement (1-2.5" Depth)

4.6.4.1.3 Wedge/Level:

If wedge/level is needed to make grade or cross slope corrections, use the following material:

For 2" maximum lifts, use Superpave Asphalt Mix 9.5mm for Wedge/Level, PG 64S-22, Level 2
For 2" to 4" lifts, use Superpave Asphalt Mix 19.0mm for Wedge/Level, PG 64S-22, Level 2

4.6.4.1.4 Resurfacing:

The surface layer specified within each Roadway Element shall be used for resurfacing of the existing roadways.

4.6.4.2 Pavement Sections - Roadway Element 1

4.6.4.2.1 Concrete Pavement Sections

If concrete is the chosen pavement type for new construction, the following minimum rigid pavement section shall be placed for Roadway Element 1 within the project limits:

12" Jointed Plain Portland Cement Concrete, Mix No. 7
6" Graded Aggregate Base Course

Associated Standard(s): N/A
Associated Detail: A

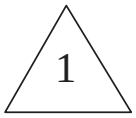
Note: The Graded Aggregate Base layer may be substituted with Reclaimed/Recycled Concrete as per Section 900.03.02.

Notes:

1- Maximum transverse joint spacing shall be 15 feet and there shall be no mid-slab reinforcement.
2- Dowel bars for transverse joints: # 12 smooth/plain dowel bars, 18" long, epoxy coated and 12" spaced center to center. Maximum joint spacing shall be 15'.
3- Longitudinal tie bars at longitudinal slab/curb interface: # 4 deformed bars, 36" long, spaced 36" center to center.
4- Joints shall be saw-cut as per MD 572.92 and shall not be sealed.

4.6.4.2.2 Asphalt Pavement Sections

If Asphalt is the chosen pavement type for new construction, the following minimum flexible pavement section shall be placed within the project limits:



2" Gap-Graded Asphalt Mix 12.5mm for Surface, PG 64E-22, Level 5
3.5" Superpave Asphalt Mix 19.0mm for Base, PG 64S-22, Level 2
9" Superpave Asphalt Mix 25.0mm for Base, PG 64S-22, Level 2 (Two 4.5" Lifts)
12" Graded Aggregate Base (Two 6" Lifts)
Associated Standard(s): N/A
Associated Detail: B

Note: The Graded Aggregate Base layer may be substituted with Reclaimed/Recycled Concrete as per Section 900.03.02.

4.6.4.2.3 New Curb and Gutter Along New Pavement

For new combination curb and gutter along new pavement refer to details A, B, and C.

4.6.4.2.4 New Curb and Gutter Placement Along Existing Pavement:

For new combination curb and gutter along existing pavement refer to Standard No. MD 580.03.

4.6.4.3 Existing MD 32 - Roadway Element 2

4.6.4.3.1 Asphalt Pavement Section for Full-Depth Base Widening

For full-depth base widening, the following minimum flexible pavement section shall be placed:

2" Gap-Graded Asphalt Mix 12.5mm for Surface, PG 64E-22, Level 5
3.5" Superpave Asphalt Mix 19.0mm for Base, PG 64S-22, Level 2
9" Superpave Asphalt Mix 25.0mm for Base, PG 64S-22, Level 2 (Two 4.5" Lifts)
12" Graded Aggregate Base Course (Two 6” Lifts)

Associated Standard(s): N/A
Associated Detail: B

Note: The Graded Aggregate Base layer may be substituted with Reclaimed/Recycled Concrete as per Section 900.03.02.

4.6.4.3.2 Rehabilitation

The following rehabilitation sections shall follow the guidance of PR Section 4.6.4.1. Use the materials listed below for the existing MD 32 pavement:

4.6.4.3.2.1 Resurfacing:

2" Gap-Graded Asphalt Mix 12.5mm for Surface, PG 64E-22, Level 5

Associated Standard(s): N/A
Associated Detail: C, G

4.6.4.4 Existing MD 32 Ramps F and H - Roadway Element 3

4.6.4.4.1 Full-Depth Base Widening

For full-depth base widening, the following minimum flexible pavement section shall be placed:

2" Superpave Gap Graded Asphalt Mix 12.5 mm for Surface, PG 64E-22, Level 5
3" Superpave Asphalt Mix 19.0mm for Base, PG 64S-22, Level 2
9" Superpave Asphalt Mix 25.0mm for Base, PG 64S-22, Level 2 (Two 4.5" Lifts)
12" Graded Aggregate Base Course (Two 6” Lifts)

Associated Standard(s): N/A
Associated Detail: C

Note: The Graded Aggregate Base layer may be substituted with Reclaimed/Recycled Concrete as per Section 900.03.02.

4.6.4.4.2 Rehabilitation

The following rehabilitation sections shall follow the guidance of PR Section 4.6.4.1. Use the materials listed below for the existing MD 32 pavement:

4.6.4.4.2.1 Resurfacing:

2" Gap-Graded Asphalt Mix 12.5mm for Surface, PG 64E-22, Level 5

Associated Standard(s): N/A
Associated Detail: C, G

4.6.4.5 Access Roads– Roadway Element 4

4.6.4.5.1 Full-Depth Pavement Construction and Base Widening

The following minimum flexible pavement section shall be placed for the construction of Roadway Element 4:

1.5" Superpave Asphalt Mix 9.5 mm for Surface, PG 64S-22, Level 2
6" Superpave Asphalt Mix 19.0 mm for Base, PG 64S-22, level 2 (Two 3" Lifts)
6" Graded Aggregate Base Course

Associated Standard(s): N/A
Associated Details: D, E

Note: The Graded Aggregate Base layers may be substituted with Reclaimed/Recycled Concrete as per Section 900.03.02.

4.6.4.6 Bridge Approaches – Roadway Element 5

For bridge approach pavement sections, refer to Standard No. MD 580.09.

4.6.4.6.1 Full-Depth Bridge Approach (Triadelphia Bridge)

For Triadelphia Bridge approach pavement sections use, Standard No. MD 580.09, medium traffic detail.

Note: The Graded Aggregate Base layers may be substituted with Reclaimed/Recycled Concrete as per Section 900.03.02.

4.6.4.6.2 Full-Depth Bridge Approaches on MD 32

For Terrapin Branch Bridges No. 1302300, and No. 1302201 and for the Middle Patuxent Bridge approach pavement sections on MD 32 use heavy traffic detail of referred standard. Instead of Superpave Asphalt Mix 12.5 mm for Surface, PG76E-28, Level 2, use the following for surface:

2" Gap-Graded Asphalt Mix 12.5mm for Surface, PG 64E-22, Level 5

Note: The Graded Aggregate Base layer may be substituted with Reclaimed/Recycled Concrete as per Section 900.03.02.

4.6.4.7 Triadelphia Road Base Widening – Roadway Element 6

For full-depth base widening at Triadelphia road, the following minimum flexible pavement section shall be placed:

2" Superpave asphalt Mix 12.5 mm for Surface, PG 64S-22, Level 2
10" Superpave Asphalt Mix 25.0 mm for Base, PG 64S-22, Level 2 (Two 5" Lifts)
12" Graded Aggregate Base Course (Two 6" Lifts)

Associated Standard(s): N/A
Associated Detail: F

Note: The Graded Aggregate Base layer may be substituted with Reclaimed/Recycled Concrete as per Section 900.03.02.

4.6.4.8 Driveways – Roadway Element 7

For driveways, refer to Standard No. MD 580.08 Driveways & Bike Paths.

Note: The Graded Aggregate Base layer may be substituted with Reclaimed/Recycled Concrete as per Section 900.03.02.

4.6.5 Traffic Data

The Design-Builder shall use the following traffic data if developing alternate pavement designs for this Project.

	Elements 1 and 2		Element 3	
	MD 32 (Sykesville Rd.)		Ramps F and H	
Year	2015	2040	2015	2040
Average Daily Traffic (ADT)	29,475	51,175	6,765	11,083
Percent Trucks	10%	10%	11%	11%
Truck Factor - Rigid	2.19	2.19	2.19	2.19
Truck Factor - Flexible	1.51	1.51	1.51	1.51
Directional Distribution	50%	50%	100%	100%
Lane Distribution	90%	90%	100%	100%

5

5

Note: This traffic data shall only be used for pavement design purposes and shall not be used for any other traffic needs in the Project.

4.6.6 Pavement Design Criteria

The Design-Builder shall use the following requirements as the general pavement design criteria if developing alternate pavement designs:

Pavement Type	**Flexible**	**Rigid**
Roadway Element	1, 2 and 3	1
New Construction Design Life	25 years	25 years
Rehabilitation Design Life	15 years	15 years
Initial Serviceability	4.2	4.5
Terminal Serviceability	2.9	2.9
Reliability	90%	90%
Overall Standard Deviation	0.49	0.39
Load Transfer Coefficient	N/A	3.2
PCC Modulus of Rupture	N/A	685 psi
PCC Elastic Modulus	N/A	4,371,000 psi
Overall Drainage Coefficient	1.0	1.0
Minimum Modulus of Subgrade Reaction (static) *	N/A	230 psi/in
Minimum Resilient Modulus of Subgrade *	4,500 psi	N/A
Maximum Modulus of	N/A	550 psi/in

Subgrade Reaction (static) *		
Maximum Resilient Modulus of Subgrade *	10,500 psi	N/A

* The Design-Builder has the option of designing with a higher design subgrade modulus than the minimum requirement and less than the maximum requirement, providing field verification is submitted by the Design-Builder as per PR Section 4.3.2.5.4.1 of the Pavement Performance Specification and is approved by the Office of Materials Technology.

4.6.7 Minimum Pavement Thickness for Frost Depth and Pavement Drainage

4.6.7.1 Frost Depth

All pavement sections shall be of a sufficient depth to protect against pavement heaving due to frost. The thickness of the pavements for frost protection purposes shall be a minimum of 15 inches. The frost protection pavement depth includes the asphalt surface or Portland cement concrete layer, the granular and bound pavement base layers, and the granular and bound subgrade improvement layers. The minimum thickness requirement may be waived if preventive methods identified in 7.04.03 of the Pavement & Geotechnical Design Guide are used.

4.6.8 Geotextiles

Geotextiles used in subsurface drainage and separation applications shall be designed in conformance with AASHTO M288.

4.6.9 Geotechnical Design Criteria

Refer to the Geotechnical Performance Specification (PR 8) for Geotechnical Design Criteria.

The Design-Builder has an option to use intelligent compaction for embankments within the project limits. If the Design-Builder decides to pursue this option, the work shall be in accordance with SP 200 – Intelligent Compaction for Embankments.

4.6.10 Soils Laboratory Test Results and Soil Samples Availability

Soils in jar samples from SPT boring will be available for review and testing upon request. Soil samples from auger borings will be discarded after testing and they will be not available for visual inspection.

The following soil laboratory testing was performed for selected soil samples recovered from the split barrel sampler and auger cuttings:

- Soil Classification
- Natural moisture content
- Gradation
- AASHTO Soil Mortar % (If needed)
- USDA Soil Mortar % (If needed)
- Atterberg Limits
- Proctor Testing

4.6.11 Boring Logs

4.6.11.1 SPT Boring Logs for Structures

Thirty-Seven (37) SPT borings were drilled for four bridges, two culverts and one retaining wall structures along MD 32. Selected soil samples of the structure soil classification, were performed and the test results are included in Appendix A of this report. SPT Boring Logs are included in Appendix C.

4.6.11.2 SPT Boring Logs for Roadways

Fifty-Six (56) SPT borings were drilled for roadway embankment foundation and slopes. Jar samples were obtained from split barrel sampler for soil classification tests and the test results are were sent to the Project Manager by Engineering Geology Division (EGD) Engineer in early January 2018. SPT Roadway Boring Logs are included in Appendix C.

Note: Five (5) Foundation borings were eliminated by the Engineering Geology Division (EGD) Engineer during the boring operation.

4.6.11.3 Soil/Pavement Auger Boring Logs

Ninety-Five (95) soil and pavement borings were drilled for the foundation of the pavement. Bulk samples were obtained from auger cuttings for soil classification and Proctor testing and test results are included in Appendix A of this report. Boring logs are included in appendix B.

4.6.11.4 SWM-Boring Logs and Infiltration Test Results

Forty-Nine (49) SWM-Borings were drilled for Storm Water Management facilities. Field

classification were identified. SWM Boring Logs and Infiltration Test Results are included in Appendix B.

Note: Six (6) SWM borings were eliminated by the Project Manager during the boring operation.

4.6.12 Top Soil

Top soil samples were not taken during this investigation. In order to utilize the existing Top Soil on the project, the Design Builder has to perform Top Soil sampling for testing if it is available within the project limit.

4.6.13 Project Related Data

- Project Related Specifications are included in Appendix D
- Pavement Legend and Details are included in Appendix E
- Network Level Performance Data and Construction History are included in Appendix F

PR 5 STRUCTURAL DESIGN PERFORMANCE SPECIFICATION

5.1 General

Design and construct all structures in accordance with requirements of this specification and the structure description in this Special Provision, including performance requirements, standards and references, design and construction criteria, maintenance during construction, and required submittals. The minimum design life for all permanent structures shall be 75 years.

All structural engineering functions shall be directed, supervised, reviewed, signed, and sealed by a Maryland Registered Professional Engineer with a minimum of 10 years of experience in structural engineering.

The requirements in this specification apply to the design and construction of all temporary and permanent structures, including but not limited to bridges, culverts, and retaining walls. A list of anticipated structures for this Contract is included in this Special Provision.

5.2 Guidelines and References

Guidelines and References for the design of the structures within this Contract are listed in PR 2. Copies of the Office of Structures Policy and Procedure Memorandums (PPMs) required for this Contract are included on ProjectWise. The design and construction of all temporary and permanent structures, including but not limited to bridges, culverts, and retaining walls shall conform to the requirements set forth in these documents.

5.3 Structural Hydrology and Hydraulics Requirements

The Design-Builder shall study, analyze, design, obtain permit modifications and approvals for structures over waterways and perform any in stream construction in accordance with requirements of this specification, including performance requirements, standards and references, design and construction criteria, maintenance during construction, and required submittals.

The Administration and MDE approved hydrology and hydraulics reports for structures S-1, S-3, S-5, S-6, S-7 and S-8 will be provided to the Design-Builder. If the Design-Builder makes any changes to the SHA and MDE approved designs they shall analyze the hydraulics conditions of the modified options for use in the overall design and to secure environmental and regulatory agency approvals for the project.

02-13-11-06 (Middle Patuxent River Watershed) is classified as Use IV-P by the Code of Maryland Regulations 26.08.02 (Reference 3).

5.3.1 Structure Classification and Design Storm

The State Functional Classification for MD 32 is a "Rural Other Principal Arterial." This classification will remain the same after the highway dualization. This means that the highway should be designed to prevent inundation by a 100-year flood. Internal waivers to the 100-year requirements have been obtained for Structures S1, S-3, S-6 and S-8. S1, S-3, S-6 and S-8will require that the road be designed to prevent inundation by a 50-year flood.

5.3.2 Existing and Ultimate Development Conditions Hydrology Requirements

1 The MDOT SHA and MDE approved hydrology must be used for structures S-1, S-3, S-5, S-6, S-7 and S-8.

5.3.3 Scour Design Requirements

A) Scour analysis shall be performed using the latest available SHA ABSCOUR program and the guidance in Chapter 11 of the OOS Hydrologic and Hydraulic Design Manual.

B) Scour analysis shall be based upon the 100-year flood (design flood). If the 100-yr flood overtops the road the Design-Builder will also analyze the incipient overtopping storm and choose the one which produces greater scour depths. Otherwise, the foundations of bottomless structures shall be designed for the design flood and checked for lateral stability under the 500-year flood as per Chapter 11 of the OOS Hydrologic and Hydraulic Design Manual.

C) Channel lateral migration distances and vertical degradation amounts as determined through the Stream Morphology study reports to be developed by the Design-Builder shall be used in conjunction with computed scour depths to determine total scour depths.

D) Scour analysis shall be performed for all bottomless structures over waterways.

E) Scour analysis shall not take into account scour countermeasures for the purposes of calculating scour depths.

F) Scour countermeasures shall be designed to protect substructure elements. Piers and abutments shall be structurally designed based on the estimated scour depths for the 100-year flood and checked for lateral stability under the 500-year flood.

G) All scour analyses shall be documented in accordance with the OOS Hydrologic and Hydraulic Design Manual and shall be submitted to the OOS structure hydrology and hydraulics division for review and approval

5.3.4 MDE Hydraulics

Major drainage structures shall be located and designed in accordance with the OOS Hydrologic and Hydraulic Design Manual and MDE regulations (COMAR 26.17.04 "Construction on Nontidal Waters and Floodplains"). The design will provide fish and aquatic organism passage as required for the extension or replacement of the existing culverts as required by MDE. Structures adherent to this section are S-1, S-3, S-5, S-6, S-7 and S-8. Additional structures covered by this section shall be determined jointly by the Design-Builder and the SHA. Additional amphibian and animal crossing may be stipulated by MDE Wetlands and Waterways or the United States Army Corps of Engineers. The design shall adhere to these additional requirements if requested.

5.3.5 Stream Morphology

Lateral migration distances and vertical degradation amount shall be used in conjunction with the scour analysis for all foundation design.

For structures S-5, S-6, and S-7, a stream morphology study of the reach through the project limits is required. The stream morphology study must be performed by an engineer with a Maryland Professional Engineering License with at least 10 years of experience with stream morphology assessments.

5.3.6 FEMA Hydraulics and CLOMR Requirements

FEMA Floodplain Map Change Requirements: The proposed design will impact the FEMA-regulated 1-percent annual chance floodplain limits and water surface elevations. The Administration will provide the design build team with a FEMA Floodplain Conditional Letter of Map Revision (CLOMR) for the structure modifications associated with Clyde's Branch, CB-16, CB-18, and the Middle Patuxent River. The Design-Builder shall be responsible for obtaining the Letter of Map Revision (LOMR) for all structures and stream included in the CLOMR. The Design-Builder shall coordinate with SHA throughout the duration of submitting and securing and meeting all subsequent requirements of the required FEMA acceptance. The Design-Builder shall provide SHA with copies of the LOMR submission, approval and all related documents.

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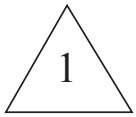
No rises in the floodplain shall be permitted in the LMR application other than those shown in the approved CLOMR. Changes to the proposed hydraulic modeling are at the risk of the Design-Builder.



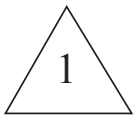
If changes are made to the structure type or location, the DBT is required to resubmit a CLOMR for Howard County concurrence and then FEMA approval. The Design-Build Team shall follow the OOS Bridge Hydrology and Hydraulics' Division's integrated FEMA/MDE approach. The Design-Builder shall coordinate with SHA throughout the duration of submitting and securing and meeting all subsequent requirements of the required FEMA acceptance. The Design-Builder shall provide SHA with copies of the CLOMR submission, approval and all related documents. The Design-Builder is responsible for the LOMR if a change is made to the structure TS&L.

5.3.7 In-Stream Structure Design

If required by the regulatory or environmental agencies, design in-stream structures to stabilize the channel bed or bank within the character of the proposed design strategy. Any in-stream structures proposed and constructed by the Design-Builder may not create a barrier for any aquatic species that may be reasonably expected to be present at the site presently or anticipated following construction. Materials for the structures must be designed to resist the range of forces and velocities in the channel in proximity to the structure(s) at discharges up to the 100 year storm event. Design computations must be provided to the Administration indicating the resistance and/or design life of any stone, wood, or other materials integral to the structural stability of all in-stream structures, prior to final approval of the design plans. A design narrative and the computations described above must be included in the Stream Stability Assessment and Design Report. Details and specifications depicting the materials, methods, and means of construction must be provided to the Administration in each plan submittal.

5.3.8 Deliverables

A. Design Report.

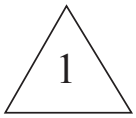


The Design-Builder must provide plans and a detailed stream morphology

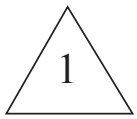
report. If the plans involve any changes to the conceptual TS&L plans, and differ from the hydraulics report, a Design Report must be submitted documenting the changes. At a minimum, the report must include all the elements described in 5.03.07. The Design-Builder is responsible for rectifying any deficiencies perceived by the regulatory agencies prior to issuance of the required permit modifications.

Design plans and specifications must include details to describe the structure in layout, materials, methods and means. The specifications must be in the format of the SHA Specification Guide dated 5/23/2013.

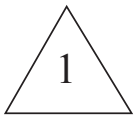
B. Requirements for Design-Builder Stream Morphology and Hydraulic Analysis Reports



The Design-Builder shall perform all stream morphology studies needed to secure MDE permit modifications and approvals for the proposed work. If any design modifications are required, the Design-Builder will perform all hydraulics studies, in addition to the stream morphology studies discussed above, needed to secure MDE permit modifications and approvals for the proposed work.



The Hydraulic Analysis Study and Report for the existing and proposed conditions, as well as the surveys and mapping needed to complete the hydraulic studies.



The Stream Morphology Report and/or Hydraulics Analysis Reports shall contain the completed text, exhibits, summary tables, computer input and output data, and other technical information. The reports will include a digital full copy of the report as well as the appropriate computer models used for the analyses. The format and content of report shall be prepared in conformance with the instructions in the OOS Hydrologic and Hydraulics Design Manual. The Design-Builder shall include the impacts the proposed project would have on the hydraulics characteristics such as water surface elevations, flow velocities, Froude numbers and shear stress in the channel in the report.

All Design-Builder study reports shall be self-contained documents to the extent practicable. When necessary, reference may be made to outside sources of information used by the Design-Builder in their preparation of data or exhibits for the reports. All references shall be clearly stated, listed and described as related to the Hydraulics Analysis Report. All the pages within the report shall be numbered, dated and shall be placed in an 8 ½-inch by 11-inch, three-hole binder.

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Upon completion of the Stream Morphology and/or Hydraulics Analysis Reports, the Design-Builder shall submit the report to SHA's Bridge Hydraulics Division for review and concurrence prior to submittal to MDE. After MDOT SHA approval, the Design-Builder shall submit the Hydraulics Analysis Report to MDE for review and approval and copy SHA. Upon approval from MDE, the Design-Builder shall provide two copies of the final, approved report, files on CD/DVD, and the notification of the MDE approval to the OOS Structure Hydrology and Hydraulics Division.

5.03.10 Structure Hydrology and Hydraulics Construction Requirements

In-stream construction shall adhere to the requirements in the Nontidal Wetlands & Waterways Permit and Section 404 Individual Permit.

1

5.04 General Structure Design Requirements

Design calculations shall be performed in Customary U.S. units. Only Customary U.S. units shall appear on the plans.

5.04.01 Design Methodology

The following references are for AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications, including all interims.

A. Concrete.
All reinforced concrete members shall be designed in conformance with AASHTO LRFD specifications, including all applicable provisions for service, fatigue, strength and extreme event limit states.

B. Prestressed Concrete.
All prestressed concrete members shall be designed in conformance with AASHTO LRFD specifications, including all applicable provisions for service, fatigue, strength and extreme event limit states

C. Structural Steel
All structural steel members shall be designed in conformance with AASHTO LRFD specifications, including all applicable provisions for service, fatigue, strength and extreme event limit states.

D. Composite Members.

Composite members shall be designed to include effects resulting from differential creep and shrinkage of the concrete deck.

E. Load Ratings.

All vehicular bridges, culverts, and pipes shall be rated using the load factor and resistance factor rating (LRFR) method of analysis using the latest edition of the AASHTO "Manual for Bridge Evaluation" and performed in accordance with PPM D-97-47(4). The load ratings shall be recorded on the Load Rating Standard Summary Sheet and shall be submitted to the Office of Structures. The HL-93 inventory rating factor for all new structure construction shall be greater than 1.

5.04.02 Loads and Forces

All loads and forces applied to structures shall be in accordance with AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications except as modified below.

A. Dead Loads (DL)

1) Unit weights of materials shall conform to AASHTO specifications which includes the weight of embedded reinforcement.
2) All bridges shall be designed to accommodate a loading of 25 psf for a future 2 inch wearing surface. A loading of 15psf for forms which remain in place shall be included in the design of the bridge on Triadelphia Road over MD 32.

B. Highway Loads (LL)

1) Live loading, designated HL-93 shall be in accordance with AASHTO.

2) Retaining walls including wing walls and headwalls shall be designed to accommodate the horizontal surcharge and traffic impact loads caused by live load per AASHTO criteria.

C. Thermal Forces

1) Moderate Temperature Climate Changes shall be used per AASHTO criteria.

2) Normal Temperature shall be 60 degrees Fahrenheit.

D. Seismic Forces.

1) Structures are located within seismic zone 1.

E. Miscellaneous Lateral Forces.

Wind loads, longitudinal traction forces, stream flow forces, etc. shall be in accordance with AASHTO LRFD Specifications.

F. Construction Loads.

Where the Design-Builder, during construction, anticipates passing truck traffic in excess of the design load over structures designed and constructed under this Project, the structure shall be designed for the higher truck load. The Inventory and Operating Rating Factors shall be greater than 1.0 for the higher truck load. The Design-Builder shall receive written concurrence from the Administration's Office of Structures before developing a design using a live load in excess of that specified above.

5.04.03 Materials

A. Foundations

1) Piling

a) Steel H piles shall conform to conform to A 36, Grade 36 or A 709, Grade 50 Steel.

b) Steel pipe piles and steel mini/pin piles shall conform to A252, Grade 3 steel (Fy = 45,000 psi.).

c) Concrete for steel pipe piles shall conform to Mix No. 3 with a slump range of 4-6 inches in accordance with Section 902.10 of the Administration's Standard Specifications for Construction and Materials.

d) Reinforcement for steel pipe piles shall conform to Section 908.01 of the Administration's Standard Specifications for Construction and Materials.

2) Drilled shaft materials shall conform to Section 412 of the Administration's Standard Specifications for Construction and Materials.

B. Structural Steel.

1) Structural Steel shall conform to A 709, Grade 50 or 50W and 909.01. All structural steel, weathering or non-weathering, shall be fully painted, 100 percent, as indicated in the special provisions.

2) Fracture critical member structures are prohibited.

3) All bridges utilizing steel beams or girders shall be designed without the use of cover plates.

4) The use of longitudinal and transverse stiffeners is prohibited except for required bearing stiffeners.

5) Minimum sizes for steel members and welds shall conform to the Administration's Policy and Procedure Memorandum D-87-37(4).

6) Electro-slag welding is prohibited in main structural tension members.

7) All bolts shall conform to A 325.

8) All bolted connections shall be designed as Class A slip critical connections.

9) Steel sheet piling shall conform to A328.

C. Concrete.

1) Mix No. 6 (4500 psi – Design for 4000 psi) normal weight concrete shall be used at the following locations:

Bridge Deck Slabs
Entire portion of abutment back walls and expansion joint cross beams.

Top Slab of Culverts with a minimum depth of fill 18 inches or less.
Precast portions of box culverts.
Precast headwalls for pipe culverts.

Parapet Portion of Wing Walls, Retaining Wall Parapets and Copings, and Culvert Headwalls.

Copings for MSE retaining walls.

All concrete for bridge deck slabs and parapets shall have synthetic fibers added to the concrete per section 902.15.

2) Mix No. 3 (3500 psi – Design for 3000 psi) normal weight concrete shall be used at the following locations:

   All footings and bridge substructure units except Abutment Backwalls.

   Retaining Walls.

   Top Slab of Culverts with a minimum depth of fill greater than 18 inches and all cast-in-place box culvert walls, bottom slabs, cutoff walls, headwalls, and wing walls.

3) Subfoundation concrete shall be normal weight Mix No. 4 (Minimum 3500 psi) concrete.

4) The use of prestressed concrete substructures is prohibited. The use of a solid prestressed concrete slab superstructure will be the only material permitted for the bridge structures at MD 32 over Terrapin Branch and MD 32 over the Middle Patuxent River.

5) All precast elements shall be fabricated with the use of self consolidating concrete.

6) Mix No. 8 (Minimum 4000 psi) normal weight concrete shall be used for the overlay placed on bridges constructed with precast slab elements. The mix no. 8 overlay concrete shall have synthetic fibers added to the concrete per section 902.06.06.

7) The use of lightweight concrete for structures is prohibited.

D. Reinforcement Steel

1) Reinforcement steel bars shall conform to 908.01.

2) Welded Wire Fabric (WWF) reinforcing shall conform to 908.05.

3) Epoxy coated reinforcement steel bars shall conform to 917.02 and shall be used at the following locations:

   Deck Slabs
   Deck overlay for precast concrete slab bridges
   Barriers and Parapets
   Bearing Seat Pads
   All Concrete Superstructure/Roadway Elements
   Non-prestressing steel contained in concrete beams
   Abutment Back Walls
   Abutment Bearing Seat Areas
   Parapet Portion of Wing Walls including Retaining Walls and Culvert Headwalls.
   Portions of Retaining Walls, located within 10 ft of the outside edge of shoulder measured vertically and/or horizontally.
   Top mat of the top slab, including truss bars and any reinforcement extending into the top of the top slab, for box culverts with less than 18" of cover.
   Top portions for precast pipe headwalls.

4) Unless noted otherwise minimum clear cover to reinforcement steel shall be as follows:

Location	**Clear Cover**
Top of Bridge Deck Slabs	2-1/2 in.
Bottom of Bridge Deck Slabs	1 in.
Top of Box Culvert Slabs Built to Grade	2-1/2 in.
Box Culvert Slab Not Built to Grade	2 in.
Toewall – Top, Bottom and Sides	3 in.
Culvert Bottom Slab – Bottom	3 in.
Footings – Bottom and Sides	3 in.
All Other Locations – Main Reinforcement	2 in.
All Other Locations – Stirrups	2 in.
Precast Concrete Elements	2 in.
Bottom of precast slabs, beams, girders	3 in.

5) Welding of reinforcement steel is prohibited.
6) Box culverts shall be designed to allow the reinforcing steel in the top mat to be laid out parallel to the headwalls or perpendicular with the culvert sidewalls when using a headwall edge beam. A fanned reinforcing layout

will also be permitted provided the minimum clearance between all reinforcing is 3".

7) Mechanical rebar couplers may be used.
8) Substructure units shall be designed so that the largest reinforcement steel bar utilized will be No. 11 bars.

E. Pipe Culverts

1) All new pipe culverts shall be constructed with the use of gasketed concrete pipe.
2) Existing culverts requiring replacement shall utilize gasketed concrete pipe regardless of the material used for the existing pipe.
3) Existing pipes requiring extension shall be extended with the use of a material that matches the original construction.
4) The use of corrugated steel or metal pipes, including structural plate pipe, is strictly prohibited.

5.04.04 Foundations and Construction

The Design-Build Team shall prepare a Foundation Plan and Report for each new or replacement structure, including box culverts, retaining walls, pipe culverts, and bridges, in conformance with the Administration's Policy and Procedure Memorandum D-79-17(4) and the following requirements.

5.04.04.01 Foundation Boring Requirements.

Foundation borings for each structure were obtained for the preliminary engineering of this project and are included elsewhere in the contract documents. The Administration guarantees the accuracy of the borings provided but not the sufficiency of the data for the foundation design. Samples from the borings are available for review by contacting the Field Explorations Division Chief, 7450 Traffic Drive, Hanover, MD21076, 1-866-926-8501. The Administration has evaluated the borings and recommendations and/or restrictions have been established for each structure as indicated in the Special Provisions.

The Design-Build Team shall determine the sufficiency of the borings provided for the final foundation design and obtain their own geotechnical data to supplement the data provided by the Administration. The Design-Build Team shall obtain supplemental borings in accordance with the Administration's Standards for Subsurface Exploration if the foundation borings provided by the Administration are more than 10 ft outside the proposed footprint of the structure foundation. Supplemental borings shall also be obtained by the Design-Build Team, if proposed pile tip elevations are below the foundation boring depths provided by the Administration. Any supplemental borings shall extend at least 10 ft below the proposed pile tip elevations. The location of supplemental borings shall be selected by the Design-Build Team in conformance with the Administration's Policy and Procedure Memorandum D-79-17(4). For bridges, at least two borings are required for each substructure unit. Both of the borings shall be within the above space limitations (i.e. if one boring is more than 10' outside the foundation footprint and one is within the footprint, at least one supplemental boring would be required). The Design-Build Team's geotechnical engineer may request in writing that the Administration reduce the number of required borings to one boring per substructure element provided the soil conditions at a particular structure appear to be consistent. Supplemental foundation borings, rock cores, laboratory testing, etc. shall be in conformance with appropriate Administration, AASHTO and ASTM policies and specifications.

5.04.04.02 Foundation Design Requirements.

Structures foundations shall be designed in accordance with AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications and as required below.

A. Spread Footings.

The bottom of a spread footing, including leveling pads for a proprietary retaining wall, shall be placed so that the top of the footing is a minimum of 1 ft below the proposed ground line and the bottom of the footing is a minimum of 3 ft below the proposed ground line. If the footing is to be placed on rock as determined by the Engineer, it shall be keyed into the sound rock at least 1 ft. The Plans developed by the Design-Build Team shall specify the maximum

allowable bearing pressure for each substructure element and its footing.

Setting spread footings or leveling pads for proprietary retaining walls in embankment or fill material is prohibited. Any spread footing, including leveling pads for a proprietary retaining wall, shall be set into existing in-situ soil or sound rock.

The Design-Build Team shall meet all requirements of Section 10 of the AASHTO Specifications with regards to the design of spread footings, allowable foundation bearing pressures, and settlements.

The allowable bearing capacity for spread footings shall be established by the Design-Builder based on additional site investigation, AASHTO Specifications and FHWA Geotechnical Engineering Circular No. 5 – Evaluation of Soil and Rock Properties. The proposed bearing capacity will be reviewed by the Administration as part of the foundation evaluation.

The Design-Builder shall have the exposed subgrade of any spread foundation inspected during construction by their geotechnical engineer with a written recommendation of their findings forwarded to the Office of Structures.

B. Driven Piles.

Steel H-piles, steel pipe piles, or steel mini/pin piles are acceptable pile types for use on this project. No other driven pile type, including concrete piles, will be considered. Bottom of footings for bridge abutments or wing walls may be placed in approach embankments provided they sit on pile-supported foundations with the pile tip elevation set in competent in-situ soil or sound rock. Pile tips shall be applied to driven piles where warranted. For bridges crossing roadways, the pile tip shall extend below the elevation of the roadway that is being crossed.

Only one type of pile shall be used on each individual substructure unit. However, different substructure units of the same structure may have different foundation types.

Any driven pile that reaches refusal with less than 20 feet of pile length embedment in original competent in-situ soils will be unacceptable and shall be extracted and holes shall be augured a minimum of 10 feet into competent rock or 5 feet into sound rock. The piles shall be embedded into the augured hole and the void area around the piles shall be filled with Mix No. 4 concrete.

The proposed pile spacing for design shall conform to the following:

1. Spacing in the front row of a pile group shall not exceed 8 ft.
2. Spacing for all other rows shall not exceed twice the spacing of the front row and/or a maximum spacing of 10 feet.
3. The Design-Build Team shall use battered piles to resist all horizontal loads
4. Pile patterns shall be designed so that no piles are in tension or uplift.

As-built pile foundation data shall be documented in the final As-Built plans.

C. Augered or Drilled Piles, including steel mini/pin piles, reinforced cast in place drilled shafts (caissons), and steel H-piles placed in augured holes with voids filled with concrete, are acceptable for use on this project. No other augered or drilled pile type, including helical piles, will be considered. Any augered or drilled pile foundation that encounters rock shall have its final tip elevation a minimum of 10 ft into competent rock or 5 ft into sound rock. Steel mini/pin piles shall have a 5’ deep grout bulb below the final tip elevation. Structural capacity of auger cast piles with steel H-pile cores shall be determined solely on the capacity provided by the steel H-pile core without any contribution of the surrounding cast in place concrete. The augered or drilled pile spacing shall conform to the same criteria as driven piles, excluding mini/pin piles. Pile patterns shall be designed so that no piles are in tension or uplift. Design strength shall be maintained for the full length of the pile.

5.04.04.03 Subsurface Condition Requirements.

The following chart represents the minimum subsurface requirements that must be present for the various structure and foundation types. This information does not

supersede any other foundation design criteria.

Structure /Foundation Type	Spread Footing	Deep Foundation (Piles)
Subsurface Conditions	N > 30 for 10 feet of sampling*	N > 50 blows per 1 foot for tests over 10 feet of sampling* or REC >50

N = Blow counts representing penetration resistance as defined in AASHTO T-206

* - In accordance with SHA's Standard Specifications for Subsurface Exploration

****In consideration of the soils that were discovered as a part of the preliminary boring program conducted by SHA, it appears there are poor and irregular soils present over a rock substrata. Potential Design/Build teams should be aware of these conditions, and the fact that pile foundations and/or drilled piles will be required for the bridge structures. Removal and replacement of unsuitable material, preconsolidation measures, or ground improvements may be required to provide adequate bearing strength for the placement of the proposed box culvert structures. If piles are used, the Design-Builder will be required to verify the capacity of all test piles through re-striking and dynamic monitoring, except for timber test piles for box culverts, which shall have their capacity verified by re-striking.**

In the case of retaining walls, the wall footings shall only be placed on original undisturbed material/rock with adequate bearing capacity, or a pile foundation.

5.04.04.04 Rock Definition.

The definition of competent rock shall be material with a minimum Rock Quality Designation (RQD) of 80% and a minimum Rock Core Recovery (REC) of 80%. The Engineer shall determine, by observations of the exposed in-situ materials and the operation of the excavation equipment, if the competent rock has been encountered for spread footings and the bottom of caisson holes. For mini/pin piles, competent rock will be determined by the Engineer based on observations of the operation of the drilling equipment and the cuttings retrieved.

5.04.05 Aesthetic Criteria

The Design-Build Team shall use an ashlar stone form liner finish on the superstructure

and substructure portions of the bridge on Triadelphia Road over MD 32 consistent with the treatment utilized for the construction of the nearby bridge structure on Burntwoods Road over MD 32, as required in Special Provision 456.

The exposed concrete surfaces on the bridges at MD 32 over Terrapin Branch and MD 32 over the Middle Patuxent River, box culverts, and pipe head walls shall have a flat concrete finish. No aesthetic treatment is required.

All retaining wall construction, cast-in-place and proprietary, that is visible from the MD 32 corridor, shall utilize a form liner finish similar to the Triadelphia Road bridge with a cast-in-place concrete coping as required in Special Provision 456. For retaining walls in fill sections that are not visible from the MD 32 corridor, the Design-Build Team shall assume an architectural treatment will not be required.

5.05 Structure Specific Design and Construction Requirements

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The Triadelphia Road Bridge shall be replaced as described in this PR. If within the limits of dualization or associated maintenance of traffic, the structures beneath or over MD 32 shall be designed as required in this PR. Standard structural detail plates have been provided in the additional information on ProjectWise. Where appliable, these details shall be used in the development of the structures detailed below.

5.05.01 Bridges, Box Culverts, Pipe Culverts, and Retaining Walls

5.05.01.01 Description

Structure S1:

Construction of a new single cell 8’-0” high x 7’-0” wide concrete box culvert on MD 32 over a Tributary of Clydes Branch at station 255+00. This structure shall incorporate the following:

-The culvert may be constructed of all cast-in-place concrete construction, or utilize precast concrete construction for a portion of the main culvert barrel.

-If precast construction is utilized, it shall be for the center portion of the main culvert barrel only. At each end of the culvert, the last 8 feet of the culvert barrel, headwalls, and wingwalls including footings, shall be cast-in-place construction.

-The entire barrel portion of the culvert may be constructed with precast concrete elements, provided a 1’-0” minimum thickness, poured-in-place subfoundation concrete slab, is placed under the last 2 sections (sixteen feet minimum) of the culvert and the wing walls. If this option is chosen, the headwall, wingwalls, and footings shall still be constructed with cast-in-place concrete, and the wing walls shall be rigidly attached to

the precast culvert section with the use of threaded rebar couplers.

-All cast-in-place and precast culvert sections shall have a minimum wall and slab thickness of 1'-0". Elements with a lesser thickness are unacceptable.

-Concrete weir walls shall be placed in the culvert for its full length at a spacing of 40 feet to accommodate fish passage.

-If precast elements are utilized for the main culvert barrel, they shall be positively connected to each other utilizing a pair of galvanized steel angles and a post tensioning bolt as depicted in the details contained on ProjectWise. The use of post-tensioning strands will not be considered as an option to the connection devices shown on ProjectWise.

-If cast-in-place construction is utilized for the full length of the structure, contraction joints shall be placed at a spacing not to exceed 30 feet and expansion joints shall be placed at a spacing not to exceed 90 feet. The contraction and expansion joint details shall conform to the Office of Structures Details.

-All wing walls shall have an underdrain system that conforms to the Office of Structures Details. The outlet pipe shall be located above the 2 year storm elevation.

-This structure can be placed on a spread or pile supported footing as determined by the foundation boring program and associated foundation design developed by the Design Build Team.

Structure S2:

Construction of a new retaining wall on MD 32 at station 480+00. If possible, the Design Build Team may eliminate the wall, provided adequate right-of-way is available and all other RFP requirements are met. If it is determined that a retaining wall is required, this structure shall incorporate the following:

-The retaining wall may be constructed as a top down wall as shown in the informational drawings, or it may be a cast-in-place concrete retaining wall, or a proprietary retaining wall as outlined in the special provisions.

-The foundation type will be determined by the foundation boring program and associated foundation design developed by the Design Build Team based on the type of wall construction chosen.

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Structure S3:
Construction of a new single cell 12'-0" high x 7'-0" wide concrete box culvert on MD 32 over Clydes Branch at station 227+45. This structure shall incorporate the following:

-The culvert shall be constructed of all cast-in-place concrete construction. The use of a precast culvert of any type is prohibited at this location.

-All cast-in-place culvert sections shall have a minimum wall and slab thickness of 1'-0". Elements with a lesser thickness will be unacceptable.

-Concrete weir walls shall be placed in the culvert for its full length at a spacing of 40 feet to accommodate fish passage.

-The culvert shall have contraction joints placed at a spacing not to exceed 30 feet, and expansion joints placed at a spacing not to exceed 90 feet. The contraction and expansion joint details shall conform to the Office of Structures Details and shall be watertight. Reference shall be made to the water tight joint detail contained in the RFP.

-All wing walls shall have an underdrain system that conforms to the Office of Structures Details. The outlet pipe shall be located above the 2 year storm elevation.

-This structure can be placed on a spread or pile supported footing as determined by the foundation boring program and associated foundation design developed by the Design Build Team.

Structure S4:
Replacement of Bridge No. 13045 on Triadelphia Road over MD 32. This structure shall incorporate the following:

-The structure shall be a two span haunched steel girder bridge to be similar to the configuration of the nearby Burntwoods Road Bridge. The abutment and pier elements shall have similar shapes and configurations as the Burntwooods Road Bridge.

-The north side of the bridge shall have a 1'-7" parapet/5'-8" sidewalk to conform to the Office of Structures Details. The south side of the bridge shall have a 2'-0" wide, 42" 'F' shape parapet to conform to Office of Structure Details.

-The parapets on each side of the bridge shall have a chain link safety fence to conform to the Office of Structures Details.

-The exposed face of the abutment, from the top of footing to the abutment seat, shall not exceed a height of 3'-0".

-The fixed bearing shall be located at the pier with the expansion moving in the direction of each abutment.

-The expansion joints shall be OOS standard compression seals placed in conjunction with an expansion joint cross beam configuration matching detail SUB-AB-201.

-The bridge shall be constructed utilizing staged construction to allow for the westbound traffic to be maintained.

-During the staged removal and replacement of the bridge the Design Build Team shall maintain a typical bridge section with at least three stringers for both the existing and proposed bridges.

-The construction joint between the two stages of construction shall be placed a close as possible to the center of the girder bay. This will allow for the girder adjacent to the staged construction joint to receive its maximum loading and deflection during the stage 1 deck pouring operation, prior to it becoming composite. If the Design-Build Team determines a closure pour is required, then it shall be centered in the girder bay where the construction joint is located.

-Construction of the new bridge shall include removal of the existing bridge to a minimum depth of 2'-0" below the finished ground line or to the bottom of the roadway pavement subbase. In addition, the Design Build team shall remove and salvage the existing bridge railing as outlined in the special provisions.

-This structure shall be placed on a deep pile supported footings as determined by the foundation boring program and associated foundation design developed by the Design Build Team. <u>The use of a spread footing will not be allowed for any portion of this structure</u>.

Structure S5:

Replacement of Bridge No. 13023.Construction of a new double cell 9'-0" high x 10'-0" wide concrete box culvert on MD 32 over Tributary of Middle Patuxent River. This structure shall incorporate the following:

-The culvert may be constructed of all cast-in-place concrete construction, or utilize precast concrete construction for a portion of the main culvert barrel.

-If precast construction is utilized, it shall be for the entire length of the main culvert barrel only. The precast elements shall be placed on a cast-in-place concrete footing that is continuous for the full length of the culvert, including the wing wall footings. The precast sections shall be a single monolithic element that incorporates the top slab and vertical walls for both cells of the culvert, that are set into a recessed channel cast into the footing. At each end of the culvert, the headwalls and wingwalls, shall be cast-in-place construction.

-All cast-in-place and precast culvert sections shall have a minimum wall and slab thickness of 1'-0". Elements with a lesser thickness will be unacceptable.

-If precast elements are utilized for the main culvert barrel, they shall be positively connected to each other utilizing a pair of galvanized steel angles and a post tensioning bolt as depicted in the details contained on ProjectWise. The use of post-tensioning strands will not be considered as an option to the connection devices shown on ProjectWise.

-The use of two independent precast culvert elements placed side-by-side is prohibited.

-If cast in place construction is utilized for the full length of the structure, contraction joints shall be placed at a spacing not to exceed 30 feet and expansion joints shall be placed at a spacing not to exceed 90 feet. The contraction and expansion joint details shall conform to the Office of Structures Details.

-All wing walls shall have an underdrain system that conforms to the Office of Structures Details. The outlet pipe shall be located above the 2 year storm elevation.

-This structure can be placed on a spread or pile supported footing

as determined by the foundation boring program and associated foundation design developed by the Design Build Team.

Structure S6:
Replacement of Bridge No. 13022 on MD 32 over Middle Patuxent River. Construction of dual two span concrete slab bridges on MD 32 over Middle Patuxent River.

-The structures shall be a two span precast concrete slab bridge with span lengths of 55'-0" measured from center line of bearing to center line of bearing.

-The slab elements shall be precast, prestressed concrete and shall be solid.

-The concrete slab superstructure design and detailing shall conform to the Office of Structures Details.

-The precast concrete slab units shall be posttensioned transversely as shown in the Office of Structures Details utilizing a steel tie-rod. The use of prestressing strands to post tension the slab units is prohibited.

-The bridges shall have a straight back 42" 'F' shape parapet to conform to the Office of Structures Details.

-The fixed bearing shall be located at the pier with the expansion moving in the direction of each abutment.

-The abutments shall have a jointless configuration to match OOS Structural Details.

-The bridges shall be constructed while maintaining all existing MD 32 traffic.

-The abutments and pier shall be continuous for the full width of the dual bridges.

-This structure shall be placed on a deep pile supported footings as determined by the Design Build Team. The use of a spread footing will not be allowed for this structure. All foundations shall be designed to account for the effects of scour.

-Construction of the new bridge shall include removal of the existing bridge to a minimum depth of 2'-0" below the finished ground

line or to the bottom of the roadway pavement subbase.

Structure S7:
Replacement of Bridge No. 13021 on MD 32 over Terrapin Branch. Construction of dual single span concrete slab bridges on MD 32 over Terrapin Branch.

-The structures shall be a single span precast concrete slab bridge with a span length of 55'-0" measured from center line of bearing to center line of bearing.

-The slab elements shall be precast, prestressed concrete and shall be solid.

-The concrete slab superstructure design and detailing shall conform to the Office of Structures Details.

-The precast concrete slab units shall be post tensioned transversely as shown in the Office of Structures Details utilizing a steel tie-rod. The use of prestressing strands to post tension the slab units is prohibited.

-The bridges shall have a straight back 42" 'F' shape parapet to conform to the Office of Structures Details.

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-The abutments shall have a jointless configuration to match OOS Structural Details.

-The bridges shall be constructed while maintaining all existing MD 32 traffic.

-The abutments shall be continuous for the full width of the dual bridges.

-This structure shall be placed on a deep pile supported footings as determined by the foundation boring program and associated foundation design developed by the Design Build Team. The use of a spread footing will not be allowed for this structure. All foundations shall be designed to account for the affects of scour.

-Construction of the new bridge shall include removal of the

existing bridge to a minimum depth of 2'-0" below the finished ground line or to the bottom of the roadway pavement subbase.

Structure S8:

Construction of a new single cell 7'-0" high x 6'-0" wide concrete box culvert on MD 32 over a Tributary of Clydes Branch at station 250+00. This structure shall incorporate the following:

-The culvert may be constructed of all cast-in-place concrete construction, or utilize precast concrete construction for a portion of the main culvert barrel.

-If precast construction is utilized, it shall be for the center portion of the main culvert barrel only. At each end of the culvert, the last 8 feet of the culvert barrel, headwalls, and wingwalls including footings, shall be cast-in-place construction.

-The entire barrel portion of the culvert may be constructed with precast concrete elements, provided a 1'-0" minimum thickness, poured-in-place subfoundation concrete slab, is placed under the last 2 sections (sixteen feet minimum) of the culvert and the wing walls. If this option is chosen, the headwall, wingwalls, and footings shall still be constructed with cast-in-place concrete, and the wing walls shall be rigidly attached to the precast culvert section with the use of threaded rebar couplers.

-All cast-in-place and precast culvert sections shall have a minimum wall and slab thickness of 1'-0". Elements with a lesser thickness will be unacceptable.

-Concrete weir walls shall be placed in the culvert for its full length at a spacing of 40 feet to accommodate fish passage.

-If precast elements are utilized for the main culvert barrel, they shall be positively connected to each other utilizing a pair of galvanized steel angles and a post tensioning bolt as depicted in the details contained on ProjectWise. The use of post-tensioning strands will not be considered as an option to the connection devices shown on ProjectWise.

-If cast-in-place construction is utilized for the full length of the structure, contraction joints shall be placed at a spacing not to exceed 30 feet and expansion joints shall be placed at a spacing not to exceed 90 feet. The contraction and expansion joint details shall conform to the Office of Structures Details.

-All wing walls shall have an underdrain system that conforms to the Office of Structures Details. The outlet pipe shall be located above the 2 year storm elevation.

-This structure can be placed on a spread or pile supported footing as determined by the foundation boring program and associated foundation design developed by the Design Build Team.

5.05.02 BRIDGES

5.05.02.01 Geometric Design Criteria for Bridges.

Triadelphia Road over MD 32 - The minimum typical section for the bridge shall consist of a 5'-8" sidewalk, a 6'-0" shoulder, 2-12'-0" through lanes, an 8'-0" shoulder.

MD 32 over Middle Patuxent River - The minimum typical section for the southbound roadway shall consist of an 8'-0 outside shoulder, a 12'-0" auxiliary lane, 2 -12'-0" through lanes and a 4'-0" minimum median shoulder. The minimum typical section for the northbound roadway shall consist of a 10'-0 outside shoulder, 2 -12'-0" through lanes, a variable width turn lane and a 4'-0" minimum median shoulder.

MD 32 over Terrapin Branch - The minimum typical section for the southbound roadway shall consist of a 10'-0"minimum outside shoulder, 2 -12'-0" through lanes, and a 4'-0" minimum median shoulder. The minimum typical section for the northbound roadway shall consist of a 10'-0" minimum outside shoulder, 2 -12'-0" through lanes, and a 4'-0" minimum median shoulder.

The Design-Build Team shall obtain approval from the Administration in writing prior to changing any of these dimensions. The Design-Build Team shall be responsible for determination of the final structure size, clearances, geometry, etc. to meet or exceed the design criteria.

A. The minimum vertical under clearance for all bridges over highways and roads shall be 16'-9".

B. Whenever possible bridges shall be located on tangent alignments. If this is not possible, the layout of bridges on non-tangent alignments shall be in conformance with the Administration's Policy and Procedures Memoranda D-85-25(G).

C. Every effort shall be made to provide a roadway profile grade across bridges so that the bridge surface drains without the need for scuppers. The minimum grade allowed on any structure shall be 0.5 percent. Any flow spread shall be limited to the shoulder area during the 10 year storm event.

D. Locating the low point (sump) of the vertical profile within the limits of the bridge or end wing walls is prohibited.

E. In order to address maintenance of traffic for future bridge deck replacements, all substructure units shall be designed to support full live load with portions of the superstructure completely removed. For purposes of design assume the bridge deck will be replaced one-half at a time.

The Design-Build Team shall also consider maintenance of traffic during future deck replacements when establishing the superstructure typical section. A minimum of five (5) girders shall be used for the construction of the steel girder bridge on Triadelphia Road over MD 32, with three of the girders being placed in the stage one construction that will carry traffic during stage 2 construction. The use of a 2 girder section for the initial stage of construction is prohibited.

F. The maximum super elevation rate allowed on any structure built to grade shall be 6 percent.

5.05.02.02 Structural Details for Bridges.

Structural Details developed by the Administration and located on the Administration's website www.roads.maryland.gov under the section Business Standards and Specifications shall be utilized for bearings, bridge decks, deck

joints, F shape barrier, and any other details whenever possible. Any proposed deviation from the established Structural Details shall be approved in writing by the Administration.

A. Abutments

1) The use of MSE walls as abutment front walls or wing walls is prohibited for the bridges in this Contract.
2) Integral or semi-integral abutments may not be utilized.
3) Only cast-in-place concrete abutments and piers may be utilized for this project.
4) The maximum slope provided in front of bridge abutments shall not be steeper than two horizontal to one vertical (2:1).

B. Superstructure

1) Solid, precast, prestressed concrete slabs shall be the only superstructure type permitted for the bridges on MD 32 over Terrapin Branch and MD 32 over the Middle Patuxent River. Members with voids (concrete slabs with circular voids or small prestressed concrete box elements) are prohibited.
2) The bridge structure on Triadelphia Road over MD 32 shall utilize steel haunched girders. Prestressed concrete girders are prohibited.
3) For bridges supported by individual beams or girders, the maximum beam or girder spacing between center lines of the beams or girders shall be no more than 10 ft.
4) A line girder analysis shall be used for the design of superstructure members.
5) All girders within a single bridge structure shall utilize a single type of girder.
6) The location and design of field splices shall be in conformance with the Administration's Policy and Procedure Memorandum D-83-26(4)
7) Partial Depth cross frames are prohibited.
8) The development of Camber Diagrams shall be in conformance with the Administration's Policy and Procedure Memorandum P-74-1(4).

C. Decks

1) For bridges supported by stringers, all bridge deck slabs shall match the Office of Structures Structural Details. Alternate designs of bridge decks are prohibited.
2) Steel deck forms which remain in place shall be used for all steel girder bridges.
3) The ratio of deck overhang length to adjacent deck span shall not exceed 36%.
4) A deck pouring sequence shall be prepared in accordance with the Administration's Policy and Procedure Memorandum P-76-11(4)and be provided to the Office of Structures for approval in writing as part of the Structural Submissions.
5) The development of Finished Roadway Elevation Plan Sheets shall be in conformance with the Administration's Policy and Procedure Memorandum P-75-8 (4).

D. Parapets

1) The type of parapet required for each structure will be as indicated previously in this Performance Requirement and all details shall be in conformance with the Office of Structures Structural Details.
2) All parapets on the bridges shall have two 3 in. diameter PVC conduits cast into the barrier in conformance with the Administration's Structural Details.
3) Precast concrete traffic barriers are prohibited.
4) Slip-Forming of Parapets will be permitted for the bridges on MD 32 over Terrapin Branch and MD 32 over the Middle Patuxent River. Slip-Forming of Parapets for the bridge on Triadelphia Road over MD 32 is prohibited.

E. Deck Joints

1) The selection of the appropriate roadway joint and fixed bearing location shall be as described previously in this Performance Requirement. Intermediate joints are prohibited.
2) All bridge deck expansion joints, at fixed and expansion bearing

locations, shall match the Office of Structures Structural Details contained in the contract documents. Modular joints are prohibited.

F. Bearings

1) Fixed and expansion bearings for straight steel girder bridges shall be in conformance with OOS Structural Details. Steel Reinforced elastomeric bearings are prohibited on steel girder bridges.
2) Steel Reinforced elastomeric bearings shall be used in conjunction with the concrete slabs used for the bridges on MD 32 over Terrapin Branch and MD 32 over the Middle Patuxent River.
3) Pot Bearings or disc type bearings are prohibited and <u>will not be allowed for any reason</u> within this contract.

G. <u>Utilities</u>

1) Conduits for future utilities shall be placed in bridge back walls with pipe extending 5' beyond the end of the back wall, or to the end of the moment slabs on wing walls; whichever is greater.
2) When utilities are supported on a bridge, the support requirements shall be coordinated with the utility owner and accommodated by the structural framing.
3) Utilities shall be supported between girders on a bridge. No portion of the utility or support system shall extend below the bottom flange of the girders. Utilities shall not be mounted to the fascia of a structure or supported from a concrete deck slab.

H. Slope Protection

1) Slope protection shall be required at all embankment slopes at abutments.
2) Slope protection shall be developed in accordance with the Administration's Structural Details.

5.05.03 NEW BOX CULVERTS, AND PIPE CULVERTS

5.05.03.01 General

Structural Details developed by the Administration and located on the Administration's website www.roads.maryland.gov under the section Business Standards and Specifications shall be utilized whenever possible. Any proposed deviation from the established Structural Details shall be approved in writing by the Administration.

All pipe culverts shall be constructed to a distance sufficient enough to allow for the placement of the roadside grading and w-beam traffic barriers. All proposed headwalls/wing walls taller than 4'-0" shall have Type III Chain Link Fence placed on top of them.

5.05.03.02 Foundations

A. All culverts, head walls, and wing walls shall be founded on spread footings or pile foundations as determined by the foundation boring program and associated foundation design.
B. Refer to 5.04.04.01 for specific foundation requirements.
C. Anticipated scour depth and scour protection information shall be developed by the Design-Builder and incorporated into the foundation design, when applicable.
D. Structures shall be designed and detailed for all forces that result from maximum calculated vertical, horizontal and rotational movement of foundation elements. The limiting values in AASHTO 4.4.7.2.5 shall not be exceeded.

5.05.03.03 Hydraulics

Box culverts and pipe culverts shall be constructed in stages so at least one cell is available for stream flow at all times. The Design-Builder operations shall not result in flooding beyond the limits of right-of-way or 2 year flood plain.

5.05.03.04 Support of Excavation

Temporary support of excavation may be required in order to maintain the roadway embankment during the construction of the new pipe culverts, pipe culvert extensions, box culverts, and retaining walls.

5.05.04 RETAINING WALLS

At this time one retaining wall is anticipated within the limits of this project. If the Design-Build Team's proposed design solution requires additional retaining walls, the following requirements shall also apply.

5.05.04.01 Geometric Design Criteria for Retaining Walls.

The Design-Build Team shall layout retaining walls in accordance with the following geometric design criteria:

A. Retaining walls on curved horizontal alignments may be constructed on chords, unless otherwise stated, provided the angle of deflection between segments does not exceed 5 degrees.

B. The horizontal offset of the wall from the baseline shall not change abruptly. All changes in offset shall be accomplished using curves or chorded construction as described above.

C. The top of retaining walls shall not be stepped or contain sharp breaks in slope to accomplish a change in elevation. The top shall be level or shall vary using a smooth linear or curved transition.

D. The completed retaining wall, and all associated structural elements, shall be located entirely within the Administration's Right-of-Way. Construction easements shall only be used to facilitate construction efforts.

E. The ground line behind the retaining wall shall be placed a minimum of 9" below the top of the wall, unless a barrier is required on top of the wall.

5.05.04.02 Structural Details for Retaining Walls.

Structural Details developed by the Administration and located on the Administration's website www.roads.maryland.gov under the section Business Standards and Specifications shall be utilized whenever possible. Any proposed deviation from the established Structural Details shall be approved in writing by the Administration. .

The following structural details shall be used where appropriate:

A. For retaining walls supporting roadways and adjacent to the shoulder, an F-

Shape Barrier shall be placed on top of the proposed retaining wall. The height of the proposed barrier shall be 42" in accordance with the roadway design requirements.

B. For retaining walls adjacent to and supporting sidewalks, a 2'-8" vertical face barrier with a one strand rail, resulting in a combined barrier height of 3'-6", shall be utilized. For retaining walls adjacent to and supporting hiker/biker facilities, a 2'-8" vertical face barrier with a two strand rail, resulting in a combined barrier height of 4'-6",shall be utilized. All railing elements shall meet the horizontal clear spacing requirements outlined in section 13.8 of AASHTO. These spacing requirements may not be exceeded.

C. For barriers placed on top of MSE walls, a moment slab shall be utilized to resist the horizontal loads applied to the barrier. The moment slab and barrier shall be cast-in-place.

D. For retaining walls supporting private property or other facilities that are accessible to pedestrians, type III fencing 3'-0" in height shall be provided on top of the wall. If an ornamental fence is required per the structures aesthetic specifications, the fencing details shall be developed in accordance with those requirements.

E. All retaining walls shall contain the appropriate details for drainage. The drainage system for cast-in-place cantilever walls shall be in accordance with Standard No. RW-301.

5.05.04.03 Design Alternates for Retaining Walls.

The design for permanent retaining walls shall follow one of the following alternates listed below, unless otherwise stated in the Special Provisions.

Only one alternate shall be used per wall location Retaining Wall Plans shall be developed in accordance with the Administration's Policy and Procedure Memorandum P-94-38(4).

A. Cast-in-Place Cantilever Retaining Walls.

The Design-Build Team shall design and detail proposed concrete cantilever retaining walls in accordance with Structural Standards No. RW-101 through RW-403.

B. Proprietary Retaining Walls.

The Design-Build Team shall design and detail proposed proprietary retaining walls in accordance with the manufacturer's approved details. The list of proprietary retaining wall systems that have been approved by the Administration are located on the Administration's website www.roads.maryland.gov under the section Business Standards and Specifications..

1) Mechanically Stabilized Earth (MSE) retaining walls that are to be placed adjacent to streams, floodplains, SWM ponds, or other water features shall be placed so that no stream flows up to the 100 yr flood elevation or standing water comes in contact with the face of the wall. A solid concrete barrier may be designed to protect the base of the wall and shall contain the appropriate scour countermeasures.

2) The leveling pads for proprietary retaining walls shall be cast-in-place concrete. They are considered spread footings and shall follow the design requirements for spread footings.

3) The reinforced zone backfill for Mechanically Stabilized Earth (MSE) walls shall be comprised of No. 57 stone. A phi angle of 34 degrees shall be used for No. 57 stone in the design calculations.

C. Top-Down Retaining Walls.

The Design-Build Team shall design and detail proposed top-down retaining walls in accordance with AASHTO and the following:

1) All loads shall be resisted by the soldier piles, lagging, or other elements in direct contact with the retained soil.

2) Only concrete lagging shall be used for permanent retaining walls. The use

of any type of timber lagging will be strictly prohibited.

3) A concrete facing shall be provided that will not be considered structural in nature. The aesthetic finish for the concrete facing shall be as outlined in the contract documents.

4) Portions of permanent steel elements, which are exposed after excavation, shall be coated in accordance with Section 465.

5.06 Structure Plan Development

The Design-Build Team shall prepare structure plans as part of the Contract using the latest SHA MicroStation CADD Standards and Plan Development Checklists. Specific details are shown on the conceptual plans provided on Projectwise. Each structure plan sheet shall be prepared on the Office of Structure's standard border and title block sheet.

Plan Development Checklists included in the contract documents are developed for various types of structures (Concrete Girder Bridges, Retaining Walls, etc.) and indicate the minimum amount of information that is required on the Structure Contract Plans. If a checklist is not provided for the type of structure that is proposed by the Design-Build Team, the existing checklists shall be used as a general guide to provide similar information.

The development of views on all Structure Contract Drawings shall be in conformance with the Administration's Office of Structure's Policy and Procedure Memorandum P-75-7(4).

5.07 Submittals for Structures

All structures included in this Contract shall follow an independent review process. This process will be coordinated with the review and acceptance of the other articles (roadway, drainage, etc.) as appropriate.

The structure submission schedule shall be presented in the Design-Build Team's original project schedule and updated as the project progresses. Submissions for the proposed

structures' Type, Size and Location (TS&L), combined Type, Size and Location/Foundation review, Foundation Review, and/or Structural Review shall be made, for each individual structure, one at a time. The submittals, for each individual structure project wide, shall be made at least 7 (seven) days apart. Review packages shall not be combined (i.e. 3 TS&L's in the same package). This schedule shall be presented in the Design-Build Team's original submission schedule.

The Design-Build Team shall include a minimum of one full size set, one half-size set, and an electronic .pdf file of the structure plans (including all corresponding roadway plans, typical sections, profiles and cross sections) in addition to the requirements of PR 1.19. These plan sets are for review by the Office of Structures. Official review comments will be conveyed back to the Design-Build Team via correspondence and plans with comments noted (if applicable). The Design-Build Team shall provide a point-by-point written response to all official comments received and receive concurrence from the Administration in writing prior to proceeding forward with design/plan development activities. Telephone, email, and discussion meeting comments and questions may also be utilized by the Design-Build Team. Official responses will not be required for these inquiries; however, proper documentation (telephone memos, notes to file, etc.) is highly recommended. Any incomplete submission will not be reviewed but will be returned to the Design-Build Team.

5.07.01 Type, Size, and Location Submission.

The first submission required for each structure in this Contract shall be the Type, Size and Location (TS&L) Plans. The materials developed for this submission shall represent approximately 30 percent complete construction documents. It is recommended that the roadway alignment and profile be finalized and accepted prior to this submission. It is also recommended that any other pertinent information such as grading plans or drainage features that impact the proposed structures shall also be accepted prior to submitting the structure plans for review. Comments for TS&L submissions will be provided within 21 calendar days of receipt of the submission.

Once the TS&L plan package is received by the Office of Structures, and found to be complete, a TS&L plan review meeting will be conducted in the Office of Structures. The purpose of the meeting is to discuss any concerns the Administration may have

regarding the TS&L submittal, as well as allowing the Design Build Team the opportunity to ask questions they may have regarding the final development of the design and plans for each individual structure. At a minimum the Design Build Team will be required to have their Design Build Project Manager, the Design Manager, structural designer, and a member of the Independent Design Quality Management (IDQM) Firm present at the meeting. The Administration will have representation from the Project Manager from the Office of Highway Development, and his Division Chief, the Director Office of Structures, the Deputy Director Office of Structures – Engineering, the OOS Project Manager, and his Division Chief. The meeting is mandatory for each structure and will typically be limited to one hour.

After the meeting, the Design-Builder shall prepare meeting minutes, which will include a list of compiled comments to be addressed prior to the resubmission of the TS&L plans, and distribute them to the attendees for review and comment.

5.07.02 Foundation Report.

The Foundation Report and Plan submission shall be made in conformance with the Maryland Department of Transportation Policy and Procedure Memorandum D-79-17 (4), the Structure Descriptions, and other requirements specified in the Special Provision. The submission of the foundation report can be made concurrently with the TS&L submission; however, it shall be noted that the foundation design may be impacted by comments received on the TS&L Plans. If the TS&L submission is provided separately, the Foundation Reports shall not be submitted until comments on the TS&L have been provided back to Design-Build Team and the Design-Build Team's responses are accepted by the Administration. Comments will be provided back to the Design-Build Team within 21 calendar days of receipt of the submission if the Foundation Report is submitted independently. If the Foundation Report is submitted concurrently with the TS&L submission, comments will be provided within 40 calendar days of the receipt of the submission.

5.07.03 Structural Detail Submissions.

Following acceptance of the TS&L Plans and Foundation Report, the Design-Build Team shall submit detailed plans for various structural elements. Structural details for an individual structure may be submitted as a number of sub-plan set packages or as a complete set. The Design-Build Team shall submit a structure submission schedule that outlines the anticipated structural detail submissions. The Design-Build Team shall coordinate the submission of the detailed design plans with the submission of the Type, Size and Location (TS&L) or combined Type, Size and Location/Foundation review, such that only one individual submission is being made at a time project wide, with a minimum of at least 7 (seven) days, between individual submissions. Review packages shall not be combined (i.e. a TS&L for one bridge, and a detailed design plan for another bridge, in the same package).

The Design-Build Team shall have adequately developed the load contributing elements prior to finalizing the design of any structural details that are impacted by these loads. If load conditions change during the design, previously submitted elements shall be resubmitted for acceptance. Comments for each structural detail submission will be provided back to the Design-Build Team within 21 calendar days of receipt of the submission.

At this stage of the design, the Office of Structures offers the Design Build Team and their structural designers, the opportunity to participate in a structural review meeting to discuss any concerns or questions they may have in the development of the plans for final approval. While the meeting is not mandatory, the Office of Structures has found this to be beneficial for Design Build Teams on past projects. It is a time when information can be exchanged in an informal manner, and questions can be answered.

5.07.04 Revisions to Structure Plans.

Any modifications or revisions to the structural drawings after acceptance has been received shall be submitted in writing to the Administration and accepted prior to proceeding with any change to the approved structural drawings. If the request for modifications or revisions is accepted, revised structural drawings shall be submitted to the Administration in accordance with ITP 1.26.2.1.

5.07.05 Working Drawing Review Process.

All working drawings relating to the structures shall be reviewed in accordance with ITP 1.25 and Section 499.

5.07.06 Final Plans and Computations.

The Design-Build Team shall submit a complete set of structure plans once all structural details have been accepted. A full set of plans (details, standards etc.) shall be developed for each of the structures. A structure key plan sheet shall be developed to show the location of multiple structures. The complete set shall consist of one set of .pdf and .tiff files provided electronically. The General Plan & Elevation sheet for each of the structures shall be sealed by the Design-Build Team structural designer thus denoting it as the final construction documents.

The Design-Build Team shall submit As-Built Drawings of structure plans in accordance with ITP 1.26.2.2.

The Design-Build Team shall submit a complete set of structure computations once all structural details have been accepted for each structure. All computations shall be provided electronically as a .pdf document subdivided into relevant design sections with the initials of the designer and reviewer. A coversheet shall be included that is signed and sealed by the Design-Build Team structural designer, who is a Professional Engineer registered in the State of Maryland with experience in bridge design, responsible for performing or oversight of the pertinent design work.

The Design-Build Team shall submit completed SIA and PONTIS information forms for each structure for use by SHA in entering the structure data into their structural inventory system.

PR 6 TRAFFIC PERFORMANCE SPECIFICATION

6.1 General

The Design-Builder shall be responsible for the design and construction of the Project traffic control devices (TCD), including ground mounted signing and sign structures (overhead and cantilever); pavement markings; roadway and sign lighting; roundabouts; traffic signals; signal systemization; and ITS devices, and coordination of TCD design and construction with all other disciplines involved with the project. The Design-Builder shall be responsible for completion of traffic analysis and submission of Design Requests.

For any traffic control device or methodology not adhering to the Administration's guidelines, the Design-Builder shall submit the proposed device or methodology to the Administration for review and approval prior to construction or implementation. Submissions shall include engineering support and documentation as appropriate.

6.2 Standards and References

Traffic analysis and TCD design and construction shall be in accordance with this Traffic Performance Specification and the relevant requirements of the Guidelines and References in PR 2.

6.3 Coordination with Other Contracts

The Design-Builder shall coordinate the design and construction of all TCDs for the Project with those required for other SHA, County, and local jurisdiction Projects.

6.4 Traffic Operational Analysis

6.4.1 Operational Assessment of Design Alternative(s)

If a change is proposed to the general geometric layout and/or traffic control included in the RFP, the Design-Builder shall submit the proposed changes to the Administration for review and approval. The submission should include analysis of the proposed configuration using the Project Design Year Build Volumes and analysis techniques in this specification. The traffic analysis submitted to the Administration will be used for evaluation of the Design-Builder's proposal.

6.4.2 Preparation and Submittal of Design Request Form

The Design-Builder shall prepare the Administration's Office of Traffic and Safety's Traffic Control Device Request Design Request Form in accordance with the Design Request Form Instructions and Guidelines. The Design-Builder shall coordinate preparation and submittal of all Design Request Forms with the appropriate SHA District Traffic Office. All Design Request Forms will be submitted to the Administration (with accompanying traffic operational analysis/documentation and signal warrant analysis) for consultation, written comment, and approval prior to the Design-Builder proceeding with the design, installation, or modification to any traffic control device. The Design-Builder shall not proceed with design, installation, or modification of any traffic control devices until the submitted Design Request Form has been approved by the Administration.

6.4.3 Approved Analysis Techniques and Software

6.4.3.1 Highway Capacity Manual and Software – Latest Version

All freeway mainlines, ramp junctions (merge and diverge locations), and weaving sections shall be analyzed using the Highway Capacity Manual and Software (latest version). The Design-Builder shall provide a summary of results on a line diagram of the proposed roadway configurations, including both the level of service and the volume-to-capacity (V/C) ratio as appropriate. The Design-Builder shall also provide all calculation files on a CD to support the summary of results.

6.4.3.2 Synchro, SimTraffic & CLV Analysis – Latest Version

For corridors with multiple intersections, or for individual signalized intersections, the Design-Builder shall use Synchro, SimTraffic and Critical Lane Volume (CLV) analysis to evaluate corridor and individual intersection operations. The Design-Builder's timing plans shall consider corridor-wide cycle lengths and appropriate offsets. The Design-Builder shall provide all calculation files on a CD to support the summary of results.

6.4.3.3 CORSIM/VISSIM – Latest Version

For freeway and arterial operations, the Design-Builder shall use CORSIM or VISSIM to analyze operations. This shall be in addition to the Highway Capacity Manual and Software and Synchro/SimTraffic requirements. CORSIM/VISSIM results will be considered by the Administration in conjunction with Highway Capacity Manual and Software and Synchro/SimTraffic analysis when assessing design alternatives proposed by the Design-Builder.

6.4.3.4 SIDRA – Latest Version

For all roundabouts proposed by the Design-Builder, operational analyses shall be completed with SIDRA, with the Environmental Factor set to 1.2. Roundabouts shall also be coded and analyzed in VISSIM in order to capture and visualize the effects on the overall road network. The volumes should also be checked against the capacity thresholds outlined in FHWA NCHRP 672, Roundabouts: An Informational Guide, 2nd Edition, 2010. The results shall demonstrate that the roundabout operation will be no worse than the corresponding intersection operations proposed on the conceptual plans. An analysis that results in a degree of saturation of 0.85 or more on any movement shall be submitted to the Administration for review and approval prior to any geometric modifications.

6.4.3.5 Queuing Analysis

To determine the appropriate length of left and right turn bays, the Design-Builder shall calculate the queue length for both the through lane/s and the turn lane/s for the proposed design and each MOT phase of operation using the Administration's Queuing Analysis methodology.

The Design-Builder shall demonstrate that ramp queues will not extend from the ramp terminus to the mainline or that side road queues will not extend to adjacent intersections. The Design-Builder shall provide calculations demonstrating that the sight distance will be adequate for vehicles exiting and entering the mainline at highway speeds to see the back of the queue and decelerate to a stop condition. The queuing analysis shall be supplemented with simulation analysis for all cases.

6.4.3.6 Signal Warrant Analysis

The Design-Builder shall be responsible for performing an evaluation to determine if signalization is appropriate, based on the MD MUTCD, latest version. Study findings shall be submitted to the Administration for review and approval in a report which outlines the warrants evaluated, with consideration given to safety, operations, delay, and available gaps in traffic resulting from adjacent signalized intersection(s). Recommendations shall also be included in the report and the report shall be attached to the Administration’s Office of Traffic and Safety’s Traffic Control Device Request Design Request Form.

6.5 Signing

6.5.1 Signing Functional Operation Requirements

Permanent guide signing for this Project shall conform to requirements of the RFP including PR 2. Proposed signing on existing roadways shall not simply seek to replace existing signs impacted by construction, but should also seek to remedy any existing deficiencies. It is the intent of this Project to provide fully-compliant signing that meets all applicable standards. Overhead and/or cantilever sign structures are required based on the conceptual design of this project.

If the Design-Builder proposes use of a non-standard sign, the Design-Builder shall prepare the Administration's Office of Traffic and Safety's Non-Standard Regulatory & Warning Sign Approval Form in accordance with the form's instructions. The Design-Builder shall provide support documentation, as required, and coordinate preparation and submittal of all Non-Standard Regulatory & Warning Sign Approval Forms with the appropriate SHA District Traffic Office.

6.5.2 Design and Construction Requirements

6.5.2.1 Signing Plan Sheets

The Design-Builder shall prepare a signing "post-it note" roll plan to be submitted to the Administration for review and comment approval prior to preparing the signing plan cut sheets. The post-it note plan shall show the proposed message, size, MD MUTCD or MUTCD sign designation (if applicable), and location of all guide, supplemental, route marker assemblies, regulatory, and warning signing. These plans shall also show the location and messages of all existing signs to be retained. The plans shall also include the location and type of delineation devices (including pavement markings and SRPM's).

The Design-Builder shall prepare signing plans at a scale of 1"=50' or equal to the roadway plans. Plans shall show the proposed message, size, MD MUTCD or MUTCD sign designation (if applicable), and location of all guide, supplemental, route marker assemblies, regulatory, and warning signing. These plans shall also show the location, messages, and sizes of all existing signs to be retained, removed, and relocated. The plans shall also include the location and type of delineation devices (including pavement markings and SRPM's). The owner of each sign/structure shall be clearly noted on the plan sheets, if it differs from SHA.

All proposed guide, supplemental, and non-standard signs shall be detailed on an SN-3 (Sign Fabrication) detail sheet. The plan set shall include SHA's latest SN-1 sheet (General Notes and Proposals). The Design-Builder shall be responsible for contacting SHA to obtain the latest SN-1 sheet. The SN-4 (Ground Mount Sign Support Details) sheet shall be used for all ground mounted guide or

supplemental sign supports. All ground mounted sign supports (steel and wood) shall be detailed on this sheet. SHA may waive the need to list the standard signs on wood supports on the SN-4 sheets. The tables on this sheet shall include the Sign Number, Plan Sheet number where the sign is located, the sign size, the post size to be used, if the supports are breakaway or non-breakaway, the support lengths, the lateral clearance code and offset, and the support spacing from left edge of sign. As necessary, the SN-8 (Overhead Structures) and the SN-9 (Cantilever Structures) sheets shall also be included in the plan set. The SN-11 (Signing and Marking Quantities) sheet shall be included which summarizes in table format the quantities and materials being used for this Project. Every sign location shall have a separate line. Supports for standard sheet aluminum signs shall be detailed on SN-11 sheets in full.

6.5.2.2 Sign Location Design and Construction Requirements

The Design-Builder shall install all overhead and ground mounted signs within 25-feet of the location shown on the signing plan. An 800 foot spacing shall be maintained between overhead signs and traffic signals. For signing along MD 32 and I-70, all guide signs, supplemental guide signs, and any overhead or cantilever structures shall be installed such that 800 foot spacing is maintained, unless approved by the Administration. It is the Administration's intent to have the signs spaced at 800 foot intervals so that future signing can be accommodated and the 800 foot spacing is maintained.

Overhead and cantilever sign structures installed upstream of bridges crossing over the traveled roadway shall be constructed with at least 300 feet between the sign structure and the bridge, unless precluded by the MD MUTCD or Administration standards. Overhead and cantilever sign structures installed downstream of bridges crossing over the traveled roadway shall be constructed at least 800 feet from the bridge. All overhead and cantilever sign structures installed under this Project shall be located at a minimum of 50 feet from any roadway lighting.

To the extent possible, the Design-Builder shall provide minimum 500 foot spacing between ground-mounted signs. The Design-Builder shall coordinate the proposed sign locations with all proposed landscaping, utility, hydraulic, lighting, and all other roadside features to assure proper clearances, lighting levels, and adequate sight distance.

The Design-Builder shall also provide for the replacement or removal of any signing outside the limits of the Project that is no longer appropriate or pertinent as a result of changes associated with this Project. The signing shall be removed or replaced regardless of whether it falls within or outside the limits of construction along the mainline and cross-street approach roadways.

6.5.2.3 Sign Design and Construction Requirements

The Design-Builder shall design, fabricate, and install all guide, supplemental, route marker assemblies, regulatory, warning, and transit-related signing required for this Project, including signing on approaches outside the Project limits. The Design-Builder shall identify and install sign structure identification numbers for all overhead and cantilever sign structures. Structure numbers will be provided by the Administration. The Design-Builder shall request structure numbers for all sign structures from the Administration's Traffic Engineering Design Division Structures Team following approval of the post-it note plan, or upon the decision to install a sign structure if the decision is made after post-it note review.

The messages, fonts, font size, arrows, shields, colors, borders, and type of support for the overhead and ground mounted signs shall be designed and constructed according to the MD MUTCD. The FHWA Standard Highway Gothic Alphabet shall be used for all sign legends. Legends for guide signs and non-standard sign shall be submitted to the Administration for review and approval.

For all signing (advisory, regulatory, guide, warning, route marker assemblies, etc.), roadways in the project area shall be treated as follows:

- MD 32: Maryland MUTCD Expressway size signs. Fonts for guide signs shall follow Maryland MUTCD Expressway Table 2E-2 and Table 2E-3;
- MD 32 Ramps: Maryland MUTCD Expressway size signs. Fonts for guide signs shall follow Maryland MUTCD Expressway Table 2E-2 and Table 2E-3;
- I-70: Maryland MUTCD Freeway Requirements (Maryland Expressway*). Fonts for guide signs shall follow Maryland MUTCD Freeway Table 2E-4 and Table 2E-5;
- I-70 Ramps: Maryland MUTCD Expressway size signs. Fonts for guide signs shall follow Maryland MUTCD Freeway Table 2E-4 and Table 2E-5;
- MD 144: Maryland MUTCD Single Lane Conventional Road approaching MD 32 and Maryland MUTCD Multi-Lane Conventional Road at the intersection with MD 32;
- 48" tall shields shall be used on advanced guide and exit direction signs along MD 32 for I-70;
- All other roadways: design per Maryland MUTCD guidelines for the design criteria set forth in PR 3.4.1.
- Signing for J Turn or Maryland T intersections shall comply with Maryland J Turn Intersection Signing Typical and Maryland T Intersection Signing Typical.

*Note: The MUTCD meanings of the terms, "Expressway" (MUTCD Definition #71) and "Freeway" (MUTCD Definition #77) are different according to Maryland law (see Section TR 8-101 of The Maryland Vehicle Law). In Maryland, an "Expressway" is defined as a divided highway with full access control and other features. Those provisions of the Manual and its referenced documents that relate to a freeway should be applied to a Maryland expressway. Those provisions in this Manual and its referenced documents that relate to an expressway should be applied to a divided highway in Maryland that has only partial control of access.

All proprietary logos (e.g. Police, etc.) will be provided and installed by the Administration onto signs and/or supports furnished and installed by the Design-Builder. The Design-Builder shall submit a letter to the Administration requesting the logos and the required size.

All signs greater than 4' x 10' shall be manufactured using extruded aluminum sign material. All new signs for this Project shall be constructed with non-reflective (black copy with retroreflective background) or retroreflective (all other colors) sheeting background and copy. All signs mounted on overhead or cantilever structures shall use ASTM D4956 Type XI legend on ASTM D4956 Type XI background.

Please note that on January 25th 2016, the Federal Highway Administration (FHWA) issued a notice in the federal register officially terminating Interim Approval IA-5 for Clearview font which was issued in 2004; all new signs shall use the FHWA approved Highway Gothic alphabet.

The Design-Builder may reuse or relocate existing signs within the Project limits, provided that the sign meets all applicable standards (including placement, application, size, color, reflectivity, condition, etc.). Existing signs that have been damaged in any way shall be removed and replaced, as necessary. The Design-Builder shall be prepared to submit photographs of any signs to remain or be relocated within the Project Limits at the request of the Administration to verify that the sign is suitable for reuse. Removed signs and supports become the property of the Design-Builder.

6.5.2.4 Sign Support Design and Construction Requirements

For each overhead or cantilever structure location, the Design-Builder shall draw the sign panel(s) and the sign structure on the corresponding completed cross-section. The proper vertical and horizontal clearances, sign sizes and sign structure offsets, number of lanes, and lane widths shall be labeled on the cross-sections. The Design-Builder shall maintain 20'-9" to the bottom of Design Sign, or actual sign if the actual sign is taller than the Design Sign, from the high point on the roadway for overhead and cantilever sign structures, regardless of the presence of sign lighting. The Design-Builder shall check the cross-sections and profiles at all overhead sign locations and make adjustments as necessary to provide adequate sight distances and ground clearances to the bottom of the luminaire supports, where necessary. Structure verification sheets shall be submitted for any existing sign structure that involves a change in the amount of sign square footage.

Any alternate to SHA standard sign structure design shall be submitted to the Administration for review and approval. The Combined Stress Ratio (CSR) for any structural support members shall be limited to 0.90. Alternate sign structure designs for Overhead structures shall be designed for a maximum design sign area equal to the overall roadway width multiplied by the height of the tallest design sign size panel including exit panel(s); Cantilever sign structures shall be designed for a maximum design sign area equal to the design sign size width multiplied by the sign height multiplied by a factor of 1.25. The wind speed to be used in design shall be 100 mph. The structure design life shall be a 10 year recurrence interval for ground mounted signs using breakaway steel supports. For signs using breakaway steel supports, the Design-Builder shall utilize the design assistance software provided by the manufacturer of the breakaway system and follow the ground mounted steel post breakaway system selection process provided by the Administration. Post sizes W8x21 and larger shall have 7 foot minimum clearance between adjacent posts. The minimum clear distance shall be measured from inside flange edge to inside flange edge. All wide flange steel I-beam sign supports shall utilize ASTM A709 Grade 36 steel. All square steel posts shall utilize ASTM A500 Grade B structural tubing.

Sheet aluminum signs on State-maintained roadways shall be mounted on wood supports. Sheet aluminum signs on all other roadways may be mounted on either wood supports or 2" square tubular steel posts. Signs over 40 square feet shall be installed on steel posts. Additionally, if the signs are installed at a location where steel posts are required, then extruded aluminum sign material shall be used. All exit gore signs shall be placed on two steel supports. All steel I-beam mounted signs shall be installed on two steel supports, unless otherwise approved by SHA.

No signs or sign structures will be allowed on bridge overpass structures. No signs shall be banded to utility poles, street lighting poles, and overhead or cantilever sign structure uprights without Administration approval.

Traffic barriers shall be provided for protecting all non-breakaway supports within the clear zone and for new structures within as well as outside the limits of work. Signs shall be placed outside the clear zone wherever possible.

The Design-Builder will be responsible for locating and marking all underground and overhead utilities prior to any signing work beginning.

6.5.2.5 Sign Layout and Overhead Sign Requirements

Signing layout and sequencing shall be per the most recent Maryland MUTCD. The Administration adheres to all "shall" and "should" conditions in the Maryland MUTCD. Only "may" conditions are subject to discussion for non-adherence.

The Design-Builder shall seek guidance from the Administration regarding the configuration of any proposed lane reductions (e.g. merge left, merge right, alternate merge). If an alternate merge application is to be used, the Design-Builder shall follow the Maryland MUTCD and the Administration's "Form Single Lane Application Guidelines November 2016."

MD 32 shall be treated as an Maryland MUTCD Expressway for signing design. Permanent guide signing for this Project on MD 32 shall have the following functional requirements:

- Exit directional guide signing along MD 32 for interchange ramps shall be installed on overhead or cantilever sign structures;
- Signing along MD 32 for an Interchange of MD 32 and Linden Church Road shall be based on the Intermediate Interchange Classification;
- Signing along MD 32 for an Interchange of MD 32 and Burntwoods Road and Ten Oaks Road shall be based on the Intermediate Interchange Classification;
- Signing along MD 32 for Burntwoods Road shall maintain all existing advanced guide and exit direction sign destinations and shall maintain all supplemental guide sign destinations;
- If designed and constructed, signing along MD 32 for an Interchange of MD 32 and MD 144 shall be based on the Intermediate Interchange Classification;
- Signing along MD 32 for an Interchange of MD 32 and I-70 shall be based on the Major Category A classification;
- Signing along MD 32 for a lane drop condition shall require overhead or cantilever mounted signs for two advanced guide signs and an exit direction sign. This condition is anticipated at MD 32 at I-70;
- Advance guide signing on MD 32 approaching all interchange ramps shall be at ½ and 1 mile;
- Exit direction and exit gore signs shall be provided for all interchange ramps along MD 32;

- Exit numbers and exit panels shall be provided for all interchange ramps along MD 32, except I-70;
- For overhead or cantilever mounted signs, the controlling text and shield size from Table 2E-2 and Table 2E-4 shall be the greater of the Type of Interchange and Overhead column;
- Maryland T Intersections shall include a minimum of one advanced street name sign;
- Advanced Street Name/Next Signal Signs shall be provided for all at-grade intersections along MD 32 (signalized or unsignalized). Text for street names shall be 10.6 inch minimum.

*Note: The MUTCD meanings of the terms, "Expressway" (MUTCD Definition #71) and "Freeway" (MUTCD Definition #77) are different according to Maryland law (see Section TR 8-101 of The Maryland Vehicle Law). In Maryland, an "Expressway" is defined as a divided highway with full access control and other features. Those provisions of the Manual and its referenced documents that relate to a freeway should be applied to a Maryland expressway. Those provisions in this Manual and its referenced documents that relate to an expressway should be applied to a divided highway in Maryland that has only partial control of access.

6.6 Pavement Markings

6.6.1 Design and Construction Requirements

6.6.1.1 Plan Sheets

The final design marking plans shall be indicated on the signing plan with the same scale as the signing plan. The plans are to show color, size, location, and material type for markings within the limits of work. The lanes shall be dimensioned based on the typical sections for the Project. Dimensions shall be included for each change in the roadway typical. Dimensions shall be included for placement of arrows, "ONLY" or other text messages, bicycle markings, stop lines, and length of longitudinal turn lane lines. The plan shall also clearly define locations where pavement markings change color, width, or material. Existing pavement markings that are to remain shall be shown on the plans and locations where proposed pavement markings tie-in to existing pavement markings shall be denoted on the plans.

6.6.1.2 Pavement Marking Design and Construction Requirements

The Design-Build Team shall be responsible for the design and construction of all pavement markings. At a minimum, final pavement marking lane lines, including parallel, acceleration/deceleration lanes for ramps, intersection auxiliary lanes, and Snowplowable Raised Pavement Markers (SRPM), the Pavement Marking

Materials shall adhere to the guidelines and references in PR 2, including the Pavement Marking Material Selection Policy and Guidelines updated 7-27-2017, or current version if a newer document has been issued. SRPM shall be used per SHA Memorandum Dated 8-1-2017 and Pavement Marking Material Selection Policy and Guidelines updated 7-27-2017. Metal holders (castings) will not be permitted for use on hot mix asphalt pavements (HMA) for this project. Recessed SRPM with Plastic Holders shall be used on all hot mix asphalt pavement on this project in accordance with Shelf Typical 557.01. When using SRPM on new HMA or Portland Cement Concrete (PCC) roadways with a posted speed limit of 50 MPH or greater, use Recessed Snowplowable Raised Pavement Markers with Dual Plastic Holders and Dual Lenses in a groove where alignments allows.

MD 32 shall be treated as an Expressway for the design of pavement markings. All pavement markings on HMA on MD 32 shall be Inlaid Pavement Marking Tape.

Durable Markings include thermoplastics, preformed thermoplastics (wet tape), or epoxy. All durable markings shall demonstrate wet retro reflective properties when tested in accordance with ASTM #E 2177-01 (Test Method for Measuring the Coefficient of Retroreflected Luminance (RL) of Pavement Markings in a Standard Condition of Wetness).
Whenever paint is listed as an application, the 50/50 blend of large and standard glass beads is required.

For pavement markings along ramps, the Design-Builder shall utilize the highest category markings of the intersecting roadways.

All transverse pavement markings (i.e. yield symbols (shark's teeth), crosswalks, stop lines), as well as all arrows, symbols, and letters shall be heat applied permanent preformed thermoplastic.

Crosswalks shall be provided at all signalized intersections as specified in an approved Design Request.

All permanent pavement markings installed on the Project shall be listed on the Administration's List of Qualified Permanent Pavement Markings, unless submitted and approved through the Administration's Maryland Product Evaluation List (MPEL) program.

The use of flex posts or channelizing devices at Maryland T or J Turn intersections shall not be considered an acceptable alternative for physical channelization using curbs or barriers.

6.7 Traffic Signals

6.7.1 Traffic Signal Functional Operation Requirements

Temporary traffic signals, permanent traffic signals, and existing traffic signal modifications shall be designed as per the requirements outlined in the Design Request Forms as coordinated by the Design-Builder with the appropriate District Traffic Office. All temporary and permanent traffic signals for this Project shall conform to requirements of the RFP including PR 2.

Traffic signals are anticipated at the following locations:

- MD 32 at MD 144
- MD 32 at SHA Dayton Shop – The proposed traffic signal will be an on-demand traffic control signal which will operate under flashing operation until pushbutton actuated (pushbutton located in the Dayton Shop). A mast arm pole mounted overhead hazard identification beacon with PREPARE TO STOP WHEN FLASHING sign is required in the northbound direction. A mast arm pole mounted overhead hazard identification beacon with PREPARE TO STOP WHEN FLASHING sign is required in the southbound direction if MD 32 southbound motorists are required to stop when the side street is activated.
- MD 32 at I-70 Eastbound Ramps
- MD 32 at I-70 Westbound Ramps

Any proposed temporary and permanent modifications to this existing traffic signal (e.g. signal timing, phasing, turn restrictions, etc.) proposed by the Design-Builder shall be submitted to the Administration for review. If approved, the Design-Builder is required to prepare and submit a Design Request Form per "6.4.2 Preparation and Submittal of Design Request Form."

All temporary and permanent traffic signals proposed by the Design-Builder shall be coordinated with the appropriate District Traffic Office and meet their functional requirements. An approved Design Request from the Administration is required for any new traffic signals, traffic signal reconstructions, and traffic signal modifications.

6.7.2 Design and Construction Requirements

6.7.2.1 Traffic Signal and Interconnect Plan Sheets

The Design-Builder shall prepare traffic signal and interconnect plans to address any new traffic signals, temporary traffic signals, or modifications to existing traffic signals that are required.

6.7.2.2 Traffic Signal Design and Construction Requirements

Design and construction of all permanent traffic signal shall use mast arm signal

poles. The use of diagonal single mast arms is not permitted. Any proposed alternatives to mast arm requirements shall be submitted by the Design-Builder to the Administration for review and approval. Design and construction of temporary traffic signals may use strain poles or wood poles (if the estimated duration of signal operation is less than one year) with span wires.

Light-Emitting Diode (LED) lighting shall be provided on signal poles in accordance with the Administration's current Lighting Guidelines, and shall be coordinated with adjacent existing and/or proposed roadway and/or sign lighting. Electrical cables for intersection lighting shall not pass through the signal cabinet, shall be equipped with a photocell and shall be wired to the metered service pedestal for the signal.

The Design-Builder shall prepare and submit Accessible Pedestrian Signal (APS) worksheets to the Administration for review and approval of APS messages. Countdown Pedestrian Signal (CPS) heads shall be used for signalized pedestrian crossings.

All conduits crossing roadways shall be installed perpendicular to the roadway being crossed, unless there are constructability or utility conflicts, in which case the Administration must approve of the proposed conduit route. With the exception of conduit being used for non-invasive probes, all conduit crossing underneath a roadway shall be 4 inch Schedule 80 rigid PVC conduit. Conduit used for the installation of non-invasive probes shall be 3 inch Schedule 80 rigid PVC conduit. Three (3) inch Schedule 80 rigid PVC may be used between handholes and pedestal poles with transformer bases. Two (2) inch Schedule 80 rigid PVC may be used between handholes and pedestal poles with breakaway couplings. Two (2) inch Schedule 80 rigid PVC conduit may only be used for power feeds where acceptable by the power company. The Design-Builder shall confirm and use the conduit size required by the power company providing power on this project. HDPE Polyethylene Conduit with a wall thickness equal to Schedule 80 may be used in lieu of PVC at the discretion and approval of the Engineer, generally for bored conduits. Splicing of HDPE conduit to PVC conduit is prohibited. HDPE, when used, shall be installed from handhole/manhole to handhole/manhole in one continuous section.

Traffic signals shall be designed and constructed in accordance with the following:

A) Using base mounted (NEMA size S) Maryland State Econolite Traffic Signal Cabinets wired in accordance with Administration specifications for all permanent traffic signals. Pole mounted (NEMA size 5) cabinets may be permitted for use at temporary traffic signals only. All signal cabinets, controllers, and rack mounted modules will be supplied by the Administration. The Design-Builder shall be

responsible for delivering the assembled cabinet from the Administration's Traffic Signal Shop to the site and installing. The Administration will provide final connection of all cables within the cabinet;

B) Using Light-Emitting Diode (LED) traffic signal heads and countdown pedestrian signal heads;

C) Using schedule 80 rigid PVC conduit for underground installations, and,

D) S cabinet uninterruptable power supply (UPS) battery backup shall be installed at traffic signals which meet any of the following requirements:
    - Railroad Pre-emption
    - Airport obstruction lights
    - Located at military bases
    - Multiple intersection controllers
    - 2 or more intersections operated from a single controller
    - Point-control (police, crossing guard) intersections
    - FITA, mid-block with HIB, intersection with school HIB
    - Unusual geometry
    - Two or more right or left turn bays in same direction
    - Interactive warning beacons (Prepare to Stop When Flashing, etc.)
    - System master controller
    - Cell Modem Location in Hardwire Interconnect Systems
    - Interstate, Sate or US route ramp signals

E) Provide high speed data communications to traffic signal cabinets which are installed or modified under this project. Using cellular communication and Ethernet switches for communication between traffic signals and the SHA Advanced Transportation Management System (ATMS) in accordance with ATMS Implementation and Design Guidance for Traffic Signals memorandum dated 12-20-2016 or latest revisions is acceptable to meet this requirement.

The Design-Builder shall ensure all traffic signal heads for existing, temporary, and permanent conditions can be seen by all approaching traffic at the required sight distance at all times during and after construction. The Design-Builder shall prepare and submit to the Administration for review and comment sightline profiles for all overhead signs, bridges, and hazard identification beacons that are on traffic signal approaches, including calculations that the sight distance will be adequate for vehicles approaching signalized intersections to see the back of the queue and decelerate to a stop condition for all approaches to traffic signals under existing, temporary, and permanent conditions. If sight lines do not meet the Maryland MUTCD requirements, the Design-Builder shall provide a recommendation for meeting the requirements to the Administration for approval, such as red signal ahead warning signs or flashing beacon signs. UPS battery backup must be provided for interactive HIBs.

6.7.2.3 Interconnect Design and Construction Requirements

The Design–Builder shall obtain all existing interconnect information and all existing interconnected signals shall remain connected under the final design. All existing traffic signal interconnect shall be maintained throughout construction, which may require relocation or temporary interconnect. Along any run of existing interconnect there shall be no net increase in splice points. The Design-Builder shall utilize twelve-pair communication cable (twisted pair or fiber, as required) for all proposed interconnect. All impacted or damaged interconnect cables shall be replaced in- kind.

The Design-Builder shall be solely responsible for all work and costs associated with maintaining communication cable for all signals throughout construction. The Design-Builder shall be responsible for coordinating the relocation of any existing interconnect cable attached to utility poles. All interconnect shall be relocated prior to roadway construction in order to assure that interconnect can be maintained throughout construction. The Design-Builder shall be responsible for relocation of any existing interconnect (twisted pair or fiber optic cables) impacted by construction. The Design-Builder shall coordinate with SHA/County to facilitate the relocation of existing interconnect and fiber optic cables and equipment. All proposed splices shall occur in signal cabinets. If a section of interconnect run is not long enough to be relocated, the entire section of cable shall be replaced. The Design-Builder shall be responsible for obtaining all permits required for placing interconnect on utility poles and shall be responsible for all associated costs.

In locations where the Design-Builder completes work within an interconnected system which is not already converted to the Advanced Transportation Management System (ATMS) using high speed data communications, the Design-Builder is responsible for converting all locations within the interconnect system to ATMS using high speed data communications. This is typically accomplished by installing a cellular modem at a single location within the interconnect system and installing Ethernet switches in all other cabinets within the system.

An interconnect system exists along MD 32 between MD 144 and MD 99 and includes the ramps to I-70. This system must be upgraded with high speed data communications and integrated into the ATMS. At a minimum Ethernet switches shall be installed in each cabinet and a cellular modem shall be installed at traffic signal cabinet within the system.

6.7.2.4 Utility Design and Construction Requirements

The Design-Builder shall be responsible for locating and marking all underground and overhead utilities prior to any work. The Design-Builder shall be responsible for all Work, materials, and costs associated with obtaining power (including coordination with the utility company). Electric costs for maintaining power throughout construction for all traffic signals and other electrical work required for this Project shall be the responsibility of the Administration. The Design-Builder shall be responsible for completing all electrical service application materials necessary for obtaining and/or removing service from the appropriate power company. All materials shall be submitted to the power company through the Administration.

The Design-Builder shall use 200A Metered Service Pedestals at all traffic signal locations, unless otherwise noted by the Administration. The Design-Builder shall install conduit between the metered service pedestal and the nearest handhole (bypassing the signal cabinet) for intersection lighting. The Administration will be responsible for all on-going electric costs of proposed signal equipment after the signals have been accepted for Maintenance by the Administration. Metered Service Pedestals shall only be used to service traffic signal equipment and related intersection lighting, unless otherwise noted by the Administration. The current party responsible for any existing metered service that needs to be upgraded or replaced will continue to be responsible for all on-going electric costs after the Project is complete. For each location requested, it is the Design-Builder's responsibility to complete all paperwork, coordinate with the utility company, and schedule all utility connections so as to not adversely affect the project schedule.

The Design-Builder shall schedule meetings with the Administration to verify traffic control device work as follows:

A) At the completion of all cabling and wiring and prior to electrical utility service connection; and

B) Prior to traffic control device activation.

6.8 Lighting

6.8.1 Design and Construction Requirements

6.8.1.1 Lighting Plan Sheets

The Design-Builder shall complete a lighting analysis for all areas where new or modified lighting is proposed to be submitted to the Administration for review and comment prior to preparing the lighting plans. The submission shall include photometric calculations (illuminance and veiling luminance as appropriate) supporting the light locations and voltage drop calculations for all circuits.

The Design-Builder shall prepare and present lighting plans with a scale appropriate for the Project, generally 1"=50' or the established roadway plan scale when appropriate. Plans shall include existing and proposed geometry, existing and proposed utilities, right-of-way, landscape features, applicable drainage features, ditch lines, applicable structural facilities, and other information required for coordination of utilities. Plans shall show location of new lighting, type and mounting height of poles, type and wattage of luminaires, length of luminaire arms, removal and relocation of existing lighting, conduit, circuit routings, cable types and installation method, manholes/junction boxes, splice locations with appropriate connector kits, ground rod locations, signs to be lit, electrical service locations, and other details pertinent to the construction.

The lighting plans shall include standard Administration identifiers for light poles and manholes as well as standard designations for cable sizes. The plans shall include a panel schedule (including pole and base mounted lighting cabinets and metered service pedestals) showing the circuit breaker loads and equipment connected to each circuit breaker. The plan shall include a schedule of light poles, a sign lighting schedule, and a schedule of enclosures (manholes/vaults/junction boxes.) Voltage drop calculations shall be provided concurrently with the lighting plan sheets.

For each lighting submittal, the Design-Builder shall submit all available lighting sheets (updated and previously submitted) as one complete package. The submission shall include photometric calculations (illuminance and veiling luminance as appropriate) supporting the light locations and voltage drop calculations for all circuits.

The Design-Builder shall combine intersection lighting with the traffic signal plans whenever possible.

6.8.1.2 Lighting Design and Construction Requirements

Prior to any construction activities, an inventory of the existing lighting system shall be conducted to document which luminaires, including signs and roadway, are operating. For existing lighting, the maximum outage time for luminaires shall be 24 hours unless otherwise approved by the Administration. All proposed luminaires within the Project limits shall be working upon completion of the Project. All existing (to remain) luminaires within the Project limits that were working at the time of conducting the existing lighting inventory shall be working upon completion of the Project and are to be maintained throughout the duration of the construction.

All roadway lighting installed under this Project shall be located a minimum of 50 feet from any overhead or cantilever structure.

All lighting cabinets shall be designed and constructed with at least 20 amps spare capacity for the Administration's future use.

All proposed lighting equipment shall be located such that it can be readily maintained by personnel of the maintaining agency. Where possible, the Design-Builder shall locate signal and lighting cabinets in the same quadrant of the intersection/interchange. Lighting placed on traffic signal equipment shall be serviced from a metered service pedestal. Each luminaire mounted on a signal structure shall be equipped with a photocell. Power supply for signal structure mounted lighting and the traffic signal may be installed in the same conduit system.

The voltage drop for each branch circuit shall not exceed five percent for new circuits or existing circuits, assuming a cable temperature of 40 degrees Celsius. A minimum of two branch circuits shall be used for each continuous succession of lighting structures. All lighting circuits shall have balanced lighting loads. The voltage drop for each feeder circuit shall not exceed the maximum recommended by the National Electric Code (NEC).

Lighting circuits shall be direct-buried duct cable unless under roadway surfaces, in structures, or in locations where protection from surface loading is needed. Two conductor duct cables shall be used for all roadway lighting circuits. Four conductor duct cable is permitted for sign lighting circuits. Only the conductors that serve the lighting structures shall enter the foundation of the lighting structures. All other conductors shall remain un-spliced and bypass the foundation. The Design-Builder shall furnish and install single conductor Type USE cables in Schedule 80 rigid PVC conduit under all roadway surfaces. Single conductor cables shall be used any place cables are to be installed in conduit. For cable runs in bridges and/or parapets, cables sizes equal to or less than #6 AWG shall be used.

The Design-Builder shall provide electrical manholes (or vaults) and connector kits to splice the conductors. The Design-Builder shall provide no more than 30 connector kits in each manhole and no more than 50 connector kits in each electrical vault. No in-ground splices of electrical cables shall be permitted for any reason. The use of 'splitbolt' type connectors for splicing conductors shall not be permitted. The Design-Builder shall use waterproof electrical splice kits (sealed with silicone gel) or approved equal for splicing conductors in non-breakaway applications such as manholes and other similar underground locations.

No foundations or electrical handholes/handboxes/manholes shall be placed in drainage ditches. Electrical manholes shall be constructed of concrete. Manholes constructed of composite materials will not be permitted for use on the Project.

The stone surrounding these structures shall not be considered a suitable outfall. Underdrain shall be connected to a suitable outlet such as a drainage pipe or structure. If a drainage structure is not available, the Design-Builder shall submit alternative designs to the Administration for review and approval. The Design-Builder shall abandon existing conductors between poles that are to be removed. Power supply for lighting (other than that mounted on signal structures) shall be installed in separate conduit (including cabinets, handboxes, handholes, and manholes/vaults) and on independently metered circuits for respective jurisdictional owners.

All underground lighting conduits shall be constructed of Schedule 80 rigid PVC conduit. All exposed conduit shall be constructed of galvanized rigid steel. PVC coated rigid galvanized steel conduit shall be used from the nearest manholes/handhole below grade to a minimum of 2' above grade. Conduit fill ratios shall not exceed 25% of conduit area. HDPE Polyethylene Conduit with a wall thickness equal to Schedule 80 may be used in lieu of PVC at the discretion and approval of the Engineer, generally for bored conduits. Splicing of HDPE conduit to PVC conduit is prohibited. HDPE, when used, shall be installed from handhole/manhole to handhole/manhole in one continuous section.

All light poles that are not protected by traffic barrier and are in the clear zone as defined in the AASHTO Roadside Design Guide shall be installed on a breakaway transformer base complying with the Maryland Book of Standards. Light poles shall not be installed in front of traffic barrier.

The lighting system shall utilize cabinets, conduits, and handboxes/ manholes/vaults/junction boxes separate from the traffic signal or ITS equipment. Common metered service pedestals may be used.

The Design-Builder shall place luminaries approximately one foot over the pavement marking edge line. To avoid foundation conflicts, the luminaire location may be located between 1' inside to 2' outside of the pavement marking edge line. Where such adjustments are made, the Design-Builder shall ensure that all other design requirements are being met.

Illuminance and veiling luminance calculations shall include uniformity ratios (average-to-min and max-to-min), point-by-point computations, and a summary of the minimum and average maintained lighting levels and the critical veiling luminance ratios. The Design-Builder shall apply a light loss factor of 0.64 when computing photometrics. For lamp types not listed in Section 950.12.02, the Design-Builder shall use the values provided by the manufacturer. The light loss factor and lamp lumens shall be provided with the illuminance and veiling luminance calculations. For LED luminaires, the Design-Builder shall use fixtures listed on the SHA Qualified Products List (QPL). All LED fixture choices shall be approved by the Office of Traffic and Safety. Point-by-point computations shall be provided for all proposed interchange, roundabout,

intersection and roadway lighting. Photometric calculations shall be performed with the fixture which is intended for installation on the project.

At a minimum, intersection lighting calculation grids shall include the area of the intersection bound by the stop lines (or the location where a stop line would be located on an uncontrolled approach). Calculation grids for channelized right turns or channelized left turns at at-grade intersection shall be placed in accordance with Figure III-A.2 and Figure III-A.3 from the Administration's Lighting Guidelines unless waived by the Engineer through the design process. The recommended and optional light poles shown in Figure III-A.1 of the Administration's Lighting Guidelines shall be considered required unless waived by the Engineer through the design process. Calculation grids for roundabout intersections shall extend to the nose of the separation median islands. In locations where 600 feet or less is provided between any two light poles, the 600 feet or less shall be lit and included within a lighting calculation grid. All gaps of lighting 600 feet or less shall be lit. Calculation grids for secondary ramp merges or diverges shall placed in accordance with Figure III-A.2 and Figure III-A.3 from the Administration's Lighting Guidelines.

The Design-Builder shall design, fabricate, and install all roadway lighting shown on the lighting plan within 5 feet of the location shown on the lighting plan.

The lighting requirements for this project are as follows:

- Lighting shall be provided in accordance with the Administration's Lighting Guidelines, most recent version, and all other relevant standards as provided in PR 2 Guidelines and References;
- Photometric calculations must be performed using the lighting fixture which will be installed in the field, any deviation must be approved by the Administration;
- Partial interchange lighting shall be provided at all MD 32 and/or I-70 Entrance Ramps and Exit Ramps within the project limit in accordance with Administration's Lighting Guidelines;
- All roundabouts in the project limit shall be lit per the Administration's Lighting Guidelines;
- Partial intersection lighting shall be provided at all traffic signals;
- Partial intersection lighting shall be provided at all at-grade intersections along MD 32 within the project limit which have a left turning movement permitted across MD 32 traffic; and
- Any existing High Pressure Sodium (HPS) lighting on the Administration's roadways within the project limits shall be upgraded to Light-Emitting Diode (LED). SHA may waive the requirement to prepare photometric calculations for in-kind upgrades.
- As-Built lighting inventory data shall be supplied to SHA in accordance with the Special Provisions.

6.8.1.3 Existing Lighting Design and Construction Requirements

All impacted existing roadway lighting shall be replaced by the Design-Builder unless otherwise directed by the Administration. Lighting shall incorporate the same luminaire and pole type as on the rest of the roadway in order to maintain consistency.

The Design-Builder shall design and construct the lighting system consistent with operational and engineering requirements of the utility company and owning/maintaining agencies. For locations where luminaires are attached to a utility pole, the Design-Builder (as a part of the utility relocation effort) shall contact the owner of the lighting to coordinate relocation of the light fixture. The Design-Builder is responsible for coordinating agreements between the owner and the utility company.

The Design-Builder shall remove existing light poles that are no longer required due to construction of the Project. The equipment shall be the property of the Design-Builder upon removal. The Design-Builder shall notify the owner of the lighting being removed at least two weeks in advance of scheduled equipment removal.

Any existing lighting structure that is impacted by construction of this Project shall be disconnected, reconnected, and made fully operational by the Design-Builder as part of this Project. All abandoned cables shall be made safe.

The Design-Builder shall complete a lighting analysis for all areas where new lighting is proposed. These photometric analyses are to be submitted to the Administration for approval prior to preparing the lighting plans. The submission shall include photometric calculations (illuminance and veiling luminance as appropriate) supporting the light locations and voltage drop calculations for all circuits. Lighting plans will not be reviewed without approved photometric lighting analysis. Any existing HPS lighting on SHA roadways within the project limits shall be upgraded to LED.

6.8.1.4 Sign Lighting Design and Construction Requirements

Overhead sign lighting shall only be installed under the following criteria:

A) All overhead or cantilever mounted signs with unencumbered sight distance of less than 1,000 feet. Unencumbered sight distance exists if all portions of every overhead sign panel on that structure is visible to motorists in all approaching lanes.
B) Additional lighting may be considered and requested as part of the Design Request based on Engineering Judgement to address site specific conditions.
C) All overhead or cantilever mounted signs which have sign sheeting which does not meet or exceed ASTM D4956 Type XI shall be lit.

Sight distance as noted above should be considered when selecting locations for new structures. All signs on a structure with any one sign that requires lighting shall be lit.

Lighting for all new sign structures shall follow the above criteria. Individually mounted sign lighting fixtures with luminaires is the preferred method of illumination of signs; sign lighting maintenance systems should only be used at the discretion of the Administration's Office of Traffic Safety (OOTS). All existing sign lighting will be upgraded to LED lighting; all new lighting shall be LED. Where existing signs are replaced with new signs fabricated from ASTM D4956 Type XI sheeting, the need for sign lighting will be determined according to the above criteria. If any overhead sign does not require lighting it shall use ASTM D4956 Type XI sheeting which shall be specified on the sign detail sheets.

Lighting for new sign structures shall consist of individually mounted sign lighting fixtures. Signs shall be only lit from beneath the signs. Acceptable lighting shall consist of a long-life system, meeting the following requirements:

A) Using Light Emitting Diode (LED) luminaires approved by the Administration;
B) Having a functional life time of at least 100,000 hours, including lamp and ballast;
C) Having < 50% failure of any component at 60,000 hours, including lamps; and
D) Having a lamp lumen depreciation not worse than 70% at 60,000 hours.

All sign lighting shall be on dedicated circuits. For each sign structure a minimum of two circuits shall be used. The sign lighting design shall be shown on the roadway lighting plans. The design of luminaires for sign illumination using long-life lighting systems shall be in accordance with Administration's Office of Traffic and Safety's standard lighting charts, provided as Additional Information on ProjectWise.

All sign lighting systems shall be designed to provide an average of 20 to 40 foot candles with 6:1 max to min uniformity. Photometric calculations shall be on a 1 foot grid over the entire surface of the sign. All existing sign lighting within Project limits that is impacted by construction activities shall be maintained throughout construction.

6.8.1.5 Leased Lighting Design and Construction Requirements

For locations where luminaires are attached to a utility pole, the Design-Builder (as part of the utility relocation effort) shall contact the appropriate agency to coordinate relocation of the light fixture or installation of new light fixtures provided photometric analysis supports the changes. In cases where the

photometric analysis supports the change, the Design-Builder shall also develop lighting plans for submission to the Administration for review and approval. The Administration will be responsible for coordinating agreements with the utility company.

6.8.1.6 Temporary Lighting Design and Construction Requirements

All existing roadways which have roadway lighting shall remain illuminated at IES minimum levels for the duration of the Project unless approved otherwise by the Administration.

The Design-Builder shall maintain all existing lighting within the Limits of Work throughout construction. Where temporary lighting is needed to maintain the existing lighting levels in the Project area, the Design-Builder shall install and maintain temporary lighting (cobra heads attached to wood poles). Temporary overhead electrical service is acceptable for non-breakaway poles. The Design-Builder shall remove temporary lighting when no longer needed. The Design-Builder shall be responsible for the power costs of any and all temporary lighting that may be required and it is the Design-Builder's responsibility to schedule all utility connections.

6.8.1.7 Electrical Service for Lighting Design and Construction Requirements

The Design-Builder shall be responsible for locating and marking all underground and overhead utilities prior to any lighting work beginning. The Design-Builder shall be solely responsible for all Work, and materials, and costs associated with obtaining power (including coordination with the power company). Electric costs for maintaining power throughout construction for all lighting facilities and other electrical work required for this Project shall be the responsibility of the Administration. The Design-Builder shall be responsible for completing all electrical service application materials necessary for obtaining service from the appropriate power companies. All materials shall be submitted to the power company through the Administration. The Design-Builder shall contact all utility companies to fulfill requirements to determine the location of all existing and proposed utilities, obtain power company requirements for service and obtain power company approval for service location(s). For each location requested, it is the Design-Builder's responsibility to complete all paperwork, coordinate with the utility company, and schedule all utility connections so to not adversely affect the Project schedule.

Lighting systems owned by different jurisdictions shall have separate power sources derived from the utility company. Exceptions shall require written approval and agreement of all jurisdictions involved and will require separate circuits for each jurisdiction's electrical elements fed from the electrical service

equipment.

6.8.1.8 Light Pollution

For all proposed roadway lighting, the maximum allowable vertical and horizontal illuminance at residential property lines shall not exceed 0.05 foot-candles (fc). Photometric analyses for light trespass at residential property lines is required and the analysis shall utilize a light loss factor of 1.00. House side shielding shall be provided on all roadway lighting, as necessary based on photometric calculations or as requested by the Engineer.

6.9 Bicycles

All signing and marking design and construction of bicycle facilities shall be in accordance with the Maryland MUTCD, the most recent revision of the Administration's "Bicycle Policy and Design Guidelines," and the other relevant requirements of the Guidelines and References in PR 2.

Bicycles are discouraged from being on MD 32 north of Burntwoods Road. No bicycle lane markings or signing shall be installed in these locations, and any existing bicycle lane signs and pavement markings on MD 32 north of Burntwoods Road within the project limits shall be removed.

Bicycles are not permitted on MD 32 south of Burntwoods Road. No bicycle lane markings or signing shall be installed in these locations, and any existing bicycle lane signs and pavement markings on MD 32 south of Burntwoods Road within the project limits shall be removed. The Administration's standard sign R5-10b "PEDESTRIANS AND BICYCLES PROHIBITIED" shall be posted at all entry points to MD 32 south of Burntwoods Road. If the Design-Builder proposes use of a non-standard sign, the Design-Builder shall prepare the Administration's Office of Traffic and Safety's Non-Standard Regulatory & Warning Sign Approval Form.

The Design-Builder shall work with the Administration's Office of Traffic and Safety – Traffic Engineering Design Division and appropriate District Traffic Office to provide bicycle control that is acceptable to both offices.

6.10 Virtual Weigh Station

An existing virtual weigh station is located within the project limit. The Design-Builder shall notify SHA OOTS Motor Carrier Division (MCD) at 410-582-5734 a minimum of 60 days prior to the start of construction activities. SHA OOTS MCD will be responsible for salvaging existing equipment from the site (cabinet, detectors, cameras, etc.). Once salvage activities are completed by MCD, the Design-Builder shall remove and dispose of all remaining equipment and remove foundations at least 1 foot below grade and backfill. The replacement virtual weigh station site will be designed and constructed by others (MCD). The Design-

Builder is not responsible for the design or construction of a replacement virtual weigh station site.

PR 7 LANDSCAPE AND REFORESTATION DESIGN AND CONSTRUCTION PERFORMANCE SPECIFICATIONS

7.1 Preservation of Trees and Woodlands

The Design-Build Team shall design and construct the project to minimize the amount of healthy, native, trees removed. In addition, the State Highway Administration (SHA) will require that the project design avoid or minimize impacts to existing tree stands and specimen trees through tree protection measures in accordance with this Landscape and Reforestation Design Performance Specification and the relevant requirements of the Guidelines and References in Section 1.30.01.10. The Design-Builder shall design and implement sound tree protection measures during construction in accordance with the requirements of the Administration's 2017 *Standard Specifications for Construction and Materials* (*SSCM*) Section 120-Tree Preservation Area.

1. Impacts to individual trees, woods, and forest areas occurring as part of this project, including, but not limited to: crown and branch pruning, tree clearing, and root pruning shall be in accordance with the MD Reforestation Law and/or Roadside Tree Law as applicable and Section 120-Tree Preservation Area. The Design-Builder shall clearly indicate tree removals and tree protection measures on the erosion and sediment control plans.

2. The area covered by the Maryland Department of Agriculture (MDA) Quarantine has expanded since the discovery of Emerald Ash Borer in Howard and Anne Arundel Counties in 2011. Per Plant Protection Order #11-02, effective July 11, 2011, regulated materials are not to be moved out of quarantine areas. Regulated areas include all 14 Maryland Counties west of the Chesapeake Bay and Baltimore City. Regulated materials for the Emerald Ash Borer Quarantine include the following:
    a. Emerald Ash Borer
    b. Hardwood firewood
    c. Any piece of Fraxinus spp. (Ash), including cut or fallen, living or dead.
    d. Any uncomposted Ash chips or uncomposted Ash bark, larger than 1 inch in any two dimensions.

3. The Design-Builder shall employ the services of an individual who is a Maryland Registered Forester, Maryland Licensed Landscape Architect, ISA-certified Arborist, and/or a Maryland Licensed Tree Expert (LTE) to perform the following activities:

    a. Conduct an on-site inspection to determine the presence and location of specimen and/or significant trees within the limits of disturbance plus 30 feet beyond the limits of disturbance. Specimen trees are defined as trees with a Diameter at Breast Height (DBH) of 30 inches or greater, or at least

75% of the DBH of the MD State Champion of the species, whichever DBH measurement is smaller.

For the purpose of this contract significant trees are defined as trees a DBH of 24 inches to less than 30 inches or at least 50% of the DBH of the MD State Champion of the species.

b. Identify critical root zones of specimen and/or significant trees where the trunk is located within the limits of disturbance or up to 30 feet beyond the limits of disturbance. Critical root zones shall be defined as 1 foot of radius per 1 inch of DBH (Diameter at Breast Height) for trees less than 30 inches DBH; and 1.5 feet of radius per inch of DBH for trees 30 inches or greater.

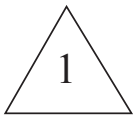
c. Prepare a Tree Impact Avoidance and Minimization Report as described under 7.5.2 Landscape Submittals and 1.30.03.6 and consistent with the 2017 *SSCM* Section 120-Tree Preservation. Submit the Report to the Office of Environmental Design, Environmental Programs Division (OED-EPD) for approval, prior to installation of erosion and sediment controls.

d. Coordinate tree protection measures with erosion and sediment control measures. Provide constructability review of tree protection measures on erosion and sediment control plans, adding additional protection measures where necessary to accommodate impacts from controls.

e. An LTE shall provide direct oversight of tree work during construction as required by State Law and/or as described in Sections 712 through 716 in the *SSCM*.

f. An LTE shall maintain project compliance with the MDA Quarantine on the Fraxinus (Ash) species; to include providing a plan for disposal of Ash trees impacted by the project, subject to the approval of MDA.

4. As stated in 1.2.5.7, SHA has obtained a Reforestation Site Review Approval for impacts to trees and forest areas within the proposed limits of disturbance shown on the Concept Plans. Prepare the forest impact plans and Reforestation Law application and provide to OED-EPD for review of conformance with the current MD Department of Natural Resources Forest Service (DNR-FS) Reforestation Site Review Approval. Tree and forest mitigation plantings shall be coordinated with and approved by SHA



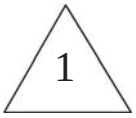
a. The Forest Impacts indicated on the Concept Plates for the Project show 115.92 acres of forest removal.

b. The Design-Builder shall provide revised Forest Impact Plans for required modifications to the approved Reforestation Site Review to OED-EPD for

submittal to DNR-FS in the event that work will impact trees beyond the permitted limits. The Design Build Team will be required to attend site review meetings with SHA/DNR-FS if requested by the Administration. Compliance with additional DNR-FS requirements or conditions associated with the modification of the Reforestation Site Review Approval shall be the responsibility of the Design Build Team, in coordination with the Administration. The Design Builder shall be responsible for replacing specimen or champion trees of fair to good condition outside of the LOD that are damaged or removed by construction operations. The replacement shall be one caliper inch for every one caliper inch of damaged or removed tree.

c. As a part of the landscape as-builts, the Design Build Landscape Architect shall conduct a project audit to confirm the actual project impacts to forest areas. Prior to requesting construction final acceptance, provide an as-built forest impact plan to OED-EPD showing the forest and tree impacts and onsite reforestation plantings.

5. Maximize on-site individual tree mitigation for impacts to trees per Roadside Tree Law as applicable. Reforestation requirements shall match actual impacted forest amounts. On-site reforestation is anticipated at 115.92 acres and will require a modification of the Reforestation Law Permit to include actual forest impacts. Reduction of forest impacts by the Design-Builder below 115.92 acres will allow an equal reduction of reforestation plantings in locations approved by OED-LAD. Coordinate proposed changes requiring revisions to the Reforestation Site Review Approval with the Landscape Architecture Division (OED-LAD), OED-EPD, and DNR-FS. The Design Build team will maintain compliance with DNR-FS requirements or conditions associated with modifications to the Reforestation Site Review Approval.



The order of preference for the location of reforestation is as follows:

a. Cleared SHA land within the project limits adjacent to existing, preserved forest areas and not in locations reserved for future roadway widening or other improvements.

b. Cleared SHA land within the project limits that is not reserved for future roadway widening or other improvements.

c. Offsite areas on SHA land in coordination with, and pending the approval of, SHA and DNR-FS.

d. Offsite areas adjacent to SHA lands in coordination with, and pending the approval of, SHA and DNR-FS.

6. Mitigation for additional impacts proposed beyond those originally approved by DNR-FS for the Project shall be the responsibility of the Design-Builder, and may

include a site search for offsite mitigation, agency reviews and approvals, reforestation design, invasive species management, obtaining right of way, and construction.

7. Revegetate land disturbed by construction activities as soon as practical after construction is completed in accordance with the Drainage, Stormwater Management, and Erosion & Sediment Control and Planting & Landscape Architectural Performance Specifications.

7.2 Guidelines and References

Design and construction of landscape and reforestation plantings shall be in accordance with this Landscape and Reforestation Design Performance Specification and the relevant requirements of the Guidelines and References in 1.30.01.10.

7.3 General

The Design-Builder shall design and install Landscape plantings associated with the project in accordance with this specification. It is the responsibility of the Design-Builder to determine tree locations based on existing and proposed signs, underground and overhead utility locations, AASHTO and Administration setback requirements, and adjacent land uses.

This project requires the Design-Builder to have a Professional Landscape Architect (PLA), licensed to practice in the State of Maryland, with at least 10 years of experience related to highway corridor landscape design and construction. The PLA will address the functional and aesthetic needs of the project, in collaboration with all other disciplines for the Project. This includes the preparation and implementation of design responses to project commitments. The PLA shall understand Maryland SHA's context sensitive solutions process as outlined in the *SHA Landscape Design Guide (LDG)*; be knowledgeable of native vegetation of the Piedmont Region of Maryland; be experienced in the requirements of the Maryland Reforestation Law; be experienced in MDE and SHA requirements for stormwater management and associated plantings, and be knowledgeable about the *LDG* and the Landscape Chapter of SHA's *Highway Construction Cost Estimating Manual (Estimating Manual).*

1. The Design-Builder shall include tree preservation, tree protection and impact minimization measures, and tree removals on erosion and sediment control plans and ensure tree protection measures are coordinated with the sequence of construction.

2. The Design-Builder may recommend and install wildlife damage prevention devices to protect the proposed landscaping. Design, installation, and maintenance of wildlife damage prevention devices and replacement of landscaping damaged by wildlife during construction, including the Plant Establishment Phase, will be the responsibility of the Design-Builder.

3. The Design-Build Landscape Architect shall prepare a set of Landscape Plans for Landscaping and Reforestation, based on the supplemental Conceptual Landscape Plan, Forest Impacts Plan, and Request for Proposal. Please refer to 7.5 Landscape Submittals for details instructions for each submittal.

   Landscape and Reforestation Plans will include the following information:

   a. Site location(s) for on-site site reforestation areas and vicinity map for off-site reforestation areas (if so required).

   b. For the purpose of this contract, critical root zones are defined as 1 foot of radius per inch of DBH (Diameter at Breast Height) for trees less than 30 inches DBH; and 1.5 feet of radius per inch of DBH for trees 30 inches or greater.

   c. Tree preservation measures and details including, but not limited to, fencing, signage, tree planking, root protection, fertilizing, root aeration, tree branch pruning, root pruning, and sequencing of construction indicating any additional requirements for tree preservation not identified in the specifications. Sequence of construction shall be coordinated with Erosion and Sediment Control Plans.

   d. Environmental/surface features, extending at least 100 ft. beyond the Proposed Right-of-Way or Temporary Construction Easements, whichever distance is greater. Include ownership and parcel numbers for each adjacent parcel.

   e. Existing roadway and incidental structures, including utilities.

   f. Proposed improvements, including traffic control devices, highway and incidental structures, drainage features, storm drain, SWM facilities, utilities, etc.

   g. Combined Limits of Disturbance for all erosion and sediment control phases.

   h. Areas of subsoil and topsoil placement, including type (salvaged or furnished) and depth.

      i. The Design-Builder shall provide topsoil and subsoil, in accordance with *SHA Standard Specifications for Construction and Materials*, Section 701, and *Estimating Manual* Section 701. The Design-Builder may elect to amend existing subsoil through screening and addition of amendments or may elect to provide imported subsoil in order to meet specifications.

ii. Soil Enhancement Areas. Areas where the existing pavement is demolished are designated as Soil Enhancement Areas, where the base and sub base are to be excavated and loosened, and any debris is to be removed. These areas are to be delineated on the roadway plans within the appropriate phase of work.

iii. The Design-Builder shall obtain and submit subsoil test results, along with the proposed method to comply with subsoil requirements, to the OED-LODfor consultation and written comments.

i. Areas of soil stabilization matting (SSM) placement, including type of SSM as per Section 709.

j. Type of permanent vegetation, including but not limited to: Bioswale Meadow Establishment, Turfgrass Establishment, Meadow Establishment, Shrub Seeding, and Turfgrass Sod Establishment.

k. Density and quantity of plantings, including plant symbology and labels.

l. Limits of constructing planting beds.

m. A schedule of materials, indicating plant quantities for each type and size of plant material, proper nomenclature for plant species, size, form, and root specifications as per ANSI standards, and proposed spacing per these specifications. Plans shall include schedules of sizes, quantities and types of plant materials proposed for use and shall be submitted to the Landscape Architecture Division (LAD) and the Landscape Operations Division (LOD), for review and approval.

n. Additional information as required by SHA.

4. The Design-Build Team shall coordinate the Landscape Plans with other elements of work to be performed under the Contract including, but not limited to: grading, stormwater management facilities and ancillary structures, drainage swales, storm drain, stormwater management BMP outfalls and cross culvert outfalls, utilities, paved areas, maintenance access ways, traffic control devices, and lighting.

5. Landscape plantings required as part of the stormwater management facilities shall be coordinated with the proposed or existing adjacent landscape plantings to ensure a contextually appropriate, unified planting theme is created for the project. Landscaping required for stormwater management purposes includes, but not limited to, Turfgrass Establishment, Turfgrass Sod Establishment, Meadow Establishment, perennials, shrubs, and trees, and shall be shown on the Landscape Plans. Plantings shall be coordinated with the stormwater management plans to ensure they are meeting all MDE and Administration requirements, as well as those outlined in these Specifications.

7.3.1 Landscape and Reforestation Preliminary Design Meeting.

The Design-Build Team shall conduct an on-site meeting and design charrette with representatives of the Landscape Architecture Division (OED-LAD) and Landscape Operation Division (OED-LOD) to discuss and review the Preliminary Landscape Plans. The Design-Build Team shall schedule this meeting early in the design process, prior to the Site Development, to ensure adequate opportunity for coordination and integration with other engineering and design disciplines.

Preliminary Landscape Plans shall be prepared by the Design-Build Team based on the Conceptual Landscape Plans.

Refer to Section 7.5 Landscape Submittals and Other Requirements for detailed requirements for Preliminary Plans.

In the event that unexpected site conditions are encountered or revisions to other design elements occur during the design process that affect the design integrity of the approved preliminary plan, it is the responsibility of the design-build team Landscape Architect to inform OED-LAD immediately of the situation and to recommend remedies that may be considered by the Administration.

7.3.2 General Landscape Design and Construction Requirements

In addition to other requirements provided in the Contract Documents, the Design-Builder shall design, construct, and establish landscape, reforestation and mitigation plantings according to the following criteria:

1. The Design-Builder shall provide the appropriate soil profile, including subsoil and topsoil, for proposed vegetative treatment and/or landscaping as per the Concept Plans or as specified in the Contract Documents. The Design-Builder shall calculate quantities of salvaged and furnished subsoil and/or topsoil to comply with the following and ensure successful establishment of vegetation and landscaping:

    a. Areas where the existing roadway has been removed and not replaced are designated as Soil Enhancement Areas. The base and sub base are to be excavated and loosened, and construction debris is to be removed. These areas are to be delineated on the roadway plans, within the appropriate phase of work. Remove unsuitable subgrade, loosen highly compacted subgrade, and furnish additional subsoil and topsoil to provide successful plant establishment.

    b. A minimum of 12 inch depth existing or placed subsoil is required in all areas to be landscaped, except where approved by the Administration. This requirement may be reduced or waived on steep slopes, in areas of shallow rock and for engineered reinforced slope systems at the discretion of the Administration.

c. In locations where landscape trees and shrubs in planting pits or planting beds are to be installed, a minimum of 24 inch depth subsoil is required.

d. Install a minimum of 4 inch depth topsoil in Turfgrass Establishment and Turfgrass Sod Establishment areas. This requirement may be reduced on steep slopes at the discretion of SHA, provided the soil profile allows for successful establishment of permanent vegetation.

e. Install a minimum of 6 inch depth topsoil in landscape planting locations and in curbed medians that are to receive Turfgrass Establishment, Turfgrass Sod Establishment, or landscape planting.

2. The Design-Builder shall determine salvageable quantities of subsoil and topsoil available within the Limits of Disturbance.

   a. The Design-Builder shall provide tests results for all areas proposed for salvaging of subsoil and/or topsoil to the Office of Materials Technology Soils and Aggregate Technology Division (OMT-SATD).

   b. If OMT-SATD determines that salvageable subsoil and/or topsoil meets SHA Specifications, the Design-Builder shall develop a Nutrient Management Plan in compliance with MD Nutrient Management Program submit to OED-EPD for review and approval.

   c. The Design-Builder shall be responsible for removing unsuitable subgrade, loosening highly compacted subgrade, and furnishing additional subsoil and topsoil as necessary to provide successful plant establishment. The Design-Builder shall document compaction to between 72-82 percent or permeability of 1 inch per hour for a minimum of 5 locations in the project boundaries in areas converting from paving to planting area.

   d. The Design-Builder shall ensure that soil which is to be planted, seeded, or sodded is properly prepared and/or amended in accordance with the approved Nutrient Management Plan and *SSCM* 701.03.01 (f) to provide successful plant establishment.

3. If the Design-Builder or SHA identifies a conflict between the Landscape Plans and other plan sheets or as-built conditions during design or in construction, the Design-Builder shall be responsible for modifying the plans to the satisfaction of OED-LAD.

4. Furnish seed and seed mixes according to the *SSCM* and in accordance with applicable State and Federal Law. Submit requests to modify SHA seed mixes or develop custom seed mixes to OED-LAD for approval.

5. Plant selections shall be appropriate for the field environmental conditions of the planting site, including microclimate, air and water-borne salt, drainage, soil chemistry and pH. Recommended plant species, minimum sizes per ANSI standards, forms, and spacing or density requirements are listed in each of the Landscape Zones. Written requests for substitution of other species, selections, and cultivars, sizes, forms, or root conditions will be reviewed by OED-LAD and approved where appropriate.

6. **Utility and Safety Setbacks**. The Design-Builder shall avoid conflicts between proposed landscaping and existing/proposed/relocated utilities and maintain safety setbacks from roadsides for vehicle recovery zones and sight distance per *AASHTO's Roadside Design Guide* and the *SHA Landscape Design Guide (LDG)*. The Design-Build Landscape Architect shall be responsible for resolving conflicts identified by the Design-Builder, SHA, or utility owners during design and construction. The Design-Builder must obtain concurrence from OED-LAD prior to constructing modifications to approved plans.

    a. Offset trees and shrubs from underground and overhead utilities, power cabinets, electrical transformers, lighting, and traffic control devices in accordance with the *LDG*, the District Utility Engineer and OED-LAD. Additional setbacks may be required at the discretion of the utility owner or the District Utility Engineer.

    b. Prior to planting, adjust tree and shrub layout where necessary to maintain offsets from new or relocated utilities. Trees and shrubs installed without necessary utility offsets will be relocated at no cost to SHA.

    c. The mulch edge of planting pits for individual trees and shrubs and the edge of mulched landscape beds shall be planted a minimum of 7 ft. from the centerline of swales and ditches. Larger setbacks may be required for lined and/or rip-rapped swales or swales with higher volume or velocity of flow.

    d. Trees shall be offset from the edge of travel lanes according to the roadway section and design speed. Refer to the *LDG*.

    e. Planting layouts shall be designed to offset trees from bridges and other structures as required for maintenance and inspection access. Large trees are to be offset at least 30 feet from bridge parapets and abutments. Offset trees from overhead sign structures to maintain sign visibility at mature plant size without tree branch pruning.

f. Additional setbacks may be required by SHAfor safety clear zones/recovery areas, to maintain sight distance, and/or for maintenance needs.

7.3.3 Low Maintenance Landscape Design.

Roadside plantings, including but not limited to: landscaping and screening, reforestation, revegetation, and stormwater management facility landscaping shall be designed following an approach that balances safety, environmental stewardship, maintenance requirements, and aesthetic appeal. The Design-builder shall develop designs that minimize landscape maintenance requirements as follows:

1. The Design-Builder shall arrange individual tree plantings, landscape beds, and plant massings to accommodate mowing and other maintenance operations in locations within or abutting areas of regularly mowed turfgrass and where otherwise requested by the Administration.

2. The Design-Builder shall use Turfgrass Establishment or Turfgrass Sod Establishment in locations requiring regular mowing maintenance, in areas were vegetation height must be controlled to maintain sight distance such as merge areas and roadside shoulder areas, where required in SWM management facilities, and elsewhere as specified in the Contract Documents.

3. In locations where regular mowing is infeasible or unnecessary for maintenance or safety considerations, (i.e. on areas of future roadway expansion, slopes steeper than 4:1 or in reforestation, revegetation, or other naturalized areas) the Design-Builder shall specify meadow establishment, shrub seeding, and/or other native seeding approved by OED-LAD in lieu of turfgrass establishment or turfgrass sod establishment.

4. Where space is available, the Design-Builder shall use masses of evergreen, flowering and deciduous trees to provide aesthetic benefit and require less annual maintenance than shrub or perennial beds. Minimize the use of shrub and perennial planting beds primarily to high-visibility locations and adjust planting density as necessary to minimize weed growth. Shrub masses in naturalized areas receiving infrequent long-term maintenance shall be installed in planting beds to discourage weed growth and aid plant establishment.

7.3.4 Invasive Species Management.

Landscape and mitigation plantings cannot be successfully established without management of invasive species and woody and herbaceous weeds.

Invasive species and prohibited weeds list below shall be treated and removed within the limits of disturbance in coordination with the OED-LOD.

Invasive Species Management **Invasive and Prohibited Species to be Controlled and Removed**		
Acer platanoides Norway Maple	*Hedera helix* English Ivy	*Perilla frutescens* Perilla
Ailanthus altissima Tree of Heaven	*Heracleum mantegazzianum* Giant Hogweed	*Phalaris arundinacea* Canary Reed Grass[2]
Albizia julibrissin Mimosa	*Humulus japonicas* Japanese Hops	*Phragmites australis* Phragmites
Alliaria petiolata Garlic Mustard	*Hemerocallis fulva* Daylily	*Polygonum cuspidatum* Japanese Knotweed
Allium vineale Wild Garlic	*Ligustrum obtusifolium* Border Privet	*Polygonum perfoliatum* Mile-a-minute [2]
Alecia quanata Chocolate Vine	*Ligustrum sinense* Chinese Privet	*Pueraria montana var. lobata* Kudzu
Ampelopsis brevipedunculata Porcelain Berry	*Ligustrum japonicum* Japanese Privet	*Pyrus calleryana* Callery Pear
Artemisia vulgaris Mugwort	*Ligustrum vulgare* European Privet	*Ranunculus ficaria* Lesser Celandine
Bambusa vulgaris, Phyllostachys aurea, Pseudosasa japonica and other Bamboo	*Lonicera japonica* Japanese Honeysuckle[2]	*Rosa multiflora* Multiflora Rose
Berberis thunbergii Japanese Barberry	*Lonicera maackii* Amur Honeysuckle	*Sorghum biclor* Shattercane
Carduus sp. & Cirsium sp. Thistles (Canada, Plumeless, Bull and Musk)	*Lonicera morrowi* Morrow's Honeysuckle	*Sorghum halepense* Johnsongrass
Celastrus orbiculatus Oriental Bittersweet	*Lonicera tatarica* Tartarian Honeysuckle	*Toxicodendron radicans* Poison Ivy [2]
Centaurea maculosa Spotted Knapweed	*Lythrum salicaria* Purple Loosestrife	*Ulmus parvifolia* Chinese Elm or (Lacebark Elm)
Dipsacus fullonum Common Teasel[2]	*Microstegium vimineum* Japanese Stiltgrass	*Ulmus pumila* Siberian Elm
Elaeagnus umbellata Autumn Olive	*Miscanthus sinensis* Eulalia	*Vitus sp.* Grape Vine
Euonymus alatus Burning bush	*Oplismenus hirtellus ssp. Undulatifolius* Wavyleaf Basketgrass	*Wisteria floribunda* Japanese Wisteria *Wisteria sinensis* – Chinese Wisteria
Note: Species in wetlands, 25' nontidal wetland buffers, and waters of the US must receive appropriate state/federal authorization prior to treatment and control.		

1. The Design-Builder shall develop a treatment program and schedule detailing proposed methods for control and removal of invasive species/prohibited weeds for review and approval by the OED-LOD, which shall include the following:

    a. Schedule of invasive vegetation management operations, including mechanical and chemical methods of control for initial, intermediate, and follow-up treatments (for re-growth);

    b. List of tools and pesticides to be used;

c. Required licenses for work as required by applicable State and Federal Law;

d. Maps in CADD or GIS, graphically indicating areas of treatment based on prevailing invasive species present.

2. The Design-Builder shall conduct invasive species management operations as appropriate before, during and after installation of proposed landscape treatments. The Design-Builder's schedule shall provide sufficient lead time between herbicide application and plant installation or seeding. Application of herbicide after plant installation shall take care not to impact landscape materials.

3. Herbicides shall be applied according to MDA requirements and applicable State and Federal Laws. Appropriate licenses shall be required.

4. The Design-Builder shall continue to treat and remove invasive species listed above until Final Acceptance of Trees, Shrubs, and Perennials for the Project.

5. Installed landscape plantings or existing plantings to be retained that are damaged by herbicide application shall be replaced at no cost to SHA. Prune damaged portions of trees and shrubs, or remove and replace unacceptable plants per *SSCM Section 710* damaged by invasive species management operations at no cost to SHA.

7.3.5 Deliverables

1. Preliminary Landscape Plans
2. Pre-final Landscape Plans
3. Final Landscape Plans
4. Tree removals and tree protection measures included on the Landscape Plans and Erosion and Sediment Control Plans
5. Tree Impact Avoidance and Minimization Report
6. Forest Impact Plans
7. Invasive Species Control Program and Schedule
8. Soil Test Reports
9. Nutrient Management Plan/Report
10. As-built Plans for Landscape and Forest Impacts, including impact and reforestation mitigation for the Reforestation Site Review.
11. Refer to Section 7.5 for additional information

7.4 PLANTING ZONES

Design and install landscape and mitigation plantings that are appropriate to site conditions and constraints. The Design-Build Team shall be responsible for ensuring that the requirements for planting densities, plant species, species mix, and spacing meet those that are provided in this document. The General Landscape Design and Construction Requirements and the *SHA Landscape Design Guide (LDG)* apply to all plantings within the project limits.

Submit a Preliminary Landscape Plan indicating the planting opportunities for each planting zone prior to commencing with detail design. The following Planting Zones are proposed within the limits of this Contract.

General Aesthetic Intent: The MD 32 corridor is largely flanked by forest, stream, and single family residential areas, offering view sheds framed by forested areas or smaller pockets of residential. Maintaining and reinforcing this character is the general aesthetic intent of the Landscape Concept Design. Plantings are to be designed in diverse random groupings of odd numbers of plants to achieve a naturalized appearance; monoculture stands of trees shall not be used. Shrubs shall be planted in massings of 9 or more. The planting palette for each planting zone shall have a minimum of three different genera of each type of planting required, unless a higher requirement is specified in the individual planting zone. Plantings shall be designed to provide continuity and a smooth transition from one planting zone to the next, appropriate to their site context; multi-season aesthetic interest to the fullest extent possible, while minimizing the need for intensive maintenance. Each planting zone has its own primary aesthetic intent, differentiating it from the other categories.

7.4.1. ZONE 1 TURFGRASS

Primary Aesthetic Intent: Zone 1 shall provide Turfgrass Establishment (*SSCM* 705) or Turfgrass Sod Establishment (*SSCM* 708) in areas indicated on the Conceptual Landscape Plans or in the Contract Specifications. In addition to areas graphically indicated on the Conceptual Landscape Plans, Zone 1 will include all locations within the project limits, including within other Zones, where regular mowing is required per the latest SHA Turfgrass Management Guidelines (dated 5/13/11 or later), including disturbed turf areas on private properties, curbed medians, grass swales, and ditches.

Turfgrass Establishment and Turfgrass Sod Establishment may both be used to establish turfgrass. Use of Turfgrass Sod Establishment is recommended in locations where rapid stabilization is desired, including but not limited to: areas of concentrated flow, areas adjacent to pedestrian walkways, and adjacent to areas of well-maintained turf on commercial or residential properties.

7.4.2. ZONE 2 NATURALIZED

Primary Aesthetic Intent: Zone 2 shall be utilized where regular mowing maintenance is not required to maintain sight distance per SHA Mowing policy and per the *LDG*. In

particular, this zone shall be located within the center of medians where turfgrass is utilized at the shoulder, except where curbed, and from the outermost limits of the Turfgrass Zone. Unless grading and topography dictate otherwise, the Design-Builder shall specify Upland Meadow Establishment for this zone.

1. The Design-Builder shall specify Meadow Establishment as per *SSCM* Section 707 or use a customized seed mix as approved by OED-LAD, in locations where mowing frequency is limited to once or twice annually as necessary to control the growth of woody vegetation. Type D soil stabilization shall be specified with Meadow Establishment on slopes steeper than 4:1 and where straw mulch is insufficient for preventing erosion and retaining soil for establishment of permanent vegetation.

7.4.3. ZONE 3 SCREEN PLANTING

Primary Aesthetic Intent: Zone 3 shall provide screening and buffering of the roadway for adjacent residences which will lack sufficient buffer from MD 32 following construction of roadway improvements. Insufficient buffer is defined as 200 linear feet from the edge of roadway to the nearest edge of the residence and less than 25 percent of the distance composed of existing trees and shrubs to remain. Screen Plantings are to meet the following requirements:

1. Screen plantings are to consist of a mix of deciduous and evergreen trees and large shrubs, arranged to provide a year-round screen.

2. Screen plantings may be necessary to augment existing plantings or forest areas to remain or to augment the visual screening benefit of proposed reforestation areas.

3. Recommended plant species, minimum acceptable sizes, and maximum spacing are listed below. Written substitution requests for use of other species, selections, cultivars, or sizes will be reviewed by OED-LAD and approved where appropriate.

4. For Narrow Screen Planting Areas, consisting of areas 50 ft. plantable width or narrower, graphically indicate locations of individual trees on the plans and provide evergreen trees as per the following:

    a. Install pyramidal and broad-spreading evergreens, 15 ft. on center when installed in multiple staggered rows and install at 12 ft. on center when only single row of planting is feasible.

    b. For screen plantings under 120 linear feet (LF), planting may consist of 1 or more evergreen species.

    c. For screen plantings exceeding 120 LF and shorter than 240 LF, planting shall consist of at least 2 evergreen species.

d. For screen plantings 240 LF or longer, planting shall consist of at least three 3 evergreen species.

e. Large evergreen shrubs shall be used to augment screen plantings in locations where utility conflicts or other site constraints preclude installation of evergreen trees.

f. Non-native evergreen and semi-evergreen species such as Ilex Nellie r. Stevens, Picea abies, Picea omorika, Thuja 'Green Giant', Viburnum x Pragense, Viburnum rhytidophylloides 'Allegheny, etc., may be utilized in Narrow Screen Planting Areas.

5. For Wide Screen Planting Areas, consisting of plantable areas greater than 50 ft. and up to 100 ft. wide when measured perpendicular from the road edge, provide evergreen and deciduous trees and shrubs as per the following:

a. Provide screen plantings composed of rows or massings of major deciduous trees, minor deciduous trees, evergreen trees, and large shrubs. Use native species and cultivars of natives unless otherwise approved by OED-LAD.

b. Where indicating wide screen plantings with a graphic hatch in lieu of showing locations of individual trees, provide typical planting layout details indicating approximate size of quantities of plants in single-species massings.

c. Wide Screen Planting areas may count toward the Project's reforestation requirements if they meet the minimum reforestation area requirements.

d. Ornamental tree species and shrubs shall be substituted for shade tree and evergreen tree species when overhead utilities and other site constraints preclude the use of shade tree species.

e. Plantings are to be provided at the following minimum densities:

Overstory and Understory Tree Species:	300 trees per acre
Overstory Shade Trees:	25%
Overstory Evergreen Trees:	60%
Understory Ornamental Trees:	15%
Shrubs:	350 shrubs per acre

Plant selections shall be appropriate for the environmental field conditions of the planting site. The design shall maintain sight lines at all times. This planting zone shall be under-planted with Turfgrass or Meadow Establishment per the SHA Turfgrass Management Guidelines.

The approved plant species, minimum acceptable sizes, and maximum spacings are listed as follows:

PLANT MATERIAL:

Botanical Name (Common Name)	**Maximum Spacing**	**Minimum Size**
Shade Tree Species (Overstory)		
Acer rubrum cultivars (Red Maple)	30’ OC	2” Cal., B&B
Betula lenta (Sweet Birch)	30’ OC	8’ Ht. Multi., B&B/#15 CG
Betula nigra (River Birch)	30’ OC	8’ Ht. Multi., B&B/#15 CG
Celtis occidentalis (Hackberry)	30’ OC	2” Cal., B&B
Liquidambar styraciflua (Sweetgum)	30’ OC	2” Cal, B&B
Nyssa sylvatica (Blackgum)	30’ OC	2” Cal., B&B/#25 CG
Platanus occidentalis (Sycamore)	30’ OC	2” Cal., B&B
Quercus alba (White Oak)	30’ OC	2” Cal., B&B
Quercus bicolor (Swamp White Oak)	30’ OC	2” Cal., B&B
Quercus coccinea (Scarlet Oak)	30’ OC	2” Cal., B&B/#25 CG
Quercus palustris (Pin Oak)	30’ OC	2” Cal., B&B
Quercus phellos (Willow Oak)	30’ OC	2” Cal., B&B/#25 CG
Quercus rubra (Red Oak)	30’ OC	2” Cal., B&B
Quercus velutina (Black Oak)	30’ OC	2” Cal., B&B
Ornamental Tree Species (Understory)		
Amelanchier canadensis (Canadian Serviceberry)	15’ OC	6’ Ht. multi, B&B/#10 CG
Amelanchier laevis (Downy Serviceberry)	15’ OC	6’ Ht., B&B/#10 CG
Cercis canadensis (Eastern Redbud)	15’ OC	2” Cal., B&B
Crataegus virdis ‘Winter King’ (Winter King Hawthorn)	15’ OC	2” Cal., B&B
Chionanthus virginicus (White Fringetree)	15’ OC	6’ Ht., B&B/#10 CG
Crataegus phaenopyrum (Washington Hawthorn)	15’ OC	2” Cal., B&B
Hamamalis virginicus (Witchhazel)	10’ OC	5’ Ht., B&B/#10 CG
Magnolia virginiana (Sweetbay Magnolia)	15’ OC	6’ Ht., B&B/#10 CG
Evergreen Tree Species (Overstory)		
Ilex opaca (American holly) OED approved cultivars	15’ OC	5’ Ht., B&B
Juniperus virginiana (Eastern Red Cedar)	15’ OC	5’ Ht., B&B/#20 CG
Picea abies (Norway Spruce)	15’ OC	5’ Ht., B&B
Picea omorika (Serbian Spruce)	15’ OC	5’ Ht., B&B

Pinus rigida (Pitch Pine)	15’ OC	5’ Ht., B&B
Pinus taeda (Loblolly Pine)	15’ OC	5’ Ht., B&B
Pinus strobus (Eastern White Pine)	15’ OC	5’ Ht., B&B
Pinus virginiana (Virginia Pine)	15’ OC	5’ Ht., B&B
Thuja occidentalis (American arborvitae)	15’ OC	5’ Ht., B&B/#20 CG
OED approved cultivars may be utilized		

Shrub Species

Calycanthus floridus (Eastern Sweetshrub)	5’ OC	3’ Ht., #5 CG
Clethra alnifolia (Summersweet)	5’ OC	30’ Ht., #5 CG
Cornus sericea (Redosier Dogwood)	5’ OC	3’ Ht., B&B/#5 CG
Ilex glabra (Inkberry)	5’ OC	3’ Ht., #5 CG
Ilex verticillata ‘Sparkleberry’ (Winterberry)	5’ OC	3’ Ht., B&B/#5 CG
(Provide 10% male plants of OED approved compatible varieties)		
Ilex verticillata ‘Winter Gold’ (Winterberry)	5’ OC	3’ Ht., B&B/#5 CG
(Provide 10% male plants of OED approved compatible varieties)		
Ilex verticillata ‘Winter Red’ (Winterberry)	5’ OC	3’ Ht., B&B/#5 CG
(Provide 10% male plants of OED approved compatible varieties)		
Myrica pensylvanica (Northern Bayberry)	5’ OC	3’ Ht., B&B/#5 CG
Rhododendrum maximum (Great Laurel)	5’ OC	30” Ht., #5 CG
Rhus aromatica (Fragrant Sumac)	5’ OC	3’ Ht., #3 CG
Rhus glabra (Smooth Sumac)	5’ OC	3’ Ht., #3 CG
Viburnum acerifolium (Mapleleaf Viburnum)	5’ OC	3’ Ht., #5 CG
Viburnum dentatum (Southern Arrowwood)	5’ OC	3’ Ht., B&B/#5 CG
Viburnum lentago (Nannyberry)	5’ OC	3’ Ht., B&B/#5 CG
Viburnum nudum (Witherod Viburnum)	5’ OC	3’ Ht., B&B/#5 CG
Viburnum prunifolium (Blackhaw Viburnum)	5’ OC	3’ Ht., B&B/#5 CG
Viburnum x pragense (Prague Viburnum)	5’ OC	3’ Ht., B&B/#7 CG
V. x rhytidophylloides ‘Allegheny (Allegheny Viburnum)	5’ OC	3’ Ht., B&B/#7 CG

Note: B&B indicates Balled and Burlapped. Cal. indicates Caliper inches. OC indicates On-center Spacing. CG indicates Container-grown.

7.4.4 ZONE 4 REFORESTATION PLANTINGS

Primary Aesthetic Interest: Zone 4 shall reforest areas that are suitable for reestablishing mature forests indicative of the Piedmont Region and local Howard County ecosystem within the project right-of-way. The Design-Build Team shall maximize reforestation wherever possible and employ this planting association where indicated on the Conceptual Landscape Plans and in locations where establishment of forest is not precluded by site constraints such as proposed improvements or utility offsets.

Reforestation Plantings shall be designed according to the following:

1. Plantings shall consist of random, naturalized arrangements to mimic the ecologic niches of the local area comprised of native trees and shrubs, under planted with native low-maintenance groundcover such as meadow or shrub seeding. A mix of native evergreen and deciduous tree species and shrubs of the Piedmont region of Central Maryland shall be specified as appropriate to site conditions. Use of cultivars of native species may be approved at the discretion of OED-LAD. The Administration will reject unacceptable species.

2. In highly visible areas (such as roadside edges or cut or fill slopes facing the highway, exit ramps, or secondary roads), the Design-Builder shall use groupings of single-species of trees and shrubs rather than random plantings to increase aesthetic interest. Masses of trees selected to provide added seasonal aesthetic interest with flowers, fruit, foliage color, or bark texture or color are recommended in highly visible areas.

3. Turfgrass Establishment of Turfgrass Sod Establishment shall not be used within Reforestation or Revegetation Planting areas without approval of OED-LAD. Reforestation areas shall receive Meadow Establishment.

4. Reforestation plantings shall be provided at a mitigation ratio of 1:1. In other words, one (1) acre of reforestation plantings is required for one (1) acre of impacts. Reforestation areas species diversity and planting density shall be as follows:

   Reforestation stock shall be composed of a mix of at least 11 species of deciduous and evergreens trees and shrubs, with no more than 30% from the same taxonomic family. Individual reforestation areas smaller than 1.0 acre in size may be composed of a mix of at least 7 species provided no more than 30% are from the same taxonomic family.

Overstory and Understory Tree Species: 250 trees per acre
30% shall be 2” Cal. Overstory Shade Trees
30% shall be 1.5” Cal. Overstory Shade Trees
10% shall be Evergreen Trees
30% shall be Understory Ornamental Trees
Shrubs: 350 shrubs per acre

PLANT MATERIAL:

Botanical Name (Common Name)	**Maximum Spacing**	**Minimum Size**
Shade Tree Species (Overstory)		
Acer rubrum (Red Maple)	20’ OC	1.5”/2” Cal., B&B
Betula nigra (River Birch)	20’ OC	8’ Ht. multi.,B&B/#15 CG

Liquidambar styraciflua (Sweetgum)	20’ OC	1.5”/2” Cal., B&B
Liriodendron tulipifera (Tuliptree)	20’ OC	1.5”/2” Cal., B&B
Nyssa sylvatica (Blackgum)	20’ OC	1.5”/2” Cal., B&B/#25 CG
Platanus occidentalus (Sycamore)	20’ OC	1.5”/2” Cal., B&B
Quercus alba (White Oak)	20’ OC	1.5”/2” Cal., B&B
Quercus bicolor (Swamp White Oak)	20’ OC	1.5”/2” Cal., B&B
Quercus coccinea (Scarlet Oak)	20’ OC	1.5”/2” Cal., B&B/CG
Quercus phellos (Willow Oak)	20’ OC	1.5”/2” Cal., B&B/#25 CG
Quercus rubra (Red Oak)	20’ OC	1.5”/2” Cal., B&B/#25 CG
Quercus velutina (Black Oak)	20’ OC	1.5”/2” Cal., B&B
Ulmus americana ‘Princeton’ (American Elm)	20’ OC	1.5”/2” Cal., B&B
Ulmus americana ‘Valley Forge’ (American Elm)	20’ OC	1.5”/2” Cal., B&B

Ornamental Tree Species (Understory)

Amelanchier arborea (Downy Serviceberry)	12’ OC	6’ Ht. multi., B&B/#10 CG
Amelanchier laevis (Downy Serviceberry)	12’ OC	6’ Ht multi.., B&B/#10 CG
Carpinus caroliniana (American Hornbeam)	12’ OC	1.5” Cal., B&B/#15 CG
Cercis canadensis (Eastern Redbud)	12’ OC	1.5”/2” Cal., B&B
Chionanthus virginicus (White Fringetree)	12’ OC	6’ Ht. multi., B&B/#10 CG
Crataegus phaenopyrum (Washington Hawthorn)	12’ OC	1.5”/2” Cal., B&B
Ostrya virginiana (Hophornbeam)	12’ OC	1.5” Cal., B&B/#15 CG
Magnolia virginiana (Sweetbay Magnolia)	12’ OC	6’ Ht. multi, B&B/#10 CG
Prunus serotina (Black Cherry)	12’ OC	6’ Ht., B&B/#7CG

Evergreen Tree Species (Overstory)

Ilex opaca (American holly)	12’ OC	5’ Ht., B&B
Juniperus virginiana (Eastern Red Cedar)	12’ OC	5’ Ht., B&B/#20 CG
Pinus rigida (Pitch Pine)	12’ OC	5’ Ht., B&B
Pinus taeda (Loblolly Pine)	12’ OC	5’ Ht., B&B
Pinus strobus (Eastern White Pine)	12’ OC	5’ Ht., B&B
Pinus virginiana (Virginia Pine)	12’ OC	5’ Ht., B&B
Thuja occidentalis (American arborvitae)	12’ OC	5’ Ht., B&B/#20 CG

Shrub Species

Calycanthus floridus (Eastern Sweetshrub)	5’ OC	3’ Ht., #5 CG
Clethra alnifolia (Summersweet)	5’ OC	3’ Ht., #5 CG
Cornus sericea (Redosier Dogwood)	5’ OC	3’ Ht., B&B/ #5 CG
Ilex glabra (Inkberry)	5’ OC	3’ Ht., B&B/ #5 CG
Ilex verticillata ‘Winter Gold’ (Winterberry)	5’ OC	3’ Ht., B&B/ #5 CG

(Provide 10% male plants of OED approved compatible varieties)		
Ilex verticillata 'Winter Red' (Winterberry)	5' OC	3' Ht., B&B/ #5 CG
(Provide 10% male plants of OED approved compatible varieties)		
Rhus aromatica (Fragrant Sumac)	5' OC	3' Ht., #3 CG
Rhus glabra (Smooth Sumac)	5' OC	3' Ht., #3 CG
Sassafras albidum (Sassafras)	5' OC	3' Ht., B&B/ #5 CG
Viburnum acerifolium (Mapleleaf Viburnum)	5' OC	3' Ht., B&B/ #5 CG
Viburnum dentatum	5' OC	3' Ht., B&B/ #5 CG
(Southern Arrowwood Viburnum)		
Viburnum lentago (Nannyberry)	5' OC	3' Ht., B&B/#5 CG
Viburnum nudum (Witherod Viburnum)	5' OC	3' Ht., B&B/#5 CG
Viburnum prunifolium (Blackhaw Viburnum)	5' OC	3' Ht., B&B/#5 CG

Note: B&B indicates Balled and Burlapped. Cal. indicates Caliper inches. OC indicates On-center Spacing. CG indicates Container-grown.

7.4.5 ZONE 5 REVEGETATION PLANTINGS

Primary Aesthetic Intent: Zone 5 shall revegetate areas that are suitable for tree plantings within the project right-of-way but will not be credited towards reforestation requirements under the MD Reforestation Law. The Design-Build Team shall employ this planting association in the areas as indicated on the Conceptual Landscape Plans.

1. Revegetation Areas shall be designed and constructed according to the design criteria for Zone 4 Reforestation Plantings with the exception of the minimum area requirements.
    a. The minimum width and area for Revegetation Plantings shall be 15 ft. and 1,500 SF, respectively, except where smaller areas are shown on the Concept Plans and/or approved by OED-LAD.
    b. Refer to the Zone 4 Reforestation Plantings list for species and sizes for use in Zone 5.
2. Do not substitute Revegetation Plantings for Reforestation Plantings required under the MD Reforestation Law. Revegetation Plantings do not qualify for credit under the law.
3. Clearly label and differentiate Revegetation and Reforestation Plantings on the Landscape Plans.

7.4.6 ZONE 6 INTERCHANGE AND BRIDGE ABUTMENT PLANTING

Primary Aesthetic Intent: Zone 6 shall provide plantings in interchange and bridge areas, especially near bridge abutments and high visibility slopes for added aesthetic interest and erosion control. Naturalized massings of trees and shrubs are to be included for added aesthetic interest, soil stabilization, and environmental enhancement. The Design-Build Team shall employ this plant association in accordance with the following criteria:

1. Provide large naturalized masses composed of multiple single-species groupings of trees and shrubs to be used in high visibility naturalized or steep slope areas.

2. Use tree and shrub species that provide added aesthetic interest with flowers, fruit, fall color, bark texture or color.

3. Installation of container grown or B&B trees and shrubs or shrub seeding shall occur outside of highway clear zones or locations where woody plants are removed during vegetation management operations. Refer to Zone 2 Meadow Establishment for locations where woody plants are not permitted and regular mowing will not be required or feasible.

4. Areas graded for future roadway expansion and locations where woody plants are prohibited are excluded from this calculation. Plantings are to be provided at the following minimum densities:

Overstory and Understory Tree Species: 75 trees per acre
40% shall be Evergreen Trees
60% shall be Understory Ornamental Trees
Shrubs: 850 shrubs per acre
40% shall be Small to Medium Shrubs
60% shall be Medium to Large Shrubs

   a. Masses of shrubs and large ornamental grasses are to be installed in mulched landscape beds, with spacing reduced to minimize weed growth. Beds shall be designed for plantings to cover the extent of the beds and to out-compete weeds and minimize future maintenance. Trees within 6 ft. of mulched beds are to be included in beds.

   b. On slopes steeper than 3:1, single-stemmed deciduous trees may be reduced to 1.5 in. caliper stock, B&B/#15 CG, provided (3) 1.5 in. caliper trees are provided in lieu of (2) 2.0 in. cal. trees.

   c. Select tree and shrub species from the plant lists below. Additional species and cultivars may be used at the approval of OED-LAD.

PLANT MATERIAL:

Botanical Name (Common Name)	**Maximum Spacing**	**Minimum Size**
Ornamental Tree Species (Understory)		
Amelanchier canadensis (Canadian Serviceberry)	15’ OC	6’ Ht., B&B/#10 CG
Amelanchier laevis (Downy Serviceberry) & cvrs.	15’ OC	6’ Ht. multi, B&B/CG
Cercis canadensis (Eastern Redbud)	15’ OC	2” Cal., B&B
Chionanthus virginicus (White Fringetree)	15’ OC	6’ Ht. multi, B&B/#10 CG
Crataegus phaenopyrum (Washington Hawthorn)	15’ OC	2” Cal., B&B
Magnolia virginiana (Sweetbay)	15’ OC	6’ Ht. multi, B&B/#10 CG
Prunus virginiana (Chokecherry)	15’ OC	2” Cal., B&B
Evergreen Tree Species		
Ilex opaca (American holly)	15’ OC	5’ Ht., B&B
Juniperus virginiana (Eastern Red Cedar)	15’ OC	5’ Ht., B&B/#20 CG
Pinus taeda (Loblolly Pine)	15’ OC	5’ Ht., B&B
Pinus strobus (Eastern White Pine)	15’ OC	5’ Ht., B&B
Thuja occidentalis (American arborvitae)	15’ OC	5’ Ht., B&B/#20 CG
Shrub Species		
Medium to Large Size		
Calycanthus floridus (Eastern Sweetshrub)	5’ OC	3’ Ht., #5 CG
Cornus sericea (Redosier Dogwood) & cvrs.	5’ OC	3’ Ht., B&B/#5 CG
Ilex glabra (Inkberry)	5’ OC	3’ Ht., B&B/#5 CG
Ilex verticillata ‘Winter Gold’ (Winterberry) (Provide 10% male plants of OED approved compatible varieties)	5’ OC	3’ Ht., B&B/#5 CG
Ilex verticillata ‘Winter Red’ (Winterberry) (Provide 10% male plants of OED approved compatible varieties)	5’ OC	3’ Ht., B&B/#5 CG
Rhus aromatica (Fragrant Sumac)	5’ OC	3’ Ht., #3 CG
Rhus glabra (Smooth Sumac)	5’ OC	3’ Ht., #3 CG
Viburnum acerifolium (Mapleleaf Viburnum)	5’ OC	3’ Ht., B&B/#5 CG
Viburnum dentatum (Southern Arrowwood Viburnum)	5’ OC	3’ Ht., B&B/#5 CG
Viburnum lentago (Nannyberry)	5’ OC	3’ Ht., B&B/#5 CG
Viburnum nudum (Witherod Viburnum)	5’ OC	3’ Ht., B&B/#5 CG
Viburnum prunifolium (Blackhaw Viburnum)	5’ OC	3’ Ht., B&B/#5 CG
Small to Medium Size		
Ilex verticillata ‘Maryland Beauty’		

(MD Beauty Winterberry)	3’ OC	24” Ht., #5 CG
(Provide 10% male plants of OED approved compatible varieties)		
Itea virginica ‘Henry’s Garnet’	3’ OC	24” Ht., #5 CG
(Henry’s Garnet Sweetspire)		
Rhus aromatica 'Gro-Low'	3.5’ OC	18” Spd., #3 CG
(Grow Low Fragrant Sumac)		
Spirea tomentosa (Steeplebush)	3’ OC	18” Ht., #3 CG

Note: B&B indicates Balled and Burlapped. Cal. indicates Caliper inches. OC indicates On-center Spacing. CG indicates Container-grown.

7.4.7 ZONE 7 STREAM RESTORATION PLANTINGS

Primary Aesthetic Interest: Zone 7 shall revegetate the banks and floodplain of restored stream areas. Plantings will provide additional bank stability, shade and improved aquatic habitat. The Design-Build Team shall employ this planting association within 50 ft. from the proposed top of bank, measured perpendicularly, and in the areas as indicated on the Conceptual Landscape Plans. Areas of floodplain extending past 50 ft. shall be planted with Zone 4, Reforestation, or Zone 5, Revegetation.

Stream Restoration Plantings shall be designed according to the following:

1. Plantings shall consist of random, naturalized arrangements to mimic the ecological niches of the stream corridor comprised of native trees, shrubs, and grasses, underplanted with native low-maintenance groundcover such as meadow or shrub seeding. A mix of native deciduous tree and shrub species of the Piedmont region of Central Maryland shall be specified as appropriate to site conditions.

2. Tree and shrub species shall be selected to be hydrologically appropriate to the conditions within the zone.

3. Stream Restoration Planting areas of at least 50 ft. wide and 0.5 acre of planting not contiguous with proposed reforestation or preserved forest areas or planting of at least 0.25 acres adjacent to proposed reforestation or preserved forest areas will be credited toward reforestation mitigation requirements for the Contract.

4. Turfgrass Establishment or Turfgrass Sod Establishment shall not be used within Stream Restoration Planting areas. Stream Restoration areas shall receive Shrub Seeding, Meadow Establishment, or other native seeding as approved by OED-LAD. Seeding shall be selected based on hydrologic conditions.

5. The outside of meander bends shall receive live stakes and warm season grasses

to improve stability and increase shade and aquatic habitat.

a. Live Stakes shall be installed along the slope of the stream bank, from just below top of bank to just above the normal base flow, in a 3 ft. triangular spacing pattern. Use a minimum of 3 species.

b. Warm Season Grasses shall be installed at the top of bank, in a 18 in. triangular spacing pattern. Use a minimum of 3 species.

6. Tree and shrub plantings shall be provided at the following minimum densities:

Overstory and Understory Tree Species: 250 trees per acre
Overstory Shade Trees: 70%
Understory Ornamental Trees: 30%
Shrubs: 350 shrubs per acre

Plant Material:

BOTANICAL NAME	COMMON NAME	MAXIMUM SPACING	MINIMUM SIZE
Major Deciduous Trees			
Select species from the Zone 4 Plant Material List.			
Minor Deciduous Trees			
Select species from the Zone 4 Plant Material List.			
Shrubs			
Select species from the Zone 4 Plant Material List and the following:			
Alnus serrulata	Hazel Alder	5’ O.C.	3’ ht., #5 CG
Cephalanthus occidentalis	Common buttonbush	5’ O.C.	3’ ht., #5 CG
Cornus ammomum	Silky Dogwood	5’ O.C.	3’ ht., #5 CG
Cornus racemosa	Gray Dogwood	5’ O.C.	3’ ht., #5 CG
Lindera benzoin	Spicebush	5’ O.C.	3’ ht., #5 CG
Physocarpus opulifolius	Ninebark	5’ O.C.	3’ ht., #5 CG
Sambucus nigra ssp. canadensis	American black elderberry	5’ O.C.	3’ ht., #5 CG
Warm Season Grass Species			
Andropogon gerardii	Big Bluestem	18” O.C.	SP4
Andropogon glomeratus	Bushy Bluestem	18” O.C.	SP4
Panicum virgatum	Switchgrass	18” O.C.	SP4
Schizachyrium scoparium	Little Bluestem	18” O.C.	SP4
Sorghastrum nutans	Indian Grass	18” O.C.	SP4
Live Stake Species			
Cornus amomum	Silky Dogwood	3’ O.C.	3’ length
Cornus sericea	Red Osier Dogwood	3’ O.C.	3’ length

Cephalanthus occidentalis	Buttonbush	3’ O.C.	3’ length
Salix nigra	Black Willow	3’ O.C.	3’ length
Salix discolor	Pussy Willow	3’ O.C.	3’ length
Viburnum dentatum	Arrowwood Viburnum	3’ O.C.	3’ length
Viburnum lentago	Nannyberry	3’ O.C.	3’ length

7.4.8 ZONE 8 SWM FACILITY PLANTINGS

Primary Aesthetic Intent: Zone 8 shall provide temporary and permanent vegetation for stormwater management facilities and adjacent areas. Design, construct, and establish SWM Facility Plantings to provide permanent stabilization and landscaping as required by the SWM/ESC Approval Authority and as per the following. Landscaping in Zone 8 shall meet the requirements as set forth in “*SHA Stormwater Site Development Criteria*”, latest edition with the following modifications:

1

7.4.8.1 Establishment of Vegetative Stabilization in all SWM facilities

1

1. The Design-Builder shall design, construct, and establish 95% vegetation coverage in areas draining into SWM Facilities prior to construction of facilities as required by the SWM/ESC Approval Authority. Permanent vegetation such as Turfgrass, Meadow, or other native herbaceous species may be specified to stabilize areas surrounding SWM Facility prior to facility construction. Temporary seeding may be approved by OED-LAD, in conformance with SP 704 provided 95% coverage is maintained throughout the duration of SWM construction. Tilling in areas of temporary seeding for the establishment of permanent vegetation is not permitted unless an approved erosion and sediment control device is in place.

2. The Design-Builder shall establish and maintain 95% permanent vegetation coverage in all areas of topsoil or bioretention soil mix within SWM facilities, except in areas stabilized with wood mulch, stone mulch, or riprap or where standing water is intended as in wet ponds and wet swales. Vegetative coverage requirements may be reduced in areas that remain permanently inundated.

1

3. With the exception of grass swales, the Design-Builder shall minimize the use of Turfgrass Establishment or Turfgrass Sod Establishment within Stormwater Management Facilities to locations where regular mowing will occur, on stabilized maintenance access roads, and where required by the SWM/ESC Approval Authority.

4. In locations where turfgrass or shredded hardwood bark mulch is not required, the Design-Build Landscape Architect shall specify appropriate native seed mixes such as SHA Meadow Establishment. Native seed mixes are also to be used in areas planted with plugs, container grown herbaceous plants, and other landscaping. Mixes of other native species appropriate to soil, hydrologic conditions, or growing season may be specified pending approval of OED-LAD.

5. Specify Type A Soil Stabilization Matting (SSM) with Turfgrass Establishment or Type D SSM with Meadow Establishment in SWM Facilities where other types of mulch (straw, wood cellulose, hardwood bark mulch) are not permitted per the *SHA Stormwater Site Development Criteria* or where mulch will not remain in place due to temporary and permanent water elevations in Stormwater Management Facilities. Use of other types of SSM may be required by the Highway Hydraulics Division, although Type D SSM is to be used with all broadleaf meadow species.

7.4.8.2 Planting Requirements by SWM Facility Types

The Design-Builder shall design, build, and maintain stormwater management facilities as required by MDE and the Office of Highway Development. Design and criteria for different facility types will vary as per the following and is supplemental to the General SWM criteria provided in 7.4.8. Facility types not listed below shall follow the guidance of the *SHA Stormwater Site Development* for landscape requirements.

1. Grass Swale: The permanent vegetative treatment for grass swales is Turfgrass Sod Establishment or Turfgrass Establishment with Soil Stabilization Matting (SSM).

2. Bioswale: The permanent vegetative treatment for bioswales is native meadow, which may be Upland or Lowland Meadow Establishment, or Bioretention Meadow Establishment, with Type D Soil Stabilization Matting (SSM).

    a. The Design-Builder shall establish and maintain 95% native vegetation coverage throughout the limits of the swale until approval of the as-built plans for SWM. Additional plantings of container-grown, deep-rooted perennials, typically plugs, may be used to expedite establishment of native vegetation but are only required in bioswales on check dams.

    b. Turfgrass Establishment and SSM or Turfgrass Sod Establishment may be approved for bioswales in locations where tall vegetation would block necessary sight lines. Where approved, 95% coverage will be required for turfgrass areas throughout the swale limits.

    c. Container-grown plantings of deep-rooted perennials or grasses are to be used on check dams to provide additional reinforcement. Minimum spacing of plantings on check dams will vary depending on container class as follows:

        i. Plug (2 in. dia. by 5 in. depth): 12 in. on center spacing
        ii. #SP4: 18 in. on center spacing
        iii. #1: 24 in. on center spacing

    d. Species to be used on check dams are as follows:

BOTANICAL NAME	**COMMON NAME**	**MAXIMUM SPACING See 7.4.8.2.2.c**	**MINIMUM SIZE See 7.4.8.2.2.c**
Grass Species			
Andropogon gerardii	Big Bluestem		
Elymus virginicus	Virginia Wild Rye		
Panicum virgatum	Switchgrass		
Panicum amarum 'Dewey Blue'	Dewey Blue Beachgrass		
Schizachyrium scoparium	Little Bluestem		
Sorghastrum nutans	Indian Grass		

3. Dry Pond: The permanent vegetative treatment for dry ponds is to be Turfgrass or native meadow.

    a. Native meadows may be SHA Upland, Lowland, or Wet Meadow Establishment or another custom native seed mix approved for the project. Where SSM is recommended in the Landscape section of the *SHA Highway Construction Cost Estimating Manual*, provide SSM suited for the specified permanent vegetation.

    b. Areas of dry ponds located within wetlands or waters of the US buffers are to be permanently vegetated with native meadow with SSM. Locations with base flow or standing water may require plantings of containerized stock to provide vegetative stabilization if required by the Highway Hydraulics Division, Environmental Programs Division, or the State or Federal permitting agencies.

    1 c. When possible, side slopes of dry pond above the water surface elevation of the 10-year frequency storm event shall be used as reforestation, revegetation and/or screen plantings, except where woody vegetation are prohibited on stormwater management embankments as per the MD Pond Code 378 and the 2000 Stormwater Design Manual, where plantings are prohibited by the Highway Hydraulics Division, or where otherwise prohibited by the *SHA Landscape Design Guide.*

7.4.8.3 Planting Requirements for Microbioretention

The Design-Builder shall design Microbioretention facilities as required by the Highway Hydraulics Division. Unlike the other types of facilities listed, areas of Bioretention Soil Mix (BSM) in microbioretention facilities are stabilized with 3 inch depth shredded hardwood bark mulch and then planted with native plants. As such, the vegetative stabilization and planting requirements vary from other types of SWM facilities in this project as follows:

1. Provide perimeter tree and shrub plantings to shade, screen, and improve the aesthetics of microbioretention facilities. Use the following table to calculate required minimum perimeter plantings for each facility:

Plant Type	**Size/Root**	**Max. Spacing**	**Quant. per 100 LF of perimeter**
Major Deciduous Tree	2 in. cal. /B&B	N/A	1
Minor Deciduous Tree (single leader)	1.75 in. cal/B&B	N/A	Provide 2 of one of the following
Minor Deciduous Tree (multistemmed)	6 ft. ht./B&B or #7 CG	N/A	
Evergreen Tree	6 ft. ht./B&B	N/A	
Shrub	30 in. ht. #5 CG	5 ft. OC	10
Perennial	#1 CG	30 in OC	30
*Note: Where site constraints do not permit use of major deciduous trees, substitute 2 minor deciduous trees or 5 shrubs.			

2. Establish permanent vegetation on side slopes to obtain 95% coverage. Turfgrass Establishment with Type A SSM or Turfgrass Sod Establishment shall be used on side slopes above the level of water volume retained during rain events. Native meadow establishment, using SHA Upland Meadow, Lowland Meadow, Bioretention Meadow or other approved native seed, with Type D SSM may also be used on side slopes, provided 95% coverage is obtained. Perimeter plantings shall be installed on side slopes where feasible.

3. Where bioretention soil mix is present, the design-builder will be required to design and establish native herbaceous and woody plants in 3 inch depth shredded hardwood bark mulch. Seeding will not be used to establish vegetation in areas containing shredded hardwood bark mulch. The density of plantings will vary based on the size and type of stock at installation. Provide plants from at least 3 different genera.

Plant Type	**Size/Root**	**Max. Spacing**	**Quant. per 100 SF of BSM surface area**
Shrub	30 in. ht. #5 CG	5 ft. OC	2
Perennial	#1 CG	30 in OC	16
Perennial	#SP4 CG	24 in OC	25
Perennial	Plug (2 in. diam. by 5 in. depth	18 in. OC	50

SWM Facility Plantings

BOTANICAL NAME	**COMMON NAME**	**TYPICAL SPACING**	**MINIMUM SIZE**
Major Deciduous Trees			
Acer rubrum ‘Autumn Flame’	Autumn Flame Maple	30’ OC	2’’ Cal. B&B
Acer rubrum ‘Brandywine’	Brandywine Maple	30’ OC	2’’ Cal. B&B
Betula nigra	River Birch	20’ OC	8’ Ht. Multi-stem, 3-5 stems B&B/#15

			CG
Celtis occidentalis	Hackberry	30’ OC	2’’ Cal. B&B
Liquidambar styraciflua’Happdell’	‘Happidaze’ Sweetgum	25’ OC	2’’ Cal. B&B
Liquidambar styraciflua ’Rotundiloba’’	Rotundiloba Sweetgum		2’’ Cal. B&B
Nyssa sylvatica	Black Gum	30’ OC	2’’ Cal. B&B/#25 CG
Quercus bicolor	Swamp White Oak	30’ OC	2’’ Cal. B&B
Quercus coccinea	Scarlet Oak	30’ OC	2’’ Cal. B&B
Quercus palustris	Pin Oak	30’ OC	2’’Cal. B&B
Quercus phellos	Willow Oak	30’ OC	2’’Cal. B&B/#25 CG
Tilia americana	Basswood	30’ OC	2’’Cal. B&B
Minor Deciduous Trees			
Select species from the Zone 4 Plant Material List.			
Evergreen Trees			
Ilex opaca	American Holly	15’ OC	5’ Ht. B&B SHA approved varieties
Juniperus virginia	Eastern Red Cedar	15’ OC	5’ Ht. B&B/#20 CG
Magnolia virginiana	Sweetbay Magnolia	15’ OC	5’ Ht. B&B/#15 CG
Pinus rigida	Pitch Pine	20’ OC	5’ Ht. B&B
Pinus taeda	Loblolly Pine	20’ OC	5’ Ht. B&B
Pinus virginiana	Virginia Pine	20’ OC	5’ Ht. B&B
Shrubs			
Select species from the Zone 4 Plant Material List and the following:			
Cephalanthus occidentalis	Common buttonbush	30 in. ht.	#5 CG
Cornus ammomum	Silky Dogwood	30 in. ht.	#5 CG
Cornus racemosa	Gray Dogwood	30 in. ht.	#5 CG
Physocarpus opulifolius	Ninebark	30 in. ht.	#5 CG
Sambucus nigra ssp. canadensis	American black elderberry	30 in. ht.	#5 CG
Container Grown Herbaceous Species			
‘Cape’ Ammophila breviligulata Fernald	‘Cape’American beachgrass	Spacing as noted in 7.4.8.3	Size as noted in 7.4.8.3
Amsonia tabernaemontana	Eastern Bluestar		
Andropogon virginicus	Broomsedge		
Asclepias incarnata	Swamp Milkweed		
Asclepias tuberosa	Butterfly Weed		
Aster novae-angliae	New England Aster		
Aster novi-belgii	New York Aster		
Carex retrorsa	Retrose Sedge		
Eragrostis spectabilis	Purple Lovegrass		

Eupatorium dubium	Joe-pye Weed		
Helianthus angustifolius	Swamp Sunflower		
Heliopsis helianthoides	False Sunflower		
Hibiscus moscheutos	Swamp Rose Mallow		
Iris versicolor	Blue Flag		
Iris virginica	Virginia Blue Flag		
Juncus effusus	Soft Rush		
Leymus arenarius 'Blue Dune'	Blue Lyme Grass		
Liatris spicata	Blazing Star		
Lupinus perennis	Sundial lupine		
Oenothera fruticosa	Sundrops		
Panicum amarum Elliott	Bitter panicgrass		
Panicum virgatum (species and approved cultivars)	Switchgrass (species and approved cvs)		
Rudbeckia Triloba	Black-eyed Susan		
Schoenoplectus pungens var. *pungens (Scirpus pungens)*	Common Three-Square		
Scirpus cyperinus	Woolgrass		
Schoenoplectus validus (*Scirpus validus)*	Soft-Stemmed Bulrush		
Solidago sempervirens	Seaside goldenrod		
Sparganium americanum	Bur-reed		
Spartina pectinata	Freshwater Cordgrass		
Symphyotrichum laeve var. laeve	Smooth Blue Aster		
Thalictrum pubescens	King of the Meadow		

Notes:
1. All plugs to be 2" diameter, and 5" depth unless otherwise noted.
2. B&B indicates Balled and Burlapped. CG indicates Container Grown. OC indicates On Center Spacing.

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4 **7.4.8.4 Planting Requirements for Submerged Gravel Wetlands**

The Design-Builder shall design and construct plantings in Submerged Gravel Wetlands (SGW) as required by the Highway Hydraulics Division and Plan Review Division (PRD) and in accordance with the following.

1. Provide perimeter tree and shrub plantings to shade, screen, and improve the aesthetics of SGW facilities. Use the following table to calculate the required minimum perimeter plantings for each facility:

Plant Type	**Size/Root**	**Max. Spacing**	**Quant. per 100 LF of perimeter**
Major Deciduous Tree	2 in. cal. /B&B	N/A	1
Minor Deciduous Tree (single leader)	1.75 in. cal/B&B	N/A	Provide 2 of one of the following
Minor Deciduous Tree (multistemmed)	6 ft. ht./B&B or #7 CG	N/A	
Evergreen Tree	6 ft. ht./B&B	N/A	
Shrub	30 in. ht. #5 CG	5 ft. OC	10
*Note: Where site constraints do not permit use of major deciduous trees as indicated in the *LDG*, substitute 2 minor deciduous trees, 2 understory evergreens, or 5 shrubs.			

2. Areas of wetland soils in SGW, typically located on the floor of the facility, are to be stabilized with native seeding and Type D Soil Stabilization Matting (Type D SSM) and planted with container-grown native plants. Specify and establish native seeding and plantings as necessary to establish permanent vegetation with obtain 95% coverage.
    a. Woody plants are not to be utilized within the limits of wetland planting soils.
    b. Native seeding may consist of Bioretention Meadow Establishment, Wet Meadow Establishment, Lowland Meadow Establishment, Upland Meadow Establishment, or a custom native mix approved by OED.
    c. Utilize container-grown herbaceous plant species as listed in 7.4.8.3 Planting Requirements for Microbioretention or as approved by OED. The density of plantings will vary based on the size and type of stock at installation. Provide plants from at least 3 different genera.

Plant Type	**Size/Root**	**Max. Spacing**	**Quant. per 100 SF of surface area**
Perennial	#1 CG	30 in OC	16
Perennial	#SP4 CG	24 in OC	25
Perennial	Plug (2 in. diam. by 5 in. depth)	18 in. OC	50

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7.5 Landscape Submittals and Other Requirements

7.5.1 Forest Impact Plans

The Forest Impact plans shall be prepared and formatted at a minimum scale of 1" = 100', and shall indicate forest impacts based on the most current limits of disturbance. Forest Impact Plans shall indicate the quantities of impacts on each plan sheet for each individual area identified, and shall include a summary of quantity totals for the entire package of drawings. Forested wetlands shall not be included in the Forest Impact as wetland impacts are quantified and mitigated separately. The Design-Builder shall update the Forest Impact Plans throughout construction and provide a completed set to SHA following completion of construction activities impacting tree and forest areas.

7.5.2 Tree Impact Avoidance and Minimization Report

The Design-Build Licensed Tree Expert, Certified Arborist, Maryland Licensed Landscape Architect, or Registered Forester shall prepare a Tree Impact Avoidance and Minimization Report consistent with the *SSCM* Section 120-Tree Preservation and a Tree

Preservation Program. Submit the Report to the Office of Environmental Design, Environmental Programs Division (OED-EPD) for approval, prior to installation of erosion and sediment controls.

The report shall detail all impacts to trees and forest areas as well as impact reduction and tree preservation measures. In addition, the report will include the Design-Builder's plan to maintain compliance with the MDA Quarantine on Fraxinus (Ash) species, including disposal of Ash trees impacted by the project.

7.5.3 Preliminary Landscape Plans

The Design-Builder shall prepare Preliminary Landscape Plans based on the Landscape Concept Plans. The Design-Builder shall be responsible for coordinating the plans for the Landscaping with all other elements of work to be performed under the Contract including, but not limited to: Final grading; storm drain and stormwater management BMP locations and outfalls; cross culvert outfalls; utilities; signage; and lighting. The Design-Builder shall demonstrate that areas were maximized for plantings and that the Design-Builder worked cooperatively toward this goal. Landscaping required as part of the stormwater management plans shall be included on the Landscape plans to ensure a unified planting theme is created for the project.

In the event that conditions change during the design process so as to affect the design integrity of the approved Preliminary Landscape Plan, it is the responsibility of the Design-Builder Landscape Architect to immediately inform the SHA and OED- LAD of the situation and recommend remedies that may be considered by the SHA and OED LAD.

The Preliminary Landscape Plan shall be formatted as a roll plan at a minimum scale of 1" = 100' and may include: graphics, sketches and illustrations to convey the Landscape Architect's design intent in complying with the requirements of the RFP. The Landscape Concept Plans, which are included in this Request for Proposals (RFP) document, are indicative in nature, and provided as a guideline; these plans designate planting zones by type, location and square foot or square yard area.

The preliminary plans shall include, but are not limited to: Existing conditions, including adjacent natural and manmade features; concept design elements; limits of construction phasing; location and extent of planting zone types; anticipated types of plantings, such as overstory and understory, and clear labels or a legend to identify these elements. Provide proposed roadway; tree preservation areas; reforestation areas; plant types, locations and potential species selections; stormwater and ESD plantings; cut and fill lines; limit of disturbance lines; Right of Way lines, and other information deemed necessary for adequately evaluating the proposed planting locations.

7.5.4 Preliminary Landscape Review Meeting.

The Design-Builder shall conduct a review meeting with OED-LAD and OED-LOD to discuss and review the Preliminary Landscape Plans. This meeting should be scheduled early in the design process to ensure adequate opportunity for coordination and integration with other engineering and design disciplines. The Design-Builder shall prepare meeting minutes and distribute them to attendees for review and comments. After approval by OED-LAD and the OED-LOD of the Preliminary Landscape Plans, the Design-Builder may then begin to develop and advance the Landscape Plans to a Pre-final level of completion while continuing close coordination and communication with other engineering and design disciplines.

7.5.5 Pre-Final Landscape Plans

The Pre-final Landscape Plans shall undergo a multi-disciplinary review to identify and resolve any conflicts. Plans shall be prepared at a scale no smaller than 1" = 50' with match-lines and station limits reflecting those of the proposed Roadway Plans. Plans shall include all proposed plant species, cultivars, sizes, densities, symbology, labels, limits of mulch and landscape beds, material schedules and locations for the project.

Plans shall also include all information from other disciplines, including, but not limited to: existing and proposed roadway and site conditions; limits of disturbance; Right of Way lines; existing grades; proposed grades; stormwater management BMP locations; SHA-required setbacks from travel lanes; all existing and proposed utilities and their SHA-required setbacks; all barriers, fences, signage, lighting, and other fixtures that may pose a potential conflict within the project site; location and extent of planting zone types; plant species and locations; and clear labels and legends to indicate all elements of the drawings. If the Design-Builder or SHA determines a conflict from one or more of these elements, the Design-Builder shall be responsible for modifying the Landscape Plans, while still retaining the intent of the design.

7.5.6 Pre-Final Landscape Review Meeting.

The Design-Builder shall conduct a review meeting with all engineering and design disciplines, OED-LAD, and OED-LOD to discuss and review the Pre-final Landscape Plans. This meeting should be scheduled well in advance of the submittal of the Final Landscape Plans to ensure adequate opportunity for coordination and all required revisions. The Design-Builder shall prepare meeting minutes, which will include a list of compiled comments, and distribute them to attendees for review and comments. A comment response letter shall be prepared by the Design-Builder and shall be submitted prior to the submission of the Final Landscape Plans. This meeting may be eliminated with approval from the Administration.

7.5.7 Final Landscape Plans

Final Landscape Plans shall be prepared as a continuation of the Pre-Final Landscape Plans. Plans shall address and resolve all comments identified during the Pre-Final review period. Plans shall include all plant species, cultivars, sizes and locations for the

project. The plans shall include all proposed roadside, stormwater management, wetland, and stream restoration plantings and shall be submitted at a scale no smaller than 1" = 50'. The plans shall include a chart/table outlining sizes of planting zones in acres, and quantities of plants proposed, noting any differences in quantities from previous phases in the form of a chart/table. The stormwater plantings shall include the surface area of treatments, in addition to quantities of plantings. Plans shall include signs, utilities, roadside barriers and other elements that impact planting areas to demonstrate that the greatest amount of planting area was utilized.

7.5.8 Plant Material Sources

The Design-Builder shall obtain plants from nurseries that employ best IPM Best practices and shall conform to SP Section 920 of the Standard Specifications.

7.5.9 Invasive Species Control Plan

The Design-Builder shall prepare and submit a detailed Invasive Species Control Plan to the SHA prior to the commencement of planting for consultation and written comment. Refer to 7.3.4, Invasive Species Management, for requirements and treatments for removal of invasive species and prohibited weeds.

7.5.10 Contour Grading

The Design-Builder shall perform contour grading throughout the limits of the project Right of Way. Contour grading for both cut and fill conditions shall be performed so that the resultant landforms are natural in appearance, blend well with the surrounding landscape and built features, facilitate positive drainage, and minimize opportunities for erosion. Grading shall be performed to maintain desirable existing vegetation and accommodate project landscape plantings. Changes in slopes shall be rounded to appear smooth and natural. Slopes to be routinely mowed shall be no steeper than 4:1.

7.5.11 SWM Fence

SWM fencing shall be constructed at Structural SWM facilities where safety grading is not feasible as required by SHA's Stormwater Management Site Development Criteria manual. SWM fencing shall be constructed and consist of black vinyl coated chain link fencing. Chain link fencing shall be provided according to the SHA's Pond Fencing Guidelines with a height of 3.5 feet and be placed so as to be visually unobtrusive. Chain link fencing used at stormwater management facilities shall have a top rail run continuously between terminal posts at the top of the chain link. Chain link shall be tied to the top rail at two-foot maximum spacing. The top rails shall conform to the brace rail and brace rail attachment specifications. No brace rail is required when top rails are used. A tension wire shall be run continuously between terminal posts near the bottom of the fabric and be attached to the fabric with hog ring fasteners at eighteen-inch intervals. A twelve-foot wide double gate shall be constructed at each SWM facility requiring fencing. Fencing at Non-Structural (ESD) SWM facilities shall not be provided.

7.5.12 SWM Naturalized Grading and Forms

The Design-Builder shall perform naturalized grading and layout design for the Structural SWM facilities. Contour grading for both cut and fill conditions shall be performed so that the resultant landforms are natural in appearance, blend well with the surrounding landscape and built features, facilitate positive drainage, and minimize opportunities for erosion. Grading shall be performed to maintain desirable existing vegetation and accommodate project landscape plantings. Changes in slopes shall be rounded to appear smooth and natural. Slopes to be routinely mowed shall be no steeper than 4:1. Forms or shapes of the facilities shall replicate those forms found in nature of the local area. Rectangles, squares, and parallelograms are not natural forms. See Section 11.3.3.4 for grading and layout design requirements for Non-Structural (ESD) facilities.

7.5.13 Soil Test Reports

The Design-Builder shall comply with the SHA Environmental Guidelines for Construction Activities.

The Design-Builder shall obtain and submit subsoil and topsoil test results, along with the proposed method to comply with subsoil and topsoil requirements, to the SHA for consultation and written comments.

7.5.14 Nutrient Management Plan/Report

The Design-Builder shall comply with the SHA Environmental Guidelines for Construction Activities.

7.5.15 Landscape Warranty Area Plan

The Design-Builder shall submit to SHA-LOD for review and approval a plan delineating the proposed areas to be warranted and when Installation Phase Acceptance is anticipated for these areas.

7.5.16 As-Built Plans for Landscape, Reforestation and Forest Impacts

The Design-Builder shall submit as-built plans which document all post design changes, field adjustments, and substitutions to the approved Landscape Plans. The as-built plans shall document actual forest impacts and actual provided reforestation to verify on-site reforestation compliance with the Administration provided Reforestation Site Review permit.

7.5.15 Final Acceptance

7.5.15.1 Landscape Warranties

Installation Phase Acceptance for Trees, Shrubs and Ornamental Grasses/Perennials shall conform to Section 710 of the Standard Specifications. The Design-Builder shall provide a warranty and maintain all landscape plantings for one (1) year after Acceptance for Maintenance of plantings and landscape work. Acceptance for Maintenance for plantings and landscape work shall be implemented after all plant materials in the project have been planted, are true to species and minimum size, and are in a healthy and thriving condition and in accordance with Section 710 of the Standard Specifications and the applicable Special Provisions. During this one-year warranty period, the Design-Builder shall provide all required plant care and maintenance. This work shall include, but is not limited to: watering, weeding, fertilizing, pest control, invasive plant control, mulching, pruning, and replacement of any plant materials that are not in a healthy and thriving condition reflective of the species and in accordance with the SHA's Standard Specifications for Construction and Materials and related SP Sections.

7.5.15.2 Stormwater Facility Landscape Final Acceptance

Landscaping in Stormwater management facilities shall be maintained by the Design-Builder until approval of the SWM as-built drawings. Maintenance will include mowing of turf areas, control of invasive species as per the approved invasive species management program, repair of eroded areas, re-seeding bare areas, repairing and replacing soil stabilization matting, and replacing plantings in Bioretention Soil Mix (BSM) to maintain required minimum planting density.

a. The following shrub and perennial survival rates will be required within BSM in the event that SWM as-built approval occurs after the completion of the Plant Establishment Phase in Section 710:

Plant Type	**Size**	**Survival %**
Tree	Per Zone 8	100%
Shrub	Per Zone 8	90%
Perennial	#1 CG	90%
Perennial (#SP4)	#SP4 CG	80%
Perennial (Plug)	Plug 2 in. diam. By 5 in. depth.	70%

7.5.15.3 Turfgrass Final Acceptance

Turfgrass Final Acceptance shall conform to Section 705 of the Standard Specifications. The Design-Builder shall submit a turfgrass establishment certification package that consists of field photographs and completed turfgrass inspection checklists. All

acceptable turfgrass areas shall have a uniform dark green color and have achieved the minimum density per Standard Specification SP 705.03.10.

7.5.15.4 Meadow Final Acceptance

Meadow Final Acceptance shall conform to Section 707 of the Standard Specifications. The Design-Builder shall submit a meadow establishment certification package that consists of field photographs and completed meadow inspection checklists. All acceptable meadow areas shall be as specified in SP 707.03.11.

PR 8 GEOTECHNICAL PERFORMANCE SPECIFICATION

8.1. GENERAL

The Administration has completed a preliminary geotechnical subsurface investigation for this project. The results of the preliminary geotechnical subsurface investigation are included with the RFP. The preliminary geotechnical subsurface investigation data were obtained with reasonable care and recorded in good faith. Its presentation on the plans or elsewhere is for the purpose of providing intended users with access to the same information available to the Administration. The Administration neither assumes nor implies any warranty regarding the data provided, other than that the information was obtained at the locations and depths indicated and to the accuracy of the data at the time of drilling and/or testing.

The preliminary subsurface data presented is not intended as a substitute for a subsurface investigation by the Design-Builder. The Design-Builder shall form its own interpretation and assessment of the subsurface investigation data provided to satisfy itself as to the nature of the subsurface conditions, the form and nature of the site and nature of the Work that may affect the detailed design, construction methods, and tools.

It is the Design-Build Team's responsibility to perform a complete geotechnical program including, but not limited to supplemental subsurface investigation, analyses, and design, as necessary to complete the design and construction of this project. The supplemental subsurface investigation, analyses, design and construction shall be performed in accordance with this Geotechnical Performance Specification and all applicable reference and guidelines listed in PR 2. It is the Design-Builder's responsibility to obtain written clarification for any unresolved ambiguity prior to proceeding with any subsurface investigation, analyses, design and construction.

8.2. REQUIREMENTS

8.2.1 Geotechnical Subsurface Investigation

a. Geotechnical Planning Report

The Design-Builder shall prepare a Geotechnical Planning Report and submit to Office of Materials Technology's Engineering Geology Division for review and approval. The subsurface investigation shall not start until the Geotechnical Planning Report is approved.

The Geotechnical Planning Report shall include the understanding of the project, the discussion of potential geotechnical challenges of the project, Design-Builder's assessment and interpretation of the preliminary geotechnical investigation data included in the RFP, the detailed supplemental geotechnical investigation plan, the rationale of the supplemental geotechnical investigation plan, and the proposed schedule. The Geotechnical Planning Report shall also include a Quality Assurance/Quality Control (QA/QC) plan for its supplemental subsurface investigation, analyses,

design, and construction. See PR Section 8.3.1 "Geotechnical Planning Reports" for detailed submittal requirements of the Geotechnical Planning Report.

The Geotechnical Planning Report shall identify all personnel that will be involved during the supplemental geotechnical investigation and those personnel shall meet the requirements specified in GS 2.1 of Maryland State Highway Administration Standard Specifications for Subsurface Explorations. In addition, all field investigations and laboratory testing shall be performed under the direct supervision of a Maryland-registered professional engineer with a minimum of five (5) years experiences in the performance and supervision of geotechnical engineering projects.

The Geotechnical Planning Report shall identify all laboratories to perform the laboratory testing and include the list of testing for which each laboratory is certified by AASHTO Materials Reference Laboratory (AMRL). All laboratories conducting geotechnical testing shall be AASHTO Materials Reference Laboratory (AMRL) certified. The laboratories shall only conduct those tests for which the laboratory is certified.

The Geotechnical Planning Report shall include the energy efficiency of each SPT drill rig to be used for the project. The amount of driving energy shall be measured using ASTM D4633 - Standard Test Method for Energy Measurement for Dynamic Penetrometers. If energy efficiency of SPT drill rig is not available at the time of developing the Geotechnical Planning Report, the Design-Builder shall include a schedule to conduct the energy measurement for drill rigs. The energy efficiency information of each drill rig shall be also included on each boring logs. Boring logs without energy efficiency information of the drill rig being used will not be acceptable.

b. Field Investigation

The supplemental subsurface investigation shall be performed in accordance with the Technical Specification of Maryland State Highway Administration Standard Specifications for Subsurface Explorations. It is Design-Builder's responsibility to obtain, prior to the start of the subsurface investigation work, all permits, utility clearances and licenses required by any of all Federal, State, County, or local laws or regulatory agency requirements in accordance with GS 2.15 of Maryland State Highway Administration Standard Specifications for Subsurface Explorations.

The soil and rock samples obtained by the Design-Builder for the supplemental subsurface investigation are the property of the Administration. The Design-Builder shall deliver all samples to Field Exploration Division, Office of Materials Technology upon completion. The Design-Builder shall submit two copies of Digital Flash Drives to the Field Exploration Division, Office of Materials Technology with all original driller's logs, final boring logs in PDF format, and final boring logs in gINT file format. Field Exploration Division, Office of Materials Technology is located at 7450 Traffic Drive, Hanover, MD 21076, Phone: 1-866.926.8501 (Toll free).

The Standard Penetration Test shall be performed every 2 feet in the upper 10 feet and every 5 feet thereafter. All roadway embankments shall have one Standard Penetration Test location performed at least every 500 feet along the roadway embankment. All testing locations shall be performed to a depth of at least twice the height of the embankment beneath the anticipated bearing elevation

(i.e. to a depth sufficient to characterize settlement and stability issues) or to auger refusal, whichever is shallower. All cut excavations shall have one Standard Penetration Test location performed at least every 300 feet along the cut area. All testing locations shall be performed to a depth of at least 25 feet below the anticipated bottom depth of the cut or to auger refusal, whichever is shallower.

c. Laboratory Testing

Soil index property testing for classification purposes shall be carried out in accordance with current ASTM standards for USCS and AASHTO soil classification and should include, but not limited to, moisture contents, grain size distribution analyses and Atterberg limits.

Consolidation properties shall be determined using laboratory odometer testing of undisturbed thin-walled tube samples of cohesive soils in accordance with ASTM D 2435 standard.

Undrained shear strength, Su, shall be determined using Consolidated undrained (CU), unconsolidated undrained (UU) testing or in situ testing such as CPT, Flat Plate Dilatometer Test (DMT), or VST. Strength measurements from hand torvanes, pocket penetrometers, or unconfined compression tests, or correlated from SPT shall not be used to determine undrained shear strength. If in situ testing is used to determine the undrained shear strength, the undrained shear strength shall be calibrated with the appropriate level of triaxial testing. CPT testing results shall be correlated with soil borings and laboratory triaxial testing to back-calculate the cone factor for the specific soil types under evaluation. The DMT results should be corrected and correlated to undrained shear based on the FHWA Publication FHWA-SA-91-044.

The drained shear strength of cohesive soils, c’ and φ’, shall be evaluated by consolidated drained (CD) triaxial tests, or consolidated undrained (CU) triaxial tests with pore pressure measurements. The drained shear strength of cohesive soils, c’ and φ’, shall not be evaluated by direct shear tests. The drained shear strength of soils that have both φ’ and c′ shall be treated as if the soil were either cohesive soils or cohesionless soils. The drained friction angle of granular deposits shall be evaluated by correlation to the results of SPT testing, CPT testing, or other relevant in-situ tests.

In laboratory tests, the rate of shearing load application shall be sufficiently slow to ensure substantially complete dissipation of excess pore pressure in the drained tests, or, in undrained tests, complete equalization of pore pressure throughout the specimen.

Parameters obtained from in-situ testing, without correlation with soil index and validation by a qualified engineer shall not be allowed for design purposes. Laboratory testing conducted on undisturbed samples shall be performed no more than 7 calendar days after sample retrieval.

The Administration has established maximum allowable Total Soil Shear Strength and Maximum Allowable Effective Soil Shear Strength design parameters shown in Table 1.1 and 1.2 for use in design. These soil shear strength design parameters may not be exceeded without laboratory testing and the express written permission of the Administration.

Table 1.1 Maximum Allowable Total Soil Shear Strength

Soil Type		Peak		Residual	
USCS	**Description**	**c (psf)**	**ϕ (degrees)**	**c_r (psf)**	**ϕ_r (degrees)**
GW, GP, GM, GC	Stone and Gravel	0	34	0	18
SW	Coarse Grained Sand	0	17	0	7
SM, SP	Fine Grained Sand	0	17	0	7
SP	Uniform Rounded Sand	0	15	0	6
ML, MH, SC	Silt, Clayey Sand, Clayey Silt	1,500	15	1,200	6
SM-ML	Residual Soils	900	14	700	6
CL-ML	NC Clay (Low Plasticity)	1,500	0	900	0
CL, CH	NC Clay (Med-High Plasticity)	2,500	0	1,250	0
CL-ML	OC Clay (Low Plasticity)	2,500	0	1,400	0
CL, CH	OC Clay (Med-High Plasticity)	4,000	0	2,000	0

Table 1.2 Maximum Allowable Effective Soil Shear Strength

Soil Type		Peak[(1)]		Residual	
USCS	**Description**	**c' (psf)**	**ϕ' (degrees)**	**c_r' (psf)**	**ϕ_r' (degrees)**
GW, GP, GM, GC	Stone and Gravel	0	40	0	34
SW	Coarse Grained Sand	0	38	0	32
SM, SP	Fine Grained Sand	0	36	0	30
SP	Uniform Rounded Sand	0	32	0	32
ML, MH, SC	Silt, Clayey Sand, Clayey Silt	0	30	0	27
SM-ML	Residual Soils	0	27	0	22
CL-ML	NC Clay (Low Plasticity)	0	35	0	31
CL, CH	NC Clay (Med-High Plasticity)	0	26	0	16
CL-ML	OC Clay (Low Plasticity)	0	34	0	31
CL, CH	OC Clay (Med-High Plasticity)	0	28	0	16

(1) The same maximum peak effective shear strength parameters shall be used for peak effective internal friction angle of normally consolidated cohesive soils and to the fully-softened internal friction angle of overconsolidated soils.

The selection of soil shear strength design parameters for borrow materials requires that the Design-Builder obtain soil shear strength parameters from all potential borrow pit sources. Evaluation of the soil shear strength design parameters requires that a composite bulk sample be obtained from the borrow source and have the following laboratory tests performed:

- Moisture Density Relationship (Modified Proctor)
- Grain Size Distribution with wash #200 Sieve
- Moisture-Plasticity Relationship Determination (Atterberg Limits)
- Natural Moisture Content
- Consolidated Undrained (CU) Triaxial Shear Test with pore pressure measurements (sample remolded to 97% of Modified Proctor with moisture -1 percent to +2 percent of optimum moisture content) to obtain drained and undrained shear strength parameters

8.2.2 Geotechnical Analyses and Design

a. Software and Spreadsheets

Software and spreadsheets used for geotechnical analysis and design shall be consistent with AASHTO, FHWA and MDSHA guidelines and specifications. The Design-Build team shall provide background information about the software or spreadsheet, assumption made and their limitations, calculation procedure, references, definition of parameters, units, equations used, input values and output values. The Administration reserves the right to accept or reject the use of a particular software or spreadsheet. The calculation results of software or spreadsheet shall also be checked with hand-calculations.

b. Roadway Slopes (Fill Embankment and Cut Slopes)

The need for geotechnical analyses (settlement, bearing, slope stability) for roadway depends on the height of the slope, slope ratio, subsurface conditions, ground water table, adjacent structures, the type of materials being used for fill embankment or materials encountered for cut slope, etc. The Design-Builder shall review and assess the subsurface exploration data provided in the RFP and evaluate the need for additional subsurface exploration and the need for the slope stability, settlement, bearing capacity.

Geotechnical analyses shall be performed for the critical sections. The Administration requires geotechnical analyses (settlement, bearing, slope stability, etc.) being performed for slopes meeting any one of the following scenarios:

1) Slopes steeper than 2H:1V;
2) Slope higher than 5 feet;
3) Slope in soft soil (e.g. wetland);
4) Ground water table near or above the toe of the slope;
5) Slopes supporting structures, e.g. building retaining wall, bridge, etc.;
6) Rock slopes or excavation into rock;

Roadway slope in excess of 20 feet in height shall include a bench at least 10-feet in width at the mid height of the slope. For fill embankment higher than 10 ft, geotextile inclusion shall be placed every three feet (vertical spacing) along the edge of fill embankments per SP 200 Geotextile Inclusion.

All slopes shall be designed to minimize erosion by rainfall and runoff. Adequate drainage and erosion control provisions shall be incorporated in the design and construction of embankments. Drainage and erosion control provisions and means to control seepage shall be incorporated in the design and construction of the cut slopes. The Design-Builder shall have a record of water levels and the slope stability calculation shall model the effect of seepage in the slope stability calculations. The seepage line shall be intercepted with the use of slope drains or horizontal drains or any other techniques to enhance the stability of cut slopes. If the toe of the slope is adjacent to pond or water, the toe of the slope shall be protected by riprap.

Permanent roadway soil slopes (fill embankment or cut slopes) shall not be steeper than 2H: 1V without reinforcement. Reinforced soil slopes shall be designed and constructed per SP 200 Reinforced Soil Slope, SP 900 Geosynthetic Reinforcement Reinforced Soil Slope, and SP 200 Soil Nail Slope.

c. Slope Stability

Slope stability analyses shall be conducted using limit equilibrium methodologies using a computer program such as PCSTABL, ReSSA, or StedWIN/GSTABL. The use of slope stability design charts shall not be acceptable. The Simplified (Modified) Bishop, simplified Janbu, Spencer, or Morgenstern and Price may be used for rotational and irregular surface failure mechanisms. Simplified (Modified) Bishop Method is required.

Circular, sliding, compound and wedge type failures shall be analyzed for potential occurrence for each critical location. For all slope stability analyses, linear Mohr-Coulomb model shall be used for soil strength model unless it is approved by the Administration. The evaluation of global slope stability shall accommodate potential seepage forces, water infiltration, surficial water runoff and any weak deposits and seams that are adversely impacted by water flow.

Below are the requirements of the minimum safety factor:

1) A minimum safety factor of safety of 1.3 is required for fill embankment slopes not steeper than 2H:1V for both global stability and surficial stability analyses.
2) A minimum factor of safety of 1.5 is required for cut soil slopes not steeper than 2H:1V for global stability and surficial stability.
3) A minimum factor of safety of 1.5 is required for soil slopes supporting structures.
4) Reinforced soil slopes shall be designed and constructed per SP 200 Reinforced Soil Slope, SP 900 Geosynthetic for Reinforced Soil Slope and SP 200 Soil Nail Slope.

d. Settlement

The settlement analyses shall include immediate settlement, consolidation settlement, secondary settlement, and time for settlement. Fill embankments shall be designed to keep estimated total long-term settlements limited to one (1) inches during a period of 50 years after construction. Differential settlements within fill sections and across fill/structure interfaces shall be limited to 1/300.

e. Ground Improvement

The use of soil improvement techniques to increase soil shear strength or to reduce compressibility in order to increase the safety factors for external and internal stability and to reduce settlements to the allowable range will be allowed in the design. Techniques such as soil-cement, vertical drains, surcharge, stone columns, vibro compaction, dynamic compaction, lime columns, cement columns, deep mix methods, rammed aggregate pier, and grouting may be considered.

All soil improvement systems shall be designed using current practice and procedures. The performance of all ground improvement techniques shall be verified with a pre-production, post-production field testing program (e.g SPT, CPT, DMT, load testing, etc.), and instrumentation developed to demonstrate that the proposed methods and design will provide the ground improvement level required to satisfy the performance requirements specified herein.

f. Alternative Materials

Alternative embankment materials for reducing load and settlement such as foamed concrete, expanded polystyrene and fired/expanded clay shale may be considered for use on the project upon approval by the Administration. Recycled materials such as wood chips/products and by-products from steel and coal production such as slags and fly ashes, will not be accepted. The Contractor shall submit the following for alternative materials proposed for use and approval on the project:

1) The purpose of materials;
2) Design calculations;
3) Material design specification,
4) Material strength and engineering properties,
5) Construction and placement specification,
6) Material quality control plan specification,
7) Long-term performance history,
8) Certification and test data demonstrating compliance with all MDE and EPA requirements for use of recycled materials, and
9) Material Safety Data Sheets from the material supplier.

8.2.3 Construction

The Design-Builder is responsible for any and all damage (including, but not limited to settlement and vibrations) to property, structures, or utilities, both inside and outside of the State Right-of-Way, caused by the Work on the Project, and shall appropriately mitigate for these damages.

The Design-Builder is responsible for the temporary support of excavation and it shall be designed in accordance with all applicable OSHA standards and AASHTO requirements including, but not limited to, the appropriate lateral earth pressures, hydrostatic pressure, surcharges and construction loading. Detailed design of all components shall be completed by the Design-Builder, including but not limited to, temporary decking, sheeting, bracing and tie-backs.

The Design-Builder shall prepare instrumentation plans, where appropriate, to monitor existing facilities, temporary construction support structures and in-progress construction of permanent facilities for effects of construction activities such as excavation by blasting, pile driving and nearby construction equipment traffic. Monitoring may include vibrations, ground accelerations, tilt or rotation, and vertical and lateral movement during and after construction.

The Design-Builder shall prepare a report detailing the proposed program of instrumentation and monitoring, establishing threshold values of monitored parameters, and describing the response plans that will be implemented when threshold parameters are exceeded. After the Administration's review and comment on the instrumentation plan, threshold values and response plan, the Design-Builder shall provide, install and monitor the instrumentation during and after construction and interpret the data. Construction instrumentation monitoring reports shall be submitted to the Administration prior to opening the instrumented work for subsequent construction. Corrective actions shall be taken where the instrumentation data so warrant.

The instrumentation plan shall provide that potentially affected facilities are protected against damage due to the construction of the Work. Limiting values of movement (horizontal and vertical), vibration and acceleration for each facility within the zone of influence of the Work shall be established by the Design-Builder. To establish these limiting values, the designer shall consider the nature of buildings and facilities within the sphere of influence of the construction activities, including their use, foundation systems, structural design and current condition. Records of facilities, where available, shall be examined during the design stage and, where no record exists, assessments shall be made and clearly stated. These assessments shall be subject to verification at the commencement of the construction phase prior to the adjacent construction activity.

In addition to the instrumentation plan, the Design-Builder shall conduct preconstruction and post-construction surveys for nearby structures and facilities that may be affected by construction activities. The minimum distance for preconstruction and post-construction surveys is 500 feet from existing facilities, temporary construction support structures and construction of permanent facilities to construction activities such as excavation by blasting, pile driving, and nearby construction equipment traffic.

The Design-Builder shall prepare and submit instrumentation monitoring plans to either monitor facilities that may be affected by construction activities or to monitor field performance of specific construction elements in accordance with the following criteria and requirements. The Design-Builder's Instrumentation Engineer shall have a minimum of 5 years of experience in planning instrumentation programs, monitoring, analyzing instrumentation data and providing control and threshold values.

1) The extent of the monitoring program will depend on the size and type of the facilities. The instrumentation program shall be implemented to monitor potential settlement, stability of fill or cut slopes and stability of surrounding structures;
2) The type and distribution of instrumentation shall demonstrate an understanding of the need, purpose and advantages of using each proposed instrument;
3) The plan shall include consideration of environmental effects such as temperature, rain, sun, wind, corrodibility, and electromagnetic wave interference;
4) Responsibilities for the instrumentation plan, procurement, installation, recording, maintenance and protection shall be the Design-Builders;
5) The instrumentation plan will provide construction-related control information and accommodate the collection of long-term performance data;
6) Test installations may be performed to demonstrate the compliance and acceptability of instrumentation in relation to the Contract requirements;
7) If instruments fail or are damaged they shall be replaced at no cost to the Administration and the Design-Builders Geotechnical Engineer may require that all work cease in the area to be monitored by the instruments, with the concurrence of the Administration;
8) Monitoring shall be initiated a minimum of 15 days prior to construction of the features being monitored to establish baseline readings; and,
9) The results of the vibration measurements shall be used to develop attenuation curves for predicting vibrations at varying distances from the source.

8.3. SUBMITTALS

All submittals will be subject to review and approval as per PR 1. All submittals shall be prepared, signed and sealed by a Professional Engineer licensed in the State of Maryland. All submittals shall be submitted to the Administration at least 30 days prior related activities (e.g. mobilization, construction, procurement of materials supply, etc.). Copies of these submittals shall also be sent to the Project Engineer and the Engineering Geology Division, Office of Materials Technology (OMT) located at 7450 Traffic Drive, Hanover, MD 21076, Phone: 1-866.926.8501 (Toll free).

8.3.1 Geotechnical Planning Reports

The Design-Builder shall prepare Geotechnical Planning Reports for the project per PR Section 8.2.1. The Geotechnical Planning Reports shall include a detailed method statement describing the general philosophy and methods of investigation, preliminary design and analysis and selection of the anticipated means of construction for the included Project elements. The method statement shall indicate how material and design details are chosen to match selected construction methods and construction details and the soil, rock, and groundwater environment for the site.

For each Geotechnical Planning Report, the Design-Builder shall include the information required per PR Section 8.2.1 and the following technical information, as a minimum:

a) Description of geology and various ground types to be encountered along the alignment;
b) A description of the geotechnical information that was collected and analyzed in developing the Design-Builder's Geotechnical Planning Report;
c) Assessment of the engineering properties of all soil types, including the expected average and range of soil strengths and deformation properties and the preliminary design parameters for all soil and rock types;
d) A narrative describing the interpretation of the pertinent geotechnical data used as a basis for preliminary selection, design, and installation of the proposed foundation elements;
e) A description of the planned supplemental subsurface investigation (See "Design-Builders Subsurface Exploration").
f) The Geotechnical Planning Reports shall define the investigation, engineering and design approach that will be followed in order to develop the most technically, and environmentally acceptable and durable foundations, cut and fill slopes, retaining structures, pavements, storm water management, and geotechnical designs for the elements included in the Geotechnical Planning Report.
g) The Geotechnical Planning Report should also include a set of full size or half size plans and cross sections of the areas covered by the report, and a copy of any reports or references referred in the report.
h) The Geotechnical Planning Report should include calibration information and the efficiency of all hammers and sampling assembly to be used for the project.

8.3.2 Geotechnical Subsurface Investigation Summary Report

The Design-Builder shall prepare Geotechnical Subsurface Exploration Summary Report after the completion of subsurface investigation including field testing and laboratory testing. The Geotechnical Subsurface Investigation Summary Report shall include the following, at a minimum:

a) Scope work of the project and the report;
b) Location plan showing borings, geophysical testing and other in-situ testing;
c) Field testing procedures;
d) Final typed boring logs updated with laboratory testing results;
e) Electronic copy of the gINT data of subsurface investigation data;
f) Results of any in-situ testing and geophysical testing;
g) Description of subsurface conditions, including groundwater, and subsurface profiles;
h) Results of laboratory tests;
i) Values assigned to soil parameters for design;
j) Descriptions of geotechnical risks and approach to respond to risk (e.g. settlement problems, stability, etc.);
k) Discussion of geotechnical analyses and designs to be performed;

l) Discussion of construction considerations and needs such as blasting, instrumentation, pre/post construction survey;

m) Calibration information and the efficiency of all hammers and sampling assembly used for the project.

n) A set of full size plans and cross sections of the area covered by the report,

o) Copies of any reports or references referred in the report.

8.3.3 Final Geotechnical Reports

The Design-Builder shall prepare Final Geotechnical Reports prior to releasing constructed elements for subsequent work. The Final Geotechnical Reports shall include the following, at a minimum:

a) The corresponding Geotechnical Planning Report;

b) The corresponding Geotechnical Subsurface Investigation Report;

c) Location map and results of borings, rock coring, geophysical testing and other in-situ testing;

d) A detailed description of geological and subsurface conditions for each Project element (including a description of site stratigraphy);

e) Field investigation procedures;

f) Discussion of groundwater conditions;

g) Results of laboratory tests;

h) Values assigned to all applicable soil parameters for design;

i) All pertinent data and complete discussions of all geotechnical analyses and design;

j) All relevant design calculations and computer program output/inputs checked and initialed by a Professional Engineer licensed in the State of Maryland;

k) Conclusions and recommendations for structure foundations, embankments, cut slopes, retaining walls, ground improvement, requirements for backfill materials, etc.;

l) Groundwater problems encountered, means of dewatering and/or other solutions;

m) Designs for support of excavation;

n) Discussion of pre-construction survey;

o) Recommendations of instrumentation monitoring and post-construction survey;

p) Special provisions developed;

q) A set of full size plans and cross sections of the area covered by the report,

r) Copies of any reports or references referred in the report.

8.3.4 Geotechnical Instrumentation Reports

The Design-Builder shall prepare Geotechnical Instrumentation Reports during the construction per Geotechnical Final Report. The Geotechnical Instrumentation Reports shall include the following, at a minimum:

a) Qualifications of instrumentation personnel;

b) Instrumentation location plans;

c) Instrumentation installation records and calibration data for acquisition equipment used to collect the required instrumentation data.

d) Instrumentation data and post-construction survey;

e) Recommendations;

f) A set of full size plans and cross sections of the area covered by the report;

g) Copies of any reports or references referred in the report.

PR 9 UTILITY PERFORMANCE SPECIFICATION

9.1 Utility Statement

9.1.1 General.

The Design-Build Team's attention is called to the requirements of Section GP-5.05, GP-7.13 and GP-7.17.

9.1.1.1 Buy America Steel/Iron Materials.

This section applies to projects partially or totally funded with Federal Funds. The prime contractor or its subcontractors shall comply with Section 165 of the Surface Transportation Assistance Act of 1982 as amended by Section 1041 (a) and 1048(a) of the Intermodal Surface Transportation Efficiency Act of 1991 with regard to the furnishing and coating of iron and steel products.

The prime contractor or its subcontractors shall supply certifications to the Project Engineer from the manufacturer of all coating, iron or steel products which document that the steel and iron have been manufactured and the coatings for iron or steel have been applied by the manufacturer in the United States. The Project Engineer shall forward copies of the certifications to the Office of Materials Technology for review and approval prior to such items being incorporated into the permanent work. Certifications shall extend to materials utilized in manufactured and fabricated products purchased by the Contractor.

Products manufactured of foreign steel or iron materials may be used, provided the cost of such products as they are delivered to the project does not exceed 0.1% of the total contract amount, or $2500, whichever is greater. If supplier or fabricator wishes to use a partial fabrication process where domestic and foreign source components are assembled at a domestic location, the "as delivered cost" of the foreign components should include any transportation, assembly and testing costs required to install them in the final product.

This applies to all iron, steel and coating materials used for utility work incorporated into the project including materials/items supplied by the Utility Company.

9.1.2 Utilities within Project Limits

The Design-Build Team (DBT) is alerted to the presence of overhead and underground utilities including, but not limited to, gas, electric, communication, fiber optic, SHA conduit, well, septic tanks, poles and house service connections that are located within the limits of the State Highway Administration (SHA) right of way and within the limits of the construction project. It is the responsibility of the DBT to avoid, protect, coordinate, and relocate these utilities as necessary to maintain service, safety, and project schedule with minimal disruption to the traveling public or utility customers.

The DBT is responsible to coordinate with the Utility Companies on the overall project design, schedule, and construction. The DBT is also responsible to coordinate any and all Utility Owner design, schedule and relocations by working directly with the Utility Owners. As the DBT has the flexibility to determine how to perform certain operations and how much space will be needed to perform those operations, the relocations will be based on the Utility companies' safety and clearance requirements. It may be necessary for the DBT to utilize non-typical methods in some cases to avoid impacting utility facilities. Associated costs will be incidental to the overall contract lump sum.

Utility Owner Contact Information:

Anthony Battista BGE (electric) 2nd Floor 2900 Lord Baltimore Drive Baltimore, MD 21244 Phone: 410-470-8770 anthony.g.battista@bge.com	Mr. Glenn Manning Howard County Government Department of Technology & Communication Services 8930 Stanford Boulevard Columbia MD 21045 Phone: 410-313-0467 LGManning@howardcountymd.gov
Barry Herbert, Jr. BGE Gas Distribution Mains 2nd Floor 2900 Lord Baltimore Drive Baltimore, MD 21244 Barry.HerbertJr@bge.com	Mr. Thomas Butler Howard County DPW Bureau of Engineering 9250 Bendix Road Columbia, MD 21045 Phone: 410-313-2414 tbutler@howardcountymd.gov
Mr. Jerry Fisher Columbia Gas Transmission, LLC 34646 Old Valley Pike Strasburg, VA 22657 Phone: 540-465-6441 jfishel@cpg.com	Mr. Jeff Williams Well & Septic Program Bureau of Environmental Health Howard County Health Dept. Silver Spring, MD 20904 Phone: 410-313-4261 jewilliams@howardcountymd.gov

Mr. Phil Holland Comcast Cable 7195 Troy Hill Drive Elkridge, MD 21075 Phone: 410-497-0232 Phil_holland@cable.comcast.com	Mr. Roy Pomeroy Verizon of Maryland 13101 Columbia Pike, FDC 1, 102H Silver Spring, MD 20904 Phone: 301-282-4506 raymond.l.pomeroy@one.verizon.com
Ms. Andrea Abend SHA District Utility Engineer (DUE) 5111 Buckeystown Pike Frederick, MD 21776 Phone: 301-624-8116 aabend@sha.state.md.us	

9.1.3 Utilities Coordinator.

The DBT shall provide a Utility Coordinator with experience in coordinating the relocation of utilities on major roadway projects. Responsibilities for this position include, but are not limited to, continuous coordination with all Utility Companies, establishment and continual updates of schedules for the relocation of utilities, creation and maintenance of the utility conflict matrix, tracking progress of Utility Owner design and utility construction, coordination with DBT design and construction personnel to ensure they are minimizing impacts to and protecting existing utility facilities, facilitation of issues and conflicts pertaining to utilities as they arise, organize and facilitate at least monthly Utility Coordination Meetings, including preparation of the agenda and distribution of meeting minutes.

9.1.4 Utility Coordination Meetings.

The DBT shall conduct and facilitate a utility coordination meeting as soon as possible after notification as the successful proposer. Attendees shall include:

- DBT Design-Build Manager and/or Construction Manager
- DBT Utility Coordinator
- The SHA Design Project Engineer
- The SHA Construction Project Engineer
- The SHA District 7 Utility Engineer
- The SHA Area Engineer
- A responsible officer of any necessitated subcontractors
- Utility Owners and/or their representatives

At a minimum, the following shall be discussed at this meeting:

- Status of DBT design and construction
- Potential utility impacts and avoidance and minimization efforts
- Constructability review with utility owners to identify potential conflicts between utility relocations that require sequencing in order to execute the relocations.
- DBT planned design and construction schedule and coordination between utility relocation design and construction schedule
- Schedule for utility relocations including how they will be facilitated within the DBT's design and construction
- Issue resolution
- Schedule for future utility coordination meetings

The DBT Utility Coordinator shall prepare all meeting minutes and distribute them to the team for review, comments, and final acceptance of meeting minutes within five (5) calendar days from the meeting date.

9.1.5 Utility Coordination.

The DBT shall incorporate and make provisions in the design for all utility relocations. The DBT shall establish and maintain ongoing coordination with Utility Owners to fulfill the following requirements:

a) Obtain plans from the Utility Companies and coordinate with District Utilities to obtain approval in accordance with section PR 9.1.7.2. The DBT will review utility plans and shall provide concurrence that the existing and proposed utilities are not in conflict with each other and the DBT's proposed improvements.

b) Ensure adequate protection of their utilities.

c) Maintain utility service at all times during construction of the project including providing temporary connections.

d) Identify all potential conflict areas both overhead and underground and perform test holes to verify conflicts.

e) Create and maintain a utility conflict matrix until all relocations are determined.

f) Incorporate and accommodate utility relocations in the schedule and sequence of construction.

g) Conduct alternative studies to avoid utility relocations.

h) Provide the design and construction associated with any utility service connections to existing and proposed Traffic Control Devices. The DBT shall be responsible for all

conduits, manholes, cabling, meter cans, and disconnect switches as required by the utility to obtain the electrical utility connection. Monthly energy use charges and the final connection fees will be the responsibility of SHA.

i) Provide construction stakeout, clearing and grubbing, and tree trimming for any required utility relocations.

9.1.6 Utility Relocations by Others.

Any utility relocations determined to be unavoidable shall be performed as specified herein. Immediate notification shall be made by the DBT to the utility owner and SHA if a conflict is identified. The anticipated utility relocations based on the Administration's conceptual plans have been broken down into the following general Utility Construction Phases (UCP):

UCP 1 – Triadelphia Road: Pole and UG conduit relocations

UCP 2 – MD 32: Pole and UG conduit relocations

UCP 3 – Access Road 4: Pole and UG conduit relocations

The UCPs listed above are not a complete listing off all required relocations for the project and should be taken as a general idea of the phasing proposed by the utility owners. The listing of the UCP's do not follow any particular order and some of the phases may be done concurrently or prior to a phase as agreed by the utility owner. The conduit, pipe, and overhead utility relocation work along Triadelphia Road is anticipated to be coordinated by the Administration and executed by the utility owners in advance of the bridge replacement work. The utility relocation work along the corridor of MD 32 and the utility access along Access Road 4 shall be performed concurrently with this project in accordance with section PR 9.1.6.

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The relocations described in UCP 1 will begin prior to the issuance of the notice to proceed for this Design-Build contract. It is anticipated that these relocations will extend into the design and construction activities of this Design-Build contract. The Design-Build Teams should utilize a start date of July 15, 2018 for the activities associated with UCP 1. The overhead and underground relocations associated with UCP 1 are anticipated to occur concurrently.

The work activities for each utility owner associated with UCP 1, 2, and 3 may be able to be performed concurrently, but the availability of each utility owner to provide sufficient crews to perform relocations within multiple UCPs concurrently is not guaranteed. The DBT assumes all risk for showing the same utility owner working in different UCPs at the same time within their schedule and the associated completion date provided for this project. Delays associated with the anticipated sequencing of utilities shall not be used as the basis of a claim.

The utility durations shown in this section are based on the impacts identified by the conceptual design developed by the Administration. Should the Design-Builder's design or construction result in additional or changed impacts to those identified by the Administration, the utility relocation durations provided in this section shall be null and void. It is the responsibility of the Design-Builder to coordinate and sequence the new utility relocation needs and durations with the utility owners in the event that additional or changed relocation needs are determined from those provided in the utility conflict matrix.

The Design-Builder is required to perform the work necessary to provide access to the UCPs as described in Section PR. 9.1.5 and 9.1.7.7.

9.1.6.1 BGE Electric.

BGE maintains aerial and underground facilities within the project limits. BGE will design and relocate their facilities for impacts which are unavoidable.

It is anticipated that the BGE Electric overhead and underground relocation work will be performed within the utility construction phases (UCP) described in section PR 9.1.6. Concept plans have been developed by BGE to illustrate the relocation work. BGE Electric has estimated the following durations for their utility relocations:

UCP 1 – 120 days
UCP 2 – 150 days
UCP 3 – 180 days

It is the responsibility of the DBT to coordinate BGE design and relocations with the DBT's design, schedule and sequence of construction so that there are no delays to the utility relocations or the DBT's schedule. A minimum of 3 feet of cover shall be maintained on underground facilities and all work shall adhere to BGE Standards including Design Manuals, General Provisions, Specifications, and Standard Details.

9.1.6.2 BGE Gas.

BGE Gas owns and maintains transmission and distribution pipelines within the project limits. BGE will design and relocate their facilities for impacts which are unavoidable. It is anticipated that the BGE Gas underground relocation work will be performed within the utility construction phases (UCP) described in section PR 9.1.6. Concept plans have been developed by BGE to illustrate the relocation work. BGE Gas does not anticipate relocations within UCP 2 and 3. BGE Gas relocation in UCP 1 have an estimated duration of 60 days.

The DBT shall maintain a minimum of 3 feet of cover over BGE transmission mains and encasements at all times. Minimum gas distribution line horizontal clearance is 5-feet and vertical clearance is 12-inches. All work in the vicinity of the 20-inch BGE transmission pipe shall adhere to BGE Standards including Design Manuals, General Provisions, Specifications, and Standard Details. Plans, including specifications for any equipment to be utilized in the vicinity of the transmission gas pipe, shall be submitted for a 30-day review to BGE to confirm all requirements are met. A BGE representative may be required on site for any and all work within 10 feet of the of the transmission easements. A minimum of a 72-hour notice shall be provided to BGE before any work begins within the transmission easement.

It is anticipated that the 20-inch BGE gas main crossing the project at Sta. 271+20 will not be impacted. If a conflict to the existing gas main is unavoidable, it is the responsibility of the DBT to coordinate the design and relocation of the BGE gas main with the DBT's design, schedule, and sequence of construction. If relocation is required, it is expected that BGE gas will require approximately 8 to 12 months to design and relocate the impacted gas main. It is the responsibility of the DBT to coordinate this work so that there are no delays to the utility relocation or the DBT's schedule.

If there is an existing abandoned gas main in the project limits, the DBT shall contact the BGE

Call Center at 1-800-685-0123 to request the gas main tested to verify it is abandoned. A site contact name and number must be provided and the pipe shall be exposed for access with a minimum 3-ft x 4-ft hole. In order for BGE to test the pipe, they will need to access the hole to weld or fuse fittings onto the main for safety reasons. Trench boxes or other safety precautions may be required.

9.1.6.3 Verizon of Maryland.

Verizon of Maryland maintains aerial and underground facilities within the project limits. Any necessary utility relocation design and construction shall be prior to or concurrent to this project. Verizon will design and relocate their facilities for impacts which are unavoidable. It is anticipated that the Verizon overhead and underground relocation work will be performed within the utility construction phases (UCP) described in section PR 9.1.6. Verizon has estimated the following durations for utility relocations:

UCP 1 – 120 days
UCP 2 – 270 days
UCP 3 – 330 days

It is the responsibility of the DBT to coordinate Verizon of Maryland's design and relocation with the DBT's design, schedule and sequence of construction so that there are no delays to the utility relocations or the DBT's schedule. A minimum of 3 feet of cover shall be maintained on underground facilities.

9.1.6.4 Comcast Television.

Comcast Television maintains aerial and underground facilities within the project limits. Comcast Television will design and relocate their facilities for impacts which are unavoidable. It is expected that the Comcast television overhead and underground relocation work will be performed within the utility construction phases (UCP) described in section PR 9.1.6. Comcast has estimated the following durations for utility relocations:

UCP 1 – 90 days
UCP 2 – 120 days
UCP 3 – no anticipated relocations

Comcast Television will initiate their overhead and underground relocation upon notification that the BGE and Verizon overhead relocation work has been completed. It is anticipated that the UCP 1 work will be completed prior to the start date for the Triadelphia Road bridge replacement. The work required for UCP 2 is expected to be executed concurrently with this project. Comcast does not anticipate activity associated with UCP 3.

It is the responsibility of the DBT to coordinate Comcast Television's design and relocation with the DBT's design, schedule and sequence of construction so that there are no delays to the utility

relocations or the DBT's schedule. A minimum of 3 feet of cover shall be maintained on underground facilities.

9.1.6.5 Howard County Fiber Networks.

Howard County maintains aerial and underground facilities within the project limits. Howard County will design and relocate their facilities for impacts which are unavoidable. It is anticipated that the Howard County Fiber overhead and underground relocation work will be performed within the utility construction phases (UCP) described in section PR 9.1.6. The Howard County Fiber Group has estimated the following durations for the utility relocations:

UCP 1 – 180 days
UCP 2 – 150 days
UCP 3 – 180 days

The Design-Build Team (DBT) is alerted to the sensitivity of the Howard County Fiber Optic network that traverses both underground and overhead through the project limits from the Dayton Shop to MD 144. The existing network is the primary feeder that provides connectivity for services that include, but not limited to, public safety, first responders, public schools, and County government. The County has existing agreements that will not permit downtimes to extend past four hours. The DBT shall contact Howard County Fiber when they are working in areas within close proximity (5 feet in all directions) of their facilities. The DBT Utility Coordinator shall be responsible to ensure that these services are identified and protected in accordance with section PR 9.1.7.5.1, Utility Damage. Howard County may elect to have a construction inspector on site in instances where the DBT is working within close proximity of their facilities.

It is the responsibility of the Design Build Team (DBT) to coordinate Howard County's design and relocation with the DBT's design, schedule and sequence of construction so that there are no delays to the utility relocations or the DBT's schedule. A minimum of 3 feet of cover shall be maintained on underground facilities.

Howard County Fiber Group will initiate their overhead and underground relocation upon notification that the other impacted utility owners have completed their relocation work. Howard County Fiber will be responsible for determining if their infrastructure will be relocated underground or attached to utility pole owned by others and the DBT shall coordinate the installation as described in section PR 9.1.5. It is anticipated that the Phase UCP 1 work will be completed prior to the start date for the Triadelphia Road bridge replacement. The work required for UCP Phase 2 and UCP Phase 3 is expected to be executed concurrently with this project.

9.1.6.6 Howard County DPW.

This project is beyond the metropolitan district. Howard County has no water or sewer facilities

within the project limits.

9.1.6.7 Columbia Gas Transmission, LLC.

Columbia Gas maintains a transmission gas pipeline within the project limits. The DBT shall maintain a minimum of 3 feet of cover over Columbian Gas mains and encasements at all times. All work within the vicinity of the Columbia Gas transmission pipe shall adhere to Columbia Gas requirements including the Columbia Pipeline Group Right-of-Way Use Procedure number 220.003.009.

Vibratory rollers shall not be used within the vicinity of the Columbia Gas transmission line. Plans, including specifications for any equipment to be utilized in the transmission easement, shall be submitted for a 30-day review to Columbia Gas to confirm all requirements are met. A Columbia Gas representative shall be on site for any and all work within the transmission easement. A minimum of 72- hour notice shall be provided to Columbia Gas before any work begins within the transmission easement.

It is anticipated that the 30 inch gas transmission line crossing the project at Sta. 220+00 will not be impacted. If a conflict to the existing transmission line is unavoidable, it is the responsibility of the DBT to coordinate the design and relocation of the Columbia Gas main with the DBT's design, schedule, and sequence of construction. If replacement is required, it is expected that Columbia Gas will require approximately 10 to 18 months to design and relocate the impacted gas main. It is the responsibility of the DBT to coordinate this work so that there are no delays to the utility relocation or the DBT's schedule.

9.1.6.8 Private Septic System.

The existing septic system located at the address of 2920 MD-32, West Friendship Maryland, may be impacted by the proposed roadway construction. SHA will be responsible coordinating with the owner to provide the necessary means for relocating the septic system. The existing septic tank and field will be abandoned in place.

The DBT may encounter other private septic systems within the project limits that were unforeseen during the development of the contract. If an impact to the existing septic system is unavoidable, it is the responsibility of the DBT to coordinate the relocation with the individual property owner. The DBT shall coordinate the design, permitting, schedule, installation and sequence of construction so that there are no delays to the property owner or the DBT schedule. All work shall adhere to Howard County Health Department requirements for onsite sewage disposal systems. The DBT will give the property owner (7) calendar days' notice before performing any onsite septic system work.

9.1.7.1 SHA Traffic Control Devices.

The DBT shall coordinate the design and construction of any and all utility service connections to existing and proposed Traffic Control Devices with the Utility Company. The DBT shall be responsible for all conduits, manholes, cabling, meter cans and disconnect switches as required by the utility to obtain the electric utility connection. The DBT shall review all existing and proposed traffic signal structures and related equipment to ensure clearance from all existing and proposed utility lines are in compliance with OSHA, MOSH and the High Voltage Line Act. Relocations and/or adjustments may be necessary to obtain the clearance that is required by the SHA Office of Traffic and Safety to ensure the signals can be maintained in compliance with the High Voltage Line Act. NO EXCEPTIONS will be made.

9.1.7.2 Permitting.

The Utility Owner is to obtain the required utility permits from the Administration. The DBT shall obtain any other approvals with regard to utility work that is performed by the DBT including service connections. If the DBT has reasonable cause to believe that a Utility Owner performing construction work on the site does not have necessary approvals, or is in violation of the approvals, the DBT shall notify the Administration immediately after discovery.

9.1.7.3 Existing Utility Services.

The plans show some existing utility service connections; however, this does not relieve the DBT from identifying all impacted service connections within the limits of the project. No guarantees are made regarding the completeness or accuracy of said connections. The DBT must communicate with the Utility Companies and use all means necessary to locate existing services and protect as necessary. Should a service require relocation, the DBT is responsible for the coordination and work required to relocate, reconnect and remove the existing service. Utility services must be maintained at all times during construction, unless written permission is obtained from the Utility Owner.

9.1.7.4 Existing Utility Locations.

The DBT must notify Public Service Companies of work intentions 48 hours before work is to begin, by calling MISS UTILITY at 1-800-257-7777 or by applying for utility locates online at: http://www.missutility.net/. All notifications to the above Utility Companies and "MISS UTILITY", at 1-800-257-7777, shall be given 48 hours (two full working days) in advance of working in the area of each specifically affected utility. The notification to "MISS UTILITY" is required whenever any excavating or similar work is performed. The DBT is responsible for following the MISS UTILITY process prior to any excavation or work associated with this project. Utility locations shown on the plans are for the convenience of the DBT and shall not be considered accurate or complete unless it has been located and verified by a test hole. The cost for this coordination shall be included in the overall contract lump sum and the time needed should be considered in the project schedule.

9.1.7.4.1 Utility facilities owned by the SHA.

Regarding stake out of State Highway Administration owned facilities, please make note of our new notification procedures. SHA is now part of MISS UTILITY, and we also charge fees for our locates. The DBT must provide the contract number **(HO7565370)** when contacting MISS UTILITY for locates in order to avoid paying fees for locating SHA owned facilities. This provision is required whether the DBT contacts MISS UTILITY via the internet or by phone. Failure of the DBT to comply with this requirement may result in a locate fee by SHA for which the DBT will not be allowed to recover. When processing online, you shall complete the LOCATE REQUEST FORM. On this form, toward the bottom is the Section -EXCAVATION INFORMATION .Under this section, in the blank space to the right of "Work Being Done For" type — **HO7565370.** This will allow MISS UTILITY to know what District number and highway agency that you are working for.

Regarding the marking of SHA owned facilities, the DBT shall contact the following (a minimum 72-hour advance notice is required):

Intelligent Transportation System (ITS) devices: SHA OOM Communications 410-747-8590 AND ITS Operations 410-787-7662.

SHA Owned Street Lighting: District 7 Maintenance Section, Dan Houck (301) 624-8108.

SHA owned traffic signal facilities: Hanover Complex Signal Shop 410-787-7652.

9.1.7.5 Protection of Existing Utilities during Construction.

The DBT shall maintain a minimum of three (3) feet of cover over all existing utilities that will be left in service during construction. SHA utility clearances are listed in the MD Department of Transportation SHA Utility Policy. Some Utility Owners have provided their minimum clearances which are listed under PR 9.1.6. SHA and Utility Owner clearances must be adhered to. If there is a discrepancy, it is DBT's responsibility to work out a resolution with SHA and the Utility Owner. In the event that this requirement cannot be met, the DBT shall immediately contact the impacted Utility Owner to determine alternative means of protection.

9.1.7.5.1 Utility Damage.

The DBT shall locate all existing utilities, including Administration owned utilities, and be responsible for their safety. Should any existing utilities or Administration owned facilities be damaged or destroyed due to the operations of the DBT, the Utility Owner must be immediately notified and the damaged or destroyed components shall be immediately replaced or repaired as necessary to restore the facilities to a satisfactory operating condition as directed by the Utility Owner. The DBT shall be responsible for completing a Utility Damage Report form to use in the

event a utility or Administration owned facility is damaged. The DBT must attach pictures of the damage to the utility damage report. The DBT shall complete and submit a Utility Damage Report within 24 hours of the damage to the SHA Project Engineer and the District Utility Engineer. Refer to Appendix "A" for a copy of the report.

9.1.7.6 Surface Utility Frames.

The DBT shall make all adjustments to surface utility frame and covers located in pavement and concrete, not limited to manholes, water valves, water meters. The DBT must coordinate with the Utility Owner on the specifications and schedule. This work is to be included in the overall contract lump sum.

9.1.7.7 Utility Access Path.

The Design-Build Team shall design and construct a utility access path along the general alignment of the of Access Road 4 as shown in the Concept Plans in order to facilitate utility relocations consistent to the ultimate build-out of the MD 32 corridor as described in the FEIS. The utility access path shall begin near the southbound shoulder of MD 32 at Terrapin Branch and extend west to meet the Access Road 4 alignment and continue north to a point where it will intersect with MD 144 as shown on the concept plans. The access path shall provide for access to all utility manholes, valves, vaults, poles, and all other above ground utility equipment, both during and after construction. This access path to utility equipment and facilities shall consist of a firm, 10 feet minimum wide drivable surface suitable for an AASHTO SU 30 truck and include widened areas for vehicle passing along the corridor approximately every 500 feet. In addition, a turn-around area sized to accommodate a SU 30 Truck shall be installed at various locations where the access path terminuses does not provide a means for the utility vehicle to return safely to the public road. All parts of the path shall be completely with in State right-of-way, shall have a maximum 6:1 cross slope, and shall have an eight percent maximum longitudinal slope. The Design-Build Team shall design and construct this access so utility company personal and vehicles can safely get to the equipment from public roads, work at the equipment, and safely return to the public road.

9.1.7.8 Utilities: Guidelines and Technical Requirements.

All utilities within the Project area, designed and/or constructed by the DBT, shall be placed in accordance with applicable OSHA, MOSH, Utility Owner Regulations, Governmental Rules, including the Administration's utility regulations and policies, MD Department of Transportation SHA Utility Policy Manual and Utility Procedure Manual, the applicable Utility Standards, Maryland Tariff, and other requirements specified in the Contract Documents. The DBT is to ensure the technical requirements are maintained while designing proposed improvements around and/or near utility facilities.

9.1.7.9 Measurement and Payment.

All work performed coordinating with utilities and their contractors, working around and protecting existing aerial and underground utilities shall not be measured for payment. It may be necessary for the DBT to utilize non-typical methods in some cases to avoid impacting utility facilities. Associated costs will not be measured for payment, but are to be included in the overall contract lump sum.

Appendix

"A"

UTILITY DAMAGE REPORT

UTILITY DAMAGE INFORMATION

Exact Location: _____
_____
Date & Time of Incident: _____ Reported By: _____
Repaired By:_____

UTILITY OWNER INFORMATION

Utility Owner: _____
Utility Owner Contact: _____
Time Utility Owner Contacted: _____

LOCATOR INFORMATION

Locator Service: _____
Date of Locate Request: _____
Locate Expiration: _____Date: _____
Locate Log Number: _____ Was Line Marked:____
Distance from Damage to Mark: _____

CONTRACTOR INFORMATION

Name of Supervisor: _____
Name of Foreman: _____
Name of Witness: _____

SIGNATURES

Contractor's Supervisor: _____
Utility Owner: _____
Locator Service: _____

DESCRIPTION OF DAMAGE:

_____
_____
_____
_____

PR 10 MAINTENANCE OF TRAFFIC (MOT), HAUL ROUTES AND ACCESS DURING CONSTRUCTION PERFORMANCE SPECIFICATION

10.1 General

The Design-Builder shall develop and implement a Transportation Management Plan (TMP) in accordance with the requirements of this specification including performance requirements, standards and references, design and construction criteria, maintenance during construction, and required reviews.

This performance specification provides the flexibility to establish a TMP and to adopt Maintenance of Traffic (MOT) operational changes throughout the Project life to produce benefits or savings to the Administration or the Design-Builder without impairing the essential functions and characteristics of the Project, such as safety, mobility, traffic operations, durability, desired appearance, maintainability, environmental protection, drainage, and other permitted constraints.

Work zone impacts, including impacts on the environment and surrounding communities, shall be kept to a minimum, and shall be considered when developing and implementing the Transportation Management Plan. To that end, a Transportation Management Plan Report shall be developed by the Design-Builder. The TMP Report shall include transportation management strategies and how these strategies are implemented to manage work zone impacts.

10.2 Guidelines

Maintenance of Traffic shall be in accordance with this Maintenance of Traffic (MOT) Performance Specification and the relevant requirements of the Guidelines and References in PR 2.

10.3 Performance Requirements

Administration responsibilities

The Administration’s responsibilities include the following activities:

A) Maintaining Quality Assurance (QA) of any MOT analysis, work zone impact management strategies and temporary traffic control plans from the Design-Builder;
B) Liaising with and monitoring the Design-Builder's performance for compliance with this Contract's requirements;
C) Maintaining documentation for the TMP as developed by the Design-Builder;
D) Providing a trained individual to implement and monitor the TMP during construction;

E) Monitoring implementation of the TMP to verify that strategies are being implemented on schedule and in the manner planned, and that they are effectively managing the work zone impacts.

Design-builder personnel requirements

This project requires the Design-Builder to have a team experienced in Maintenance of Traffic, including work zone design, work zone traffic analysis, and traffic control devices and setups.

Traffic Manager:

The Design-Builder shall provide a Traffic Manager (TM) on-site whose sole responsibility is to supervise and continuously monitor the installation and maintenance of all traffic control devices. The TM shall be equivalent to, meet the requirements of, and perform all duties of Section 104.18 of the Administration's Standard Specifications for Construction and Materials. The Design-Builder shall authorize the TM to direct traffic changes to ensure safe and continuous traffic flow and to direct traffic operations after a traffic incident has occurred. A TM shall be available at all times and be on-site within a ½ hour throughout the duration of the Project. The TM shall document all daily maintenance of the traffic control setups, including but not limited to maximum queue lengths/delays, work zone modifications, incidents, and suggested improvements. Minimum qualifications of the TM include successful completion of Administration's Temporary Traffic Control Traffic Managers Training Course and five years' experience in work zone traffic control.

Flaggers:

The Design-Builder shall provide flaggers with a current American Traffic Safety Services Association (ATSSA) flagger certification. The flaggers provided shall maintain their flagger certification throughout the life of the Project.

10.3.1 Maintenance of Traffic - General Requirements

All maintenance of traffic design and implementation shall be performed in accordance with the following performance requirements:

A) Provide for the safe and efficient passage of pedestrians (including those with disabilities), bicycles, and vehicular traffic through and around construction zones;
B) Prohibit use of new permanent pavement construction as haul route(s);
C) Minimize negative impacts on residents, commuters, and businesses;
D) Provide convenient and logical rerouting of traffic (by using advance warning systems and directional and informational signing, lighting, and striping) to

provide "driver friendly" detours and to maximize the safety of the traveling public;

E) Maintain and provide access at all times to properties for owners, customers, visitors, and emergency vehicles;

F) Provide a safe travel corridor while minimizing any unnecessary investment in the existing infrastructure that is being replaced;

G) Develop and coordinate MOT activities with the Maryland State Police, local law enforcement, and other emergency service agencies to ensure public safety and emergency response times are not compromised;

H) Coordinate MOT activities and Traffic Control Plans with other construction projects;

I) Provide Traffic Control Plans (TCPs) for each major phase of construction (see Section 10.6 of this performance specification);

J) Provide for a Public Outreach campaign to be implemented in cooperation with the Administration; and

K) Develop an incident management plan for accidents occurring within the Project limits, including accident prevention strategies, emergency procedures, reporting requirements, and mitigation strategies;

L) Modify existing intersection at Rosemary Lane at MD 32 as necessary to eliminate left turn movements onto MD 32 for safety reasons and prohibit vehicles from using street as a bypass in lieu of following the detour route during construction of the Triadelphia Bridge.

M) Prior to closing the eastbound direction on Triadelphia Road for bridge construction, the Design-Builder shall perform a traffic analysis at Rosemary Lane to provide adequate southbound MD 32 left turn lane storage as a result of rerouting traffic.

N) Maintain one westbound lane on the Triadelphia Bridge at all times during construction and implement the detour from Summer 2019 to Summer 2020 impacting the 2019-2020 school year only.

O) The Design-Builder shall maintain one full shoulder width (10 feet) in one direction of MD 32 and a 2-foot offset to temporary barrier in the opposite direction under two-way traffic operation. The 10-foot shoulder shall not be used as a haul route. A minimum temporary travel lane width of 11-ft shall be maintained on MD 32 during construction.

P) The Design-Builder is alerted that temporary bridges may be required over Middle Patuxent River and Terrapin Branch to maintain stream alignments.

10.4 Design and Construction Criteria

10.4.1 Traffic Through Construction Zones

The Design-Builder shall perform the following:

A) Implement Traffic Control Plans for all roadways within the Project limits in a manner that safely and efficiently accommodates traffic at all times.

B) Design temporary traffic control plans and implement maintenance of traffic setups using design speeds to determine buffer and taper lengths, clear zone distances, attenuator arrangements, acceleration and deceleration length, and other temporary traffic control elements.

C) Provide all material, labor, equipment, and personnel to effectively carry out the TMP. All equipment and tools shall be in good operating condition and shall be kept in proper adjustment throughout the duration of the project. All materials and supplies shall be of good quality and suitable for the assigned work.

D) Provide and use all safety equipment including (but not limited to) hard hats, safety vests and clothing required by State and Federal regulations and Administration policies and procedures.

E) Begin maintenance of traffic activities at the start of construction work (including preparatory MOT work), or when first hauling construction materials and/or equipment, whichever is earliest and continue MOT activities until Completion of the Project.

F) Arrange and host a pre-traffic switch meeting with the Administration and all affected agencies at least two weeks prior to switching traffic.

G) Identify desired full roadway, bridge or ramp closures (for any period of time) and submit a request in writing to the Administration for review and concurrence during the design review process.

H) Correct all traffic control deficiencies immediately upon notification or observance of the deficiency.

I) Design temporary traffic control plans using temporary raised pavement markers such that all temporary markings are supplemented with temporary raised pavement markers for positive guidance during darkness.

J) Design temporary traffic control plans in a manner that reduces conflict areas. Introducing new intersections, signal or STOP controlled, along MD 32 shall not be permitted.

K) Design all geometric aspects of temporary roadways based on the design speed, and appropriate design vehicle (school bus, farm equipment-tractor etc., pickup truck with livestock trailer, WB-67, etc..)

L) Design all active roadways to accommodate drainage such that there are no puddles or icing on the traveled roadway or shoulders.
M) Ensure appropriate MOT and flagging procedures are employed during all phases of construction, including mobilization activities;
N) Sequence work accordingly which involves grading Access Road 4 as part of the early work to allow utility owners sufficient time to relocate utilities from MD 32 along this corridor. The proposed grading of Access Road 4 needs to be consistent with the planning documents and elevations.
O) Coordinate with the Administration and provide all MOT items (bathroom facilities, temporary signs, traffic barrier, etc.) including relocating and/or installing new traffic control devices as required for each construction phase for the Automated Speed Enforcement (ASE) deployment on MD 32. The ASE setup will only be required for the portion of MD 32 between Linden Church Rd and Burntwoods Rd interchanges.

10.4.2 Public Information and Outreach

Actively assist the Administration in providing advance information to the public regarding construction phasing, detour routes, and expected travel impacts, and coordinate these activities through frequent meetings with the Community Outreach Manager SHA's Office of Communications and District – 7 Community Liaison. Coordinate with the Administration regarding special events that may affect traffic patterns through and around the Project limits and adjust the TMP and TCPs as needed.

10.4.3 Public Access

Maintain access to all businesses, residences, local streets and private driveways at all times, including all temporary approaches to, crossings of, and intersections with roads and streets. Consider any special access needs of property owners and tenants, such as business hours, delivery schedules and circulation patterns.

10.4.4 Pedestrian and Bicycle Traffic

The Design – Builder shall maintain all existing pedestrian and bicycle access along existing facilities at all times during construction. The pedestrian access way shall be fully compliant with all applicable regulations for accessibility, as defined by the Americans with Disabilities Act (ADA). Whenever an existing pedestrian access route in the public right of way is blocked by a construction, alteration, or maintenance activity, an alternate accessible pedestrian route must be provided.

Recreational trails, including bicycle paths, shall also be maintained and kept in good

condition. Access to all recreational facilities shall be provided and coordinated with the appropriate governing agency.

10.4.5 Schools and Public Transportation Agencies

The Design-Builder shall coordinate with the local schools, appropriate Board of Education, and public transportation agencies for both city and local counties to maintain bus, private vehicle, and pedestrian access to education facilities and public transportation services in the area. Access to bus stops shall also be maintained. Construction impacts on school bus and public transportation routes shall be coordinated with the local agencies. Construction staging shall be developed with the goal to minimize impacts to existing school bus routes.

10.4.6 Detour Routes

Design, place, and maintain all traffic detours required during construction. Wherever possible, use State routes of a similar roadway caliber (i.e. similar number of travel lanes and similar roadway classification as the road being closed) for detour routes. The Design – Builder is also responsible for obtaining all necessary permits from the respective agencies for temporary roadways, including construction and/or haul routes.

Detour routes shall be required when complete road or ramp closures or elimination of a particular movement or movements at an intersection approach are necessary. Proposed detour routes shall be included in the Traffic Control Plans and reviewed through the design review process (see Section 10.6 of this performance specification). Complete closures of roadways will not be permitted without the express written approval of the Administration (or Howard County for county roadways) as part of the design review process prior to the closure. Specific identification and written documentation of the proposed closure, including traffic and operational impacts, shall be provided to the Administration during the design review process for each request.

The construction of the Triadelphia Road bridge will be constructed in two phases, requiring the bridge to be reduced to one lane during bridge demolition and construction. The Design-Build Team must maintain one lane in the westbound direction on Triadelphia Road over MD 32 at all times. The anticipated detour of the eastbound movement will utilize northbound Ten Oaks Road, the interchange at Burntwoods Road to access northbound MD 32, southbound Rosemary Lane, then westbound Triadelphia Road to return to the existing bridge location. Any construction activity that will result in closing a County or State road and require a detour of any movement will need to be coordinated with Howard County Department of Public Works, Howard County Police, Howard County Emergency Medical Services, Howard County Public Schools, and Glenelg Country School. The partial detour of Triadelphia Road during the bridge construction shall only impact the school for one active school season starting in Summer 2019 and ending in Summer 2020. At no time will the Design-Builder be allowed to start the detour in the spring and continue the detour in the fall impacting two school seasons. Every effort shall be made to expedite construction and reduce the duration of the detour during the active school year to minimize impacts to bus schedules.

Howard County Public Schools require a minimum advanced notice of at least 6 months for any road closures proposed by the Design-Builder. The Design-Builder is required to schedule a meeting with Howard County Department of Public Works, Howard County Police, Howard County Emergency Medical Services, Howard County Public Schools, and Glenelg Country School to announce the planned closure dates, durations, and impacts in January 2019, with any required follow-up meeting to be held prior to the public meeting for the beginning of construction activities.

10.4.7 Motorist Guidance

The Design - Builder shall provide guidance and signage to and along the entire length of every detour route to motorists who are diverted around or traveling through the construction areas. Signing that is not in compliance with the Maryland MUTCD or Category 1 of the Administration's Book of Standards shall be corrected within 24 hours, unless the sign is a critical regulatory or warning sign, in which case the sign shall be corrected within 6 hours of notice. If the deficiency is caused by an accident, the 6 hours begins when access to the area is available.

For closures of surface streets or changes in roadway configurations, the Design-Builder shall provide guide signs in accordance with the TCP for that particular phase, Maryland MUTCD and Category 1 of the Administration's Book of Standards. At least seven (7) calendar days before a road closure or major change in the roadway configuration or travel pattern, the Design-Builder shall utilize portable variable message signs warning motorists of the pending changes. Messages to be displayed shall be submitted to the Administration for review and comment. The Design-Builder shall coordinate motorist guidance activities with the Community Outreach Manager.

10.4.8 Work Zone Intelligent Transportation Systems (ITS)

Utilize existing and future CHART and Administration system-wide variable message signs (VMS) as part of the TMP. It is the responsibility of the Design – Builder to coordinate the operation of these signs and the implementation of the appropriate messages with the Administration.

10.4.9 Construction Access and Haul Routes

Provide all construction roads required for delivery of fill, asphalt, concrete, bridge girders, and all other materials required for the Project. It is the responsibility of the Design – Builder to obtain all necessary permits from all applicable agencies for construction, maintenance, and removal of temporary roadways, including construction and/or haul roads.

10.4.10 Local Roadway Crossings

The Administration will allow construction traffic to cross roadways that intersect with the Project as long as the crossing is maintained within the Project right-of-way. Proper flagging procedures and/or temporary traffic signals are required to facilitate construction

traffic crossing local roadways. The Design -Builder shall ensure that delays incurred to local roadways as a result of at-grade crossing operations do not exceed the mobility thresholds established by the Administration's "Work Zone Lane Closure Analysis Guidelines".

10.4.11 Emergency Response

The Design–Builder shall cooperate with the Maryland State Police, local law enforcement, and other emergency service providers in their response to accidents, fires, spills, or other emergencies in any area affected by the Project, including those on the construction site and on traffic lanes open to the public. The Design–Builder shall cooperate in all Administration investigations of accidents and other incidents along the Project.

The Design–Builder shall work with emergency service providers and address their concerns about emergency access to and in the corridor, which may include installing gates to allow emergency personnel to access the Project area. The Design-Builder shall coordinate emergency services efforts as follows:

Deputy Chief Daniel G. Merson
Office of the Fire Marshal
Howard County Department of Fire and Rescue Services
6751 Columbia Gateway Drive, Suite 400
Columbia, MD 21046
O: 410-313-6006
C: 410-979-5066
F: 410-313-6066
dmerson@howardcountymd.gov

Captain Michael G. Yetter
Howard County Department of Police
Commander, Special Operations Bureau
11226 Scaggsville Rd
Laurel, Maryland 20723
O: 410-313-3700

10.4.12 Field Verification of Traffic Operations

The Design–Builder shall be responsible for monitoring queues and delays during Maintenance of Traffic operations. If the thresholds established in the Administration's "Work Zone Lane Closure Analysis Guidelines" are exceeded, the Design-Builder shall modify the Maintenance of Traffic plans or incorporate other mitigation strategies to reduce the queues and delays below the threshold levels. All proposed changes shall be submitted to Administration for review.

10.4.13 MOT Restrictions

Refer to Special Provision – Section 104.01 -Traffic Control Plan, for work restrictions and temporary lane closure and/or shoulder closure requirements.

10.4.14 Advance Notification Requirements

The Design-Builder shall submit to the Administration a lane closure permit request form for approval of each lane closure. Lane closures will not be allowed without an approved written closure request.

Type of Lane Closure Request	Minimum Advanced Notice	Maximum Days for Approval
1	30 Days	45 Days
2	10 Days	21 Days
3	7Days	14 Days
4	3Days	14 Days

Type 1 - Planned and acceptable closures of an arterial or local street, traffic switches, new road openings, or changed traffic patterns.

Type 2 - A lane closure that would have significant impact on traffic, such as temporarily stopping traffic completely (traffic drags), closing two (2) or more lanes, or flagging operations.

Type 3 - A lane closure that would have minor or no impact on the flow of traffic, such as closing one lane on a three-lane roadway during off-peak hours.

Type 4 – A lane closure that would close a shoulder (right or left).

For Type 1 closures, the Design-Builder shall make provisions in the MOT Phase Plan for local traffic to access properties and businesses at all times on the closed arterial or local street.

Type 1 and 2 closures will require extensive media and stakeholder notification effort and coordination among various local and State agencies. The Design-Builder shall assist with all notification and coordination efforts.

All notice periods exclude weekends and holidays.

The lane/shoulder closure request shall be submitted on a Lane/Shoulder Closure Request Form provided by the Administration and shall be submitted electronically.

The information provided on the form shall include, but not limited to, the following:

1) Location: Roadway name or State route number;
2) Project Number;
3) Direction: West/East/North/South;
4) Lane Closure Type: 1, 2, 3 or 4;
5) Duration: Date and Times;
6) Limits: Beginning or work zone to end or work zone;
7) Nature of work and justification of lane/shoulder closure;
8) Number of remaining lanes on roadway;
9) Lane(s)/Shoulder(s) to be closed-specifically left, right, middle, left middle, right middle, shoulder, etc.;
10) Ramp location to be closed;
11) Traffic Control Plan sheet number;
12) Appropriate Administration typical application;
13) Point of Contact: Field Inspector;
14) Contact Information;
15) Any detours required;
16) Notes: Any other pertinent information that may be needed to facilitate in clarifying closures; and
17) State Police request and required number of troopers.

The Design-Builder shall contact and notify the Administration 30 minutes prior to initiating all lane closures and after removing all lane closures.

10.4.15 Approval of Temporary Traffic Control Devices

All items for the maintenance of traffic shall be crashworthy in conformance with NCHRP Report 350 or MASH. When conformance with NCHRP Report 350 is required, the manufacturers' certifications that the devices comply with the specified criteria shall be reviewed by the Design–Builder and approved in writing, and copies of the certifications and approvals shall be provided to Administration for consultation and written comment.

All maintenance of traffic products, including temporary pavement markings, used on the Project shall be listed on the Administration's Office of Traffic and Safety's Approved Product List for Temporary Traffic Control Devices and Miscellaneous Items, unless submitted and approved through the Administration's Maryland Product Evaluation List (MPEL) Program.

10.4.16 Use of ‘Point of Presence' (POP) Sign and 'Completed As Promised' (CAP) Pennant Requirements

The Design-Builder shall install 'Point of Presence' (POP) Sign and 'Completed As Promised' (CAP) pennant per SP CATEGORY 800 - CONSTRUCTION NOTICE SIGNS of this RFP and the POP Details provided in the Additional Information on ProjectWise. Replacement of the POP sign due to a change in date shall be at no

additional cost to the Administration.

The 'Point of Presence' (POP) Sign provides the motorist with information about existing or upcoming roadway construction. The POP sign can describe the type of construction and the anticipated completion date.

The POP sign is to be used in conjunction with Limit of Work Identification Sign (LOWI) on this project and is to be paid for using only State funding. The POP sign should be installed in advance of the LOWI sign, in each direction of travel along impacted highways. The signs are not to be installed along roadways that are closed to traffic or along directions of travel which are not impacted by the construction.

All signs are to be installed in accordance with Maryland Book of Standards and the most current edition of the Maryland Standard Specifications for Construction and Materials.

The sheet aluminum POP sign shall display one of two messages based on improvements – 'Roadway Improvements' or 'Roadway Resurfacing'. It is available in two sizes depending upon roadway conditions as dictated in Standards MD 104.01-04 and MD 104.01-05.

The Project shall be considered 'Completed as Promised' when impacts to traffic operations no longer exist. Upon Final Inspection of the project and prior to the acceptance for maintenance by the Administration, the contractor shall affix a 'Completed As Promised (CAP) Pennant' overlay. The sign will remain in place for a period of 30 days, at which time the contractor shall remove the entire sign and wood supports. The material shall become the property of the contractor.

10.5 Development and Review of the Transportation Management Plan

The Transportation Management Plan (TMP) shall include Traffic Control Plans (TCP), as well as Transportation Operations (TO) and Public Information and Outreach (PI&O) strategies. The TMP shall:

A. Evaluate work zone impacts and develop strategies to mitigate those impacts through the use of improved transportation operations and management of the transportation system (refer to Section 10.5.1 of this Performance Specification). Impacts and strategies shall be documented in a TMP Report.

B. Include traffic control plans that accommodate project and site specific considerations (refer to Section 10.6 of this Performance Specification).

C. Include strategies to communicate with the public and concerned stakeholders, before and during the project, through the development of a public outreach plan.

10.5.1 Transportation Management Plan Report

The Design – Builder is responsible for developing a temporary traffic control system that best meets the performance requirements and construction activities. Therefore, maintenance of traffic design shall be done concurrently with a work zone impacts assessment and traffic analysis. This effort shall be documented in a Transportation Management Plan (TMP) report.

The report shall include discussion of the following and all supporting documentation:

(A) Work zone impacts assessment for the proposed MOT;

(B) Traffic analyses for each phase of MOT;

(C) Work zone impact management strategies.

10.5.2 TMP Report Format

(A) All the pages within the report shall be numbered and dated.

(B) The report shall be placed in an 8 ½ by 11 inch, 3-hole binder that allows for insertion of revisions and removal of old data.

(C) The Design-Builder shall make revisions to the report as required to keep reports current with design and construction activities. The date of the revision shall be placed on all pages. Pages to be added, replaced or removed shall be designated. Revisions shall be 3-hole punched for easy placement in the reports.

(D) The final approved report shall be converted to a Portable Document Format (pdf) file, including all maps and exhibits. The electronic file shall be delivered to the Administration for their records.

(E) Sections for inclusion in the TMP include:

1. Introduction (Cover Page, Table of Contents, Professional Engineer Certification, etc.)
2. Executive Summary
3. TMP Roles, Responsibilities and Contact Information
4. Project Description, including goals and constraints
5. Existing Conditions
6. Work Zone Impacts Assessment (Refer to Section 10.5.3 of this Performance Specification)
7. Work Zone Traffic Analysis (Refer to Section 10.5.4 of this Performance Specification)
8. Work Zone Impact Management Strategies (Refer to Section 10.5.6 of this Performance Specification)
9. Access and Mobility Plan (refer to Section 10.5.7 of this Performance specification)

10. Contingency Plan (Refer to Section 10.5.8 of this Performance Specification)
11. Incident Management Plan (Refer to Section 10.5.9 of this Performance Specification)
12. Public Outreach Proposal (Refer to PR 16 -Public Outreach)
13. Implementation and Monitoring Plan (Refer to Section 10.5.10 of this Performance Specification)
14. Supporting Documentation (e.g., Traffic Control Plans)

10.5.3 Work Zone Impacts Assessment

Identify how the project's construction phasing, temporary traffic control zone design, and work zone impact mitigation efforts will impact the project area, how they will affect each other, and how they might adversely impact specific areas, if any. Issues to be considered and discussed in this section of the TMP include:

A) Identification of High-level Construction/Traffic Control Approaches, including proposed construction phasing, traffic control and management, and construction schedule. Discussion may include need for lane closures, total roadway closures, shoulder closures, use of shoulder for travel during construction, use of detour routes and times related to these needs (off-peak, night-work, weekend work, intermittent closures, etc.). High-level maintenance of traffic plans shall be developed that include, but are not limited to, all major traffic shifts, use of temporary roadways, temporary traffic signals, and access modifications to businesses or residences. The duration of each phase shall be noted on the plan. The plans may take the format of 8”x11”, ll”xl7”, or plan-sized (22”x34”) sheets. These high-level Maintenance of Traffic plans will be used as a basis for the development of the Traffic Control Plans.

B) Identification of Safety Issues, including pre-existing safety issues and safety implications of proposed construction approach (es). Pre-existing safety issues may include crash history, curve and gradient issues, line of sight issues, weather related safety issues, lack of adequate shoulder width or prevailing speeds. Examples of safety issues from proposed construction approach (es) include implication of night work, lane width issues, lane-closure related safety issues, channelization and work area separation issues, construction staging areas, construction traffic access issues, and management/enforcement of speed in advance of and through the work zone.

C) Identification of Community Impacts and Related Issues, including accessibility issues and other coordination issues. This involves the identification of work zone impacts on the community businesses and residents likely to be affected by the project. Examples include business access relocation ramp-closure related access issues, detour related mobility impacts, and pedestrian and bicycle related impacts. Other coordination issues may include utility related issues and construction noise issues.

D) Identification of Combined Impacts and Coordination Issues, including identification of nearby and/or concurrent projects and assessment of potential combined impacts of these projects at the corridor/network level.

10.5.4 Work Zone Traffic Analysis

Using the year of opening traffic volumes (as provided by the Administration), the Design–Builder shall analyze all Maintenance of Traffic Phases to ensure that there are no operational or safety issues. Work Zone traffic analysis shall be performed in accordance with the methods and tools described in the "Work Zone Lane Closure Analysis Guidelines". Mobility impacts shall be limited to the allowable mobility thresholds as described in the "Work Zone Lane Closure Analysis Guidelines".

The Administration recognizes that specific work activities and time periods may make it infeasible to comply with the threshold levels contained in the Work Zone Lane Closure Analysis Guidelines. These circumstances shall be outlined in the TMP. For these situations, the Design–Builder shall analyze other MOT alternatives to reduce the mobility impacts below thresholds. If the MOT Alternatives Analysis does not produce an option that reduces impacts below thresholds, the Design-Builder shall propose additional impact management strategies (transportation operations and/or public information and outreach strategies) to minimize the impact, subject to review and approval by the Administration.

Elements to be included in the traffic analysis portion of the TMP include:

A) **Traffic and Travel Characteristics at the Project Location –** Include a summary of traffic and travel characteristics in the project area. This may include recurring congestion issues (pre-existing bottlenecks, high-volume areas, etc.) and non-recurring congestion issues (special event traffic issues, weather related delays, potential for incident related traffic congestion, etc.), heavy vehicle volumes, directional traffic, and recreational or seasonal traffic issues.

B) **Traffic Analysis Strategies –** Include a brief description on how the expected traffic conditions during construction were determined. Include source and date of traffic data. Any traffic reduction factors or other parameters assumed for the calculations should be documented.

C) **Identify Measures of Effectiveness –** List the measure of effectiveness used for the analysis, such as capacity, volume, queue, travel time, diversion rates, safety, adequacy of detour routes, etc.

D) **Analysis Tool Selection Methodology and Justification –** List the traffic analysis tools used. Include a brief summary on how the tool was selected and criteria used to select the most appropriate tool.

E) **Mobility Implications of Construction Approach** (es) **–** Discuss construction approaches that have the potential to impact mobility during the project. This may include lack of shoulders during construction that may require incident management strategies, doing work at night to reduce traffic delays, or traffic capacity and management issues that may exist on a proposed detour route.

F) **Analysis Results –** Compare existing and construction traffic conditions and operations, with and without work zone impact management strategies (where included). Detour route analysis should be included where detours will be used. Traffic analysis should also address, in a more quantitative

manner than the general impacts assessment, the impacts on:

1. Access for residences, businesses, and non-emergency services
2. Access for pedestrians, bicyclists and persons with disabilities
3. Emergency service impacts (fire, ambulance, police, and hospitals)
4. Safety
5. Adequacy of detour routes
6. Intersection traffic control (signal timing, signage, etc.)
7. Heavy vehicle traffic (including over-height, over-weight vehicles)
8. Transit operations (bus stops, school buses, other transit operations)
9. Seasonal impacts (beach traffic, etc.)

10.5.5 Approved Analysis Techniques and Software

The Design - Builder may utilize the following software packages for analysis of Maintenance of Traffic Plans.

A) For arterial maintenance of traffic operations, the Design-Builder may use QuickZone 2.0, MD QuickZone 2.0, Quewz-98, Lane Closure Analysis Program (LCAP), Highway Capacity Software (HCS 2010), Synchro/SimTraffic (version 6.0 or higher), or approved equal (as appropriate) to determine the queuing, delays, and level of service impacts caused by the maintenance of traffic plans.

B) For freeway maintenance of traffic operations, the Design - Builder may use QuickZone 2.0, MD QuickZone 2.0, Quewx-98, LCAP, CORSIM, VISSIM, HCS 2010, or approved equal (as appropriate) to determine the queuing and level of service impacts caused by the maintenance of traffic plans.

10.5.6 Additional Work Zone Impact Management Strategies

In addition to the impact management strategies and MOT requirements included in this Performance Specification, the Design-Builder shall list any additional work zone impact management strategies that will be included and discuss anticipated traffic and/or safety impacts of the strategy. The Design-Builder is encouraged to provide additional, cost-effective services to enhance the overall Transportation Management Plan. Additional services should adhere to the standards and be a supplement to the services outlined in this Performance Specification. Any such enhancements may be implemented at any time during the Project and are subject to the Administration's written acceptance.

10.5.7 Access and Mobility Plan

The Design-Builder shall develop an Access and Mobility Plan depicting haul routes and access points. The Access and Mobility Plan shall be reviewed through the design review process with participation by the Administration. Plans shall be presented on paper no smaller than 11" by 17" with appropriate scale.

10.5.8 Contingency Plan

The Design-Builder shall develop a contingency plan that specifies actions that will be taken to minimize traffic impacts should unexpected events (unforeseen traffic demand, inclement weather, etc.) occur in the work zone. This plan should also address activities under the Contractor's control within the work zone. The contingency plan should include, but not be limited to, the following:

A) Information that clearly defines trigger points which require lane closure lifting (i.e., inclement weather, length of traffic queue exceeding thresholds);
B) Decision tree with clearly defined lines of communication and authority;
C) Specific duties of all participants during lane closure operations, such as coordination with Maryland State Police;
D) Standby equipment and availability of personnel for callout.

10.5.9 Management Plan

The Design-Builder shall develop an incident management plan for accidents occurring within the Project limits, including accident prevention strategies, emergency procedures, reporting requirements, and mitigation strategies. The incident management plan shall meet the following requirements:

A) The Design-Builder shall provide immediate response to emergencies by trained personnel from an incident response team per the requirement of PR 16 - Public Outreach.
B) Immediately following the initiation of actions necessary for the security of people and property, the Design-Builder shall coordinate with the Administration on the investigation(s) of accidents and/or other incidents.
C) At a minimum, the Design-Builder shall provide documentation to the Administration with details on:
1. Cause of disruption (i.e., whether it is construction oriented or not);
2. Actions being taken to alleviate the problem;
3. Responsible parties for the actions; and
4. Anticipated duration of the disruption.

D) The Design-Builder shall establish and manage an emergency response telephone tree per the requirements of PR 16 - Public Outreach. All appropriate emergency response agencies shall be included on this telephone tree for immediate response in the event of an emergency. The telephone tree shall be divided into areas of expertise so the proper people are called for specific emergency situations

10.5.10 Implementation and Monitoring Plan

The implementation and monitoring plan shall define processes to ensure that the

Transportation Management Plan and associated elements, including the Traffic Control Plans and Incident Management Plan, are developed and implemented efficiently and appropriately, and that they are kept up-to-date with necessary modifications during the project.

10.6 Traffic Control Plans

MOT Phase Plans shall be developed for each major phase of construction that requires diversion of traffic. MOT Phase Plans shall be presented on paper no smaller than 22" by 34" with appropriate scale. The MOT Phase Plans shall be site specific for each separate portion of Work and shall not simply reference typical drawings, taper tables, or illustrations in various Administration Standards, the Maryland MUTCD. The following components shall be included in/with each MOT Phase Plan:

A) Description of MOT phase with respect to lane, ramp, or road closures and proposed detour routes;
B) Traffic Analysis/Traffic Modeling for the MOT phase;
C) Signal timing plans, if changed;
D) Temporary roadway and striping plans along with plans for any off-site modifications to local roads to accommodate detoured or diverted traffic including restoration plans to return the site to pre-construction condition;
E) Appropriate channelizing devices and barrier locations with spacing and type of barricades;
F) All temporary traffic control devices necessary to safely and efficiently construct a particular portion of Work;
G) Motorist information and guidance;
H) Temporary signing, signal, and lighting plans;
I) Specific sign messages with sign sizes, spacing or referenced distances, and Maryland MUTCD sign designations. The Design-Builder shall provide details for all proposed non-standard Maryland MUTCD signs;
J) Proposed phased construction of permanent signing;
K) Proposed phased construction of traffic signals;
L) Proposed phased construction of lighting systems;
M) Pavement marker changes shall be specific and clearly shown on the Traffic Control Plan with respect to lane widths and pavement marking material, color, location, and widths. Dimensions are necessary to assure proper installation of the pavement markings;
N) Flagging locations; and
O) Emergency response information.

PR 11 DRAINAGE, STORMWATER MANAGEMENT, AND EROSION & SEDIMENT CONTROL PERFORMANCE SPECIFICATION

11.1 GENERAL

Provide drainage systems, stormwater management, and erosion and sediment control required to serve the Project defined in these Contract Documents. Assess existing drainage and stormwater management as well as the construction of new facilities. Improve these if possible. Ensure that new or rehabilitated facilities cause no adverse impacts upstream and downstream of the project site.

11.2 GUIDELINES AND REFERENCES

Design and construction of drainage systems, stormwater management, and erosion and sediment control shall be in accordance with this Drainage, Stormwater Management, and Erosion & Sediment Control Performance Specification and the relevant requirements of the Guidelines and References in PR 2.

11.3 REQUIREMENTS

11.3.1 Surface Drainage Design

Design all surface drainage conveyances including but not limited to open channels, streams, inlets, closed storm drainage systems, cross culverts and entrance driveway pipes.

Waterway Construction (COMAR 26.17.04) review and approval is required for waterway impacts. Deliver submittals for MDE approval to the Administration for review and coordination with MDE. The Administration has established a review and approval process with MDE for the project. Under that process, the Administration will review and comment on the Design-Builder's plans and, once satisfied that the plans will meet MDE requirements, the Administration will coordinate with MDE to obtain formal approval of the Design-Builder's Waterway Construction plans and calculations.

11.3.1.1 Surface Drainage Design - General Requirements

Perform drainage design in accordance with the following criteria and regulations:

A. Design and construct all inlets, manholes, cross culverts or pipes, and other drainage structures, within the Project Limits. Inspect all existing pipes and drainage structures to be used in the Final Design and assess for structural integrity and hydraulic capacity. Repair or replace all existing pipes and drainage structures in poor condition or which fail to meet structural integrity or hydraulic requirements. Compile inspection reports and submit for concurrence. Include photographs and a written report describing the

structural integrity of the drainage structure. Design also includes the repairing and regrading of unstable or poorly drained existing outfalls.

B. Clean all existing and new pipes and drainage structures to be free of debris and sediment at conclusion of project.

C. Remove all existing pipes and drainage structures which will not be used in the Final Design or abandon by filling with Flowable Backfill.

D. Provide completed designs for all temporary and permanent pipe systems, including, but not limited to, extension of cross culverts and associated inlet or outlet protection.

E. Provide adequate measures to ensure positive drainage after construction within the Project limits. This shall include all areas that do not have positive drainage in the pre-construction condition.

F. Provide adequate connections to maintain all existing drainage systems. Ensure that adequate drainage is provided during interim paving operations (e.g., constructing asphalt berms to divert flow from base course paving to storm drains in closed sections or other precautions as necessary).

G. Adverse impacts to upstream or downstream properties, infrastructure, or environmental resources will not be allowed. Work will be performed beyond the accepted limits of the roadway improvements if necessary.

11.3.1.2 Surface Drainage Design - Specific Criteria

Follow these Specific Criteria where conflicts arise between these Specific Criteria and those contained in the General Requirements.

11.3.1.2.1 Cross Culverts

Refer to Structures Performance Specification, Section 5.03, and Environmental Performance Specification, Section 13.3.2, for additional cross culvert design requirements.

A. Calculate discharges for appropriate return period storms for cross culverts using USDA, NRCS TR-55 and TR-20 hydrology MODELS using the latest NOAA 14 rainfall data unless the drainage area exceeds 200 acres, for which GISHydro is added as an acceptable model. Use HEC-RAS for floodplain modeling and in design of streams. The use of 2-D hydrodynamic models is acceptable with prior approval from the Administration

B. Ensure the 100-year headwater pool at new culverts remains within the right-of-way or easements. For existing, replacement, or extended culverts,

where the existing 100-year storm headwater elevation extends beyond the right-of-way or easements, ensure proposed conditions 100-year headwater elevation is at or below the existing 100-year headwater elevation.

C. Calculate culvert headwater and perform overtopping analysis using the latest version of HY-8. Analyze the outfall using the subroutine and submit the information as part of the drainage reports.

D. Roadway embankments that qualify as dams per MDE criteria must be designed to MD Code 378 embankment standards.

E. Provide fish and aquatic organism passage as well as land animal passage as required for the extension or replacement of the existing bridges or culverts as required by MDE wetland and waterways and the US Army Corps of Engineers.

F. The Clydes Branch culvert crossing of MD 32 shall be replaced with a proposed structure which provides fish and aquatic organism passage as well as land animal passage. Coordinate with Office of Structures regarding the design. The Administration and MDE approved hydrology and hydraulic report will be provided to the Design-Builder. If the Design-Builder makes any changes to the SHA and MDE approved design they shall perform detailed modeling and analysis for the proposed modifications and secure environmental and regulatory agency approvals for the project. The existing culvert overtops the roadway prior to the 100-year storm. In proposed conditions, the culvert is excepted from passing the 100-yr storm but must pass the 50-year storm without overtopping the road. Verify any modification of the culvert opening is adequate to convey the 50-year storm safely based on the proposed design. If necessary, the Design-Build team must incorporate control measures to ensure that the 50-year storm can be conveyed safely, and the channel will remain stable under the 2-year and 10-year storm under proposed conditions. Perform analysis and provide adequate scour protection measures for the culvert. HEC-RAS and other appropriate software to be utilized for the culvert analysis.

G. The 54” CMP culvert crossing of MD 32 at Sta. 250+10 shall be replaced with a proposed structure which does not increase headwater elevations beyond the SHA right-of-way or easements. Coordinate with Office of Structures regarding the design. The Administration and MDE approved hydrology and hydraulic report will be provided to the Design-Builder. If the Design-Builder makes any changes to the SHA and MDE approved design they shall perform detailed modeling and analysis for the proposed modifications and secure environmental and regulatory agency approvals for the project. The existing culvert overtops the roadway prior to the 100-

year storm. In proposed conditions, the culvert is excepted from passing the 100-yr storm but must pass the 50-year storm without overtopping the road. Verify any modification of the culvert opening is adequate to convey the 50-year storm safely based on the proposed design. If necessary, the Design-Build team must incorporate control measures to ensure that the 50-year storm can be conveyed safely, and the channel will remain stable under the 2-year and 10-year storm under proposed conditions. Perform analysis and provide adequate scour protection measures for the culvert. HEC-RAS and other appropriate software to be utilized for the culvert analysis.

H. The 84" CMP culvert crossing of MD 32 at Sta. 255+10 shall be replaced with a proposed structure which provides fish and aquatic organism passage as well as amphibian passage. Coordinate with Office of Structures regarding the design. The Administration and MDE approved hydrology and hydraulic report will be provided to the Design-Builder. If the Design-Builder makes any changes to the SHA and MDE approved design they shall perform detailed modeling and analysis for the proposed modifications and secure environmental and regulatory agency approvals for the project. The existing culvert overtops the roadway prior to the 100-year storm. In proposed conditions, the culvert is excepted from passing the 100-yr storm but must pass the 50-year storm without overtopping the road. Verify any modification of the culvert opening is adequate to convey the 50-year storm safely based on the proposed design. If necessary, the Design-Build team must incorporate control measures to ensure that the 50-year storm can be conveyed safely, and the channel will remain stable under the 2-year and 10-year storm under proposed conditions. Perform analysis and provide adequate scour protection measures for the culvert. HEC-RAS and other appropriate software to be utilized for the culvert analysis.

11.3.1.2.2 Stream Grading and feature implementation for Channel and Bank Stability

A. For Middle Patuxent River, Unnamed Tributary to Middle Patuxent River, and Terrapin Branch crossings please refer to PR 5.03 for design requirements. To establish sustainable geomorphic planforms associated with the Middle Patuxent River and Unnamed Tributary crossings, the limits of grading potentially extend 1,200 feet upstream of the Middle Patuxent River structure and 145 feet upstream of the Unnamed Tributary culvert to approximately 750 feet downstream of the Middle Patuxent River Structure. To establish sustainable geomorphic planforms associated with the Terrapin Branch Structure, the limits of grading

potentially extend 110 feet upstream to approximately 300 feet downstream of the Terrapin Branch Structure.

11.3.1.2.3 Roadway Drainage Design

A. The maximum flow spread in a closed section for a 2-year storm event is 8 ft. and in no case can cover more than one half of any travel lane.

B. The maximum flow across entrances is 1 cfs for the 2-year storm event. Maximum flow from the end of curb and gutter is 0.5 cfs for the 2-year storm event.

C. Use the roadway inlets and drainage structures in the Administration's "Book of Standards for Highways and Incidental Structures" or approved equal(s) where practicable. Submit for approval non-standard structures prior to construction. Place COG or COS inlets within the travel or turning lanes when applicable. Place concrete aprons around the inlets unless specifically waived for grated inlets within the travel or turning lanes. Use bicycle friendly grates such as reticular (WR, WRM, NR, NRM) or curved vane (CV-S, CV-E) grates for grate inlets within the travel or turning lanes unless specifically exempted. Type K inlets are recommended for ditches and ESD facilities. Ensure that inlets in or immediately adjacent to crosswalks are compliant with the American with Disabilities Act (ADA).

D. No breaks in curb, such as curb cuts, for drainage purposes. Open-back curb inlets can be used to mimic sheet flow conditions in locations where the design-builder chooses to propose linear stormwater management facilities.

E. Design ditches to ensure positive drainage flow. Do not allow standing water, except for stormwater management.

F. Design ditch linings using HEC-15 "Design of Roadside Channels with Flexible Linings ". Use Soil Stabilization Matting A (SSM A) rather than riprap where practicable. Type A matting is temporary matting and is used in ditches where shear stress is less than 1.75 psf or for slope stabilization. Type B matting, permanent matting designed to reinforce the turf stems, is used in ditches where shear stresses are between 1.75 and 3.0 psf. Type C matting is a soil infilled permanent matting used to reinforce the turf root system and is used in conjunction with type B matting where shear stresses are between 1.75 and 7.0 psf.

G. Design pipe outfalls using HEC-14 "Hydraulic Design of Energy Dissipaters for Culverts & Channels" Calculate outlet velocity and at a

minimum, provide outfall protection for the same design storm as the culvert. Provide protection for conditions that indicate a greater outfall velocity may occur at a lesser storm event.

H. Do not construct concrete lined ditches and concrete slope or channel protection unless prior approval is received from the Administration.

I. Refer to Geotechnical Performance Specifications for slope design and construction requirements, and the Environmental Performance Specification for permitted wetland impacts and wetland avoidance.

J. All added or replaced storm drain pipe must be reinforced concrete.

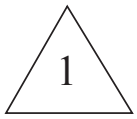
K. Provide pipe slope anchors to secure storm drain pipes installed on slopes exceeding 20%

11.3.2 Floodplain and Waterway/Wetland Coordination

Coordinate analysis of applicable drainage crossings with MDE, FEMA and the Administration. Refer to the Structures Performance Specifications PR 5.03 for Floodplain crossing requirements.

Prior to construction, the Administration will notify property owners adjacent to floodplains and jurisdictional waterways and wetlands of the upcoming construction project. Incorporate the time requirements of this notice into the design and construction schedule, and make available the necessary construction plans for property owner review, in accordance with MDE Water Management Administration requirements.

11.3.3 Stormwater Management (SWM)



Provide stormwater management for the project. For SWM design, the Design-Build team is to use the NOAA 14 rainfall data and distribution. The Design-Build Team will be required to obtain all the necessary approvals from the SWM/ESC Approval Authority including Concept, Site Development and Final approval.

11.3.3.1 SWM Facility Type Selection

Construct SWM facility types based on the following criteria:

A. Implement the best fit given the site context, the adjacent community, and the local ecology.

B. Implement non-structural and ESD practices to the maximum extent practicable (MEP) first when feasible.

C. Implement alternative surfaces and micro-scale practices before larger structural SWM facilities.

D. Structural SWM facilities are to be considered only when all other ESD options have been exhausted.

E. Implement SWM facilities that require lower maintenance first. Potential maintenance needs are considered when designing SWM facilities.

F. Provide soil borings according to the requirements stated in the 2000 MDE manual for the appropriate type of structural SWM and ESD facilities.

G. Due to the potential thermal impacts associated with their long term impounding of water, the use of SWM facilities with a permanent wet pool, excluding forebays, is prohibited due to the presence of Use IV (recreational trout) waters within the project area. Existing SWM facilities with a wet pool shall not be modified in any way to provide additional quality or quantity management unless the wet pool is eliminated and the treatment method is acceptable to the Administration and environmental and regulatory agencies.

H. SWM structural facilities shall not be placed in areas designated for future ramps; including but not limited to slip ramps from MD 32 to Access Road 4 (West Frontage Road), ramps from MD 32 to MD 144 and ramp improvements at I-70. Coordinate with FEIS documents regarding the location of these proposed projects.

11.3.3.2 Water Quality Bank

Provide Water Quality treatment of stormwater runoff according to the afore-mentioned regulations and guidelines. Account for new impervious area, impervious area removed, redevelopment, loss of existing water quality, and treatment provided. Complete the final Water Quality Summary Sheet (WQSS), using the same format as the conceptual WQSS, upon the Final Design. Do not debit the water quality bank for any 6 digit watershed. Provide a proposed WQSS to the Administration's Highway Hydraulics Division (HHD) 2 working days prior to any submission to the SWM/ESC Approval Authority using the signed WQSS. HHD will sign the WQSS and return it to the Design-Builder so they may pursue final design approval. Provide to the HHD both a photocopy and electronic Excel spreadsheet that includes the XML conversion tool upon approval and signature by the SWM/ESC Approval Authority. Accompany those copies with a copy of the SWM/ESC approval letter. Provide all of the above each time the SWM/ESC approval authority issues a modification to the approval.

11.3.3.3 SWM Specific Engineering Criteria Structural SWM facilities

A. Coordinate details for all the new stormwater management facilities throughout the Project and ensure that they are worked into the concepts for the corridor landscaping. Ensure consistency of facility types, outfall structure designs, detailing, colors, planting palette, landforms, surface area shapes and fencing (if required). Refer to SHA Sediment and Stormwater Guidelines and administrative procedures for further information regarding landscaping design and SWM.

B. Locate structural SWM facilities so that the 2-year water surface elevation limit at its closest point is a minimum distance of 15 feet from the edge of pavement.

C. Riser structures and pipe outfall systems are to be designed and constructed according to MD Pond Code 378. Concrete risers and outfall systems are preferred. Seek approval from HHD prior to installing other riser and pipe systems.

D. Retrofit of existing SWM facilities, shall be designed in accordance with the latest MD Pond Code 378 design standards, as required.

E. Use pressure rated reinforced concrete pipe for stormwater management pond outfalls meeting the requirements of ASTM C-361.

F. Set riser structures into embankments or place so they are easily accessed for maintenance. Riser structures shall also be placed so they are visually unobtrusive. Risers shall be cast in place or precast as one unit. Refer to the Maryland Stormwater Design Manual for additional SWM specifications.

G. Ensure trash racks on riser openings are adequately protected from corrosion. Hot-dipped galvanized steel, M 111-80 or epoxy coated steel are preferred. Design trash racks that stand away from and completely enclose the riser opening(s). Attach ends of the steel to a frame that attaches to the structure. Use similar detailing for all trash rack designs on the structure and throughout the Project.

H. Use concrete slabs to cap outfall structures whenever possible. When open tops are necessary, place a non-horizontally mounted trash rack at an angle of not flatter than 1” vertical for every 12” horizontal in order to reduce the potential for clogging.

I. Use slotted perforated pipes surrounded by aggregate for low flow and dewatering. Geotextile is not acceptable. Anchor pipes extending into ponds against flotation.

J. Plant SWM embankments with impervious cores and/or cut-off trenches with herbaceous plants or turf grass. Do not plant woody material on such embankments, within 15 feet of the toe of pond embankments, or within 25 feet of pond outfall structures. Allowable material for the SWM embankment clay core and cut-off trench conforms to A-2-7, A-7-2, A-4-7, A-7-4, or A-7. Maximum particle size is three inches.

K. Use filter diaphragms for embankment seepage control. Anti-seep collars are not allowed unless specifically approved.

L. Request Administration to assign a SWM Facility Number for each SWM facility and include in wherever corresponding facility is indicated in contract documents.

M. Provide adequate access to SWM facilities for maintenance. Ensure each part of the facility is accessible by the equipment needed to maintain or rehabilitate the facility. Underground facilities require that no point within each separate chamber of a facility shall be more than 100 feet from an access point. For example, a 200-foot-long chamber with a manhole in center meets this requirement since no point in chamber is more than 100 feet from an access point.

N. The minimum required service life for the structural elements (including pipes) of underground SWM facilities is 50 years. Whenever any of the structural elements are under a roadway, or extend more than 10 feet below the surface, the minimum required service life is 75 years. Pipes shall be reinforced concrete either class 4 or class 5.

O. Perform anti-flotation checks and stability checks with a Factor of Safety of 1.5 against overturning for all Riser Structures.

P. Construction of structural SWM facilities (i.e. chapter 3 facilities) will not grant water quality credit above the project requirements. Structural facilities may only be used to obtain credit equal to the project requirement provided they cannot be supplied with ESD facilities.

Q. Must set all orifices and draw down devices above the seasonal groundwater table during and after construction.

R. If unsuitable material is found at locations where SWM facilities are proposed, a clay liner or approved equal will be provided below the bottom of the proposed facility.

S. Design-build team to comply with all dam safety requirements for SWM facilities.

T. Provide tabulations table for each SWM facility.

U. Provide construction checklist for each SWM facility

11.3.3.4 SWM Specific Engineering Criteria for Environmental Site Design (ESD) Facilities

A. Design check dams to be made of top soil with 6:1 slopes in the clear zone and 3:1 slopes or flatter outside the clear zone. The minimum top width of the check dam shall be 1 foot.

B. Maximum height of check dams within the clear zone is limited to 1-ft.

C. Provide side slopes of 4:1 or flatter for all linear ESD facilities (grass swales, dry swales, bio-swales etc. and micro-bioretentions.

D. Provide adequate access to SWM facilities for maintenance. Ensure the entire facility is accessible by the equipment needed to maintain or rehabilitate the facility.

E. Do not construct wet swales or any SWM facility that will leave water impounded in the median.

F. Do not locate Submerged Gravel Wetlands within 100 feet of residential properties without prior approval from the Administration.

G. Obtain approval from the Administration prior to installing any proprietary items.

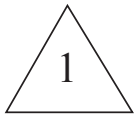
H. Obtain a SWM Facility Number for each SWM facility and include in wherever corresponding facility is indicated in contract documents.

I. Provide tabulations table for each ESD facility.

J. Provide construction checklist for each ESD facility.

K. Submerged Gravel Wetlands will not be lined at the bottom. Submerged Gravel Wetlands must obtain 100% of ESDv credit within the surface storage.

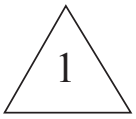
11.3.4 Erosion and Sediment Control (ESC)



Design, obtain approval from the SWM/ESC Approval Authority, and implement an E&S Plan and Sequence of Construction. Obtain all approvals prior to commencing earth disturbing activities.

Submit completed Notice of Intent (NOI) form to the Administration and obtain all approvals necessary to begin construction. The Design-Builder shall incorporate all applicable public notice timeframes into their schedule.

11.3.4.1 ESC Specific Design Criteria



Clearly delineate the Limit of Disturbance (LOD) on the ESC Plans by including a table of the break points with Station and Offset, northing and easting. Submit grading plans that show the size of each grading unit being opened at a given time unless permitted otherwise by the SWM/ESC Approval Authority. Uphold and follow all guidance from the *2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control* when creating these units. Work will be sequenced so that grading activities begin one unit at a time. Stabilized ground is any graded earth that is not exposed. Stabilized earth can be achieved through multiple methods such as hydro-seeding, erosion control matting, rip rap, sod, pavement etc. Reference the *2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control* for further direction on what is considered stable or refer to the SHA Quality Assurance Inspector if not expressly stated in the above reference. Proceed forward with construction once these grading plans have been approved by the SWM/ESC Approval Authority.

Cover slopes outside the roadway hinge point, flatter than and including 3:1 slopes, with 4 inches of topsoil prior to permanent seeding and mulching. Cover slopes within the roadway hinge points, flatter than and including 3:1 slopes, with 4 inches of topsoil.

Design E&S controls to additional standards required for all work within or draining directly to Tier 2 waters.

Retain sediment generated by construction operations within the site by performing the following:

- Stone check dams, compost socks, linings, strip sod, or other erosion inhibitors in influent ditches to sediment traps;

- Ensure effective drawdown and dewatering of sediment traps and basins prior to forecast rain events by pumping to filter bag(s) and mulch berm(s) or other approved devices to ensure that dewatered storage component of sediment trap is available for the future storm event(s);

- Minimize the potential for re-suspension of particulates; and

- Any techniques not meeting the project requirements must be approved by SWM/ESC Approval Authority as part of approval of the ESC plans.

11.3.5 Stormwater Facility Maintenance

The Design-Builder will maintain all stormwater facilities it constructs until the As-Built plans have been approved by the SWM/ESC Approval Authority and the project has been accepted for maintenance. This may include, but is not limited to, vegetation management, regular mowing, ensuring all potential underdrains and piping is functioning properly, and cleaning all pipes and structures to ensure they are not clogged.

11.3.6 Location Specific Stormwater Management Commitments

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The pre-concept stormwater management design proposes a pond behind the property at 4305 Ten Oaks Road. If a stormwater management pond (ESD or structural) is proposed between southbound MD 32 and the eastern property line for 4305 Ten Oaks Road, special landscaping requirements shall apply. The Design-Builder must provide fencing around this pond, with the all sides of the fence not facing MD 32 to be constructed of a durable plastic fence at least five feet in height. For maintenance access purposes, the fencing facing MD 32 may be black or brown coated vinyl chain link fence. The fence shall have a gate for maintenance that follows the Site Development Criteria. The pond shall be located in such a way to provide sufficient space to install two rows of evergreens (as described in PR 7.4.3.) between the pond fence and the right of way line.

PR 12 CONSTRUCTION REQUIREMENTS PERFORMANCE SPECIFICATION

12.1 Construction Standards

All construction work for this project shall be in accordance with the current edition of the SHA Standard Specifications for Construction and Materials, project specific Special Provisions, The "standard" Special Provisions, the Special Provision Inserts, and all provisions included in Part III of this RFP.

12.1.1 Book of Standards

Details and dimensions of drainage structures, TCPs, traffic barriers, etc., shall comply with the Administration's "Book of Standards, Highway and Incidental Structures."

12.1.2 Specifications for Construction and Materials

Shall comply with the Maryland Department of Transportation State Highway Administration 2017 Standard Specifications for Construction and Materials, including all Special Provision Inserts and these Special Provisions.

12.1.3 Industry Standards

The Design-Build Team shall adhere to industry standards pertaining to civil construction, such as ASTM and AASHTO or Utility and utility owners' specifications and standards. If an item of work is not covered by the Administration's specifications and standards, the materials and construction methods used shall meet the appropriate, nationally accepted industry standards and be submitted to the Administration for approval.

12.1.4 Utility Details

All Utility work shall be done in accordance with the latest edition of the utility owners' details and specifications.

12.2 Construction Stakeout

The Design-Build Team shall refer to SP 107 - CONSTRUCTION STAKEOUT FOR DESIGN-BUILD PROJECTS for project specific requirements.

The Design-Build Team shall engage a Registered Professional Land Surveyor, licensed in the State of Maryland, to determine all lines and elevations for various parts of the Work, as the work progresses:

a. Verify that the field locations of the established horizontal controls and benchmarks correspond with figures shown on the Design-Build Team's Contract Drawings.

b. Establish vertical references and axis lines showing elevations and other lines and dimensional reference points as required for the execution of the work.

c. Field check facilities and surveys thereof as required by the technical sections of the Specifications.

d. Stake out the limit of disturbance including all wetland areas and tree protection fencing at all Tree Preservation Areas.

e. Stakeout the existing and proposed Right-of-Way Line, including, but not limited to, fee acquisition, easements, and Lines of Division.

f. All stakeout performed by Design-Build Team shall be made accessible for the Administration's inspection.

12.3 Maintenance of Traffic

All maintenance of traffic work is to comply with the approved traffic control plans, traffic control standards, the MD Manual on Uniform Traffic Control Devices (MD MUTCD), MD Standard Sign Book, and special provisions.

a. Advanced Notice Requirements

The Design-Build Team shall notify the Administration's Engineer in advance of implementing any changes in traffic patterns as per requirements of the Maintenance of Traffic Performance Specification.

b. Schedules/Sequences of Construction

The Design-Build Team shall schedule work phasing and tie-in operations so as not to be working intermittently throughout the area. Schedule and pursue excavation and other construction activities to permit making the connection without unnecessary delays. Perform utility work in conformance with the maintenance of traffic requirements shown on the approved Drawings and/or as indicated in the Standards.

c. Protection of Work

Pursuant to the General Provisions, the Design-Build Team is responsible for protection of the work and safety of the public.

Various mitigation measures may be required as unforeseen conditions develop during construction operations. Potential conditions to consider are: open excavations, the use of decking or plates to close trenches, vibration or other geotechnical monitoring, temporary wedge material to prevent pavement edge drop-off, temporary shielding as both a physical and/or visual barrier, the installation of temporary channelizing devices and/or traffic barriers.

12.4 Erosion and Sediment Control

1 Except as noted below, all work shall be done in accordance with the erosion and sediment control (E&S) plans to be prepared by the Design-Build Team and approved by the SWM/ESC Approval Authority.

a. Compliance Requirements

Ensure daily stabilization for land disturbance within any drainage areas adjacent to wetlands and streams in the design and implementation of the ESC plans. Provide resources to provide immediate stabilization for the contract at all times.

Keep an erosion and sediment control manager (ESCM) on site at all times. The sole responsibility of the ESCM will be to ensure compliance with SHA standards and that all measures adhere to the *2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control.* The ESCM must strictly perform E&S related work. Daily erosions and sediment control meetings between the ESCM and SHA Erosion and Sediment Control (ESC) Inspector will be held to discuss the status of the project and the daily E&S report. Weekly meetings between the ESCM, SHA E&S Inspector, Independent Environmental Monitor (IEM) and Regional Environmental Coordinator (REC) will be held to discuss the status of the project and the E&S reports for the week.

At any time, the QA Inspector may request the contractor to disclose the total graded area throughout the project that is not stabilized. The contractor is responsible for providing proof within 48 hours that they are in compliance with the grading unit law.

4 b. Plan Adjustments and Revisions

Any proposed adjustment or revision must comply with all Federal, State, and local laws, ordinances, and regulations pertaining to environmental protection.

For field adjustment, if there are no changes in ESC sequence and/or Limit of Disturbance, the contractor must submit a request to the MDOT SHA Quality Assurance (QA) toolkit. If approved by the MDOT SHA QA Inspector, as well as the MDOT SHA Project Engineer (PE), minor field adjustments of the sediment control facilities may be made as required to accomplish the intended purpose.

All other adjustments shall follow the process outlined in Section 1.26.2.1 for Revisions.

When directed by the Administration's Engineer, the contractor shall be responsible to implement additional erosion and sediment control measures and modifications to the approved erosion and sediment control plan as required by the MDOT SHA QA Inspector to address unforeseen site conditions during design at no additional cost to the Administration.

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c. Protection of Existing Waterways and Highway

Debris or trash of any kind, either existing or generated by the project, shall not be allowed to enter Waters of the U.S or onto roadways. This includes, but is not limited to, paint splatters and spillage, wet or dry silica dust, and truck cleanout remnants. Take care to prevent damage and/or injury to personnel, vessels, and vehicles using waterways, roadways, or pedestrian ways. Provide devices and maintain as required to prevent such occurrences. Promptly remove any material or items falling in a waterway, on adjacent banks, or on roadways and immediately report to the Engineer and the jurisdictional agency.

d. Fish and Wildlife Resources

Do not alter water flows or otherwise disturb native habitat near or adjacent to the project construction area, unless otherwise stipulated in the project's permits and approved as an authorized action by the appropriate regulatory agencies.

e. Staging Areas

Do not use, in connection with this Contract, for storage, as a staging area, or as a preparation site any cultural resource facility, building, site or cleared area that is, as of the date of this Contract, on or eligible for listing on the National Register of Historic Places (16 U.S.C., paragraph 470a) without prior approval of the Engineer.

For the purpose of the preceding paragraph, the term "cultural resource" includes districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, or culture.

12.5 Protection of Existing Utilities

Attention of the Design-Build Team is directed to the presence of utility conveyance of various types within the limits in which the construction project is to be performed. The Design-Build Team shall exercise special care and extreme caution to protect and avoid damage to utility company facilities as described in this RFP. The Design-Build Team shall take into consideration the adjustments and installations by public utilities in areas within the limits of this contract. Existing utilities are located and shown in the utility designation file as they are believed to exist; however, the Administration assumes no responsibility for the presence or accuracy of these locations. The Design-Build Team shall be responsible for determining the location of all existing utilities and incorporating them into the design prior to initiating construction.

The Design-Build Team shall locate all existing utilities and be responsible for their safety and continuous service. Should any existing utilities be damaged or destroyed due to the operations of the Design-Build Team, the damaged or destroyed components shall be immediately replaced or repaired as necessary to restore the utility to a satisfactory operating condition as approved by the Utility Owner. These repairs or replacements shall be at no additional expense to the Administration or the Utility Owner.

All utility relocation work shall be assumed to occur concurrent with the project. The Design-Build Team shall give sufficient notice to the specific utilities of the Design-Build Team's overall plan for construction and utility relocations. The Utility Companies will establish the lead time necessary to meet the applicable utility work schedule and coordinate with the Design-Build Team's work operations based upon the Design- Build Team's overall plan. Additionally, the Design-Build Team shall inform the respective Utility Companies at least fourteen days prior to working in any area that would impact their facilities. The Design-Build Team shall be responsible for any work scheduling and conflict mitigation efforts required for coordination with project related utility relocation work.

For a list of known Utility Owners having existing facilities within the limits of this contract see PR 9 – Utility Performance Requirements, location elsewhere within this RFP:

All notifications to the above utility companies and "MISS UTILITY", 1.800.257.7777, shall be given 48 hours (two full working days) in advance of working in the area of the specific affected utility. The notification to "MISS UTILITY" is required whenever any excavating or similar work is to be performed.

If an adjustment is required to facilities, it is necessary that the existing facilities remain in service until the new construction is complete and placed in service. Also, when adjustments are required, establishment of lead times is necessary to meet the applicable utility schedule and coordination with the Design-Build Team's work operation. For more details on Utility

relocations see PR 9 - Utility Performance Requirements, location elsewhere within this RFP:

Working around and/or protecting utilities, removal and disposal of materials from the utilities and cooperation with Utility Owners and with other Contractors will not be measured but the cost will be included in the Contract Lump Sum Price Proposal.

12.6 Engineers Office

The Design-Build Team shall supply one (1) Engineer's Office Type D, for use by - Administration personnel, conforming to the requirements of Section 103 of the Standard Specifications.

One phone in the conference room of the Engineer's Office shall have conference call and speakerphone capabilities.

The Design-Build Team shall provide the Administration with Two (2) desktop computers and two (2) digital cameras as described in special provisions in this RFP.

The Design-Build Team shall provide the CPM schedule, as is described in the special provision in this RFP.

PR 13 ENVIRONMENTAL PERFORMANCE SPECIFICATION

13.1 General

The Design-Builder shall conduct its design and construction activities in accordance with these specifications such that no action or inaction on the part of the Design-Builder shall result in non-compliance with any requirements of Clean Water Act section 404 and 401 authorizations/permits, MDE Nontidal Wetlands and Waterways Permit, floodplain permits, approvals, and all other necessary permits and approvals required by the Project.

13.1.1 General Environmental Philosophy

The MD 32 project passes through an area of diverse environmental, community, and cultural resources. Protection of these resources is of paramount importance. The philosophy followed by the Maryland Department of Transportation State Highway Administration (Administration) during the development of the RFP was to incorporate environmental stewardship measures to avoid and minimize impacts to the natural and forest areas, community, and cultural resources (Section 106 Resources) to the greatest extent feasible and practical. The Design-Builder shall continue this environmentally sensitive approach and philosophy during the preparation of final design plans and through Project implementation.

13.1.2 Guidelines and References

The Design-Builder shall design and implement Environmental requirements in accordance with this Environmental Performance Specification and the relevant requirements of the Guidelines and References in PR 2.

13.1.3 Owner's Environmental Roles and Responsibilities

The Administration has conducted extensive coordination with various environmental and regulatory agencies (including but not limited to the U.S. Army Corps of Engineers (USACE), Maryland Department of the Environment (MDE), Maryland Department of Natural Resources (DNR), Maryland State Historic Preservation Office (MD SHPO), U.S. Fish and Wildlife Service (USFWS), U.S. Environmental Protection Agency (EPA) and the public. The Administration shall provide an Independent Environmental Monitor (IEM) on behalf of the USACE and MDE that will work with the Design-Builder to confirm that the Design-Builder's plans and construction methods are in compliance, and that all regulatory permit conditions and commitments are met. The Independent Environmental Monitor will:

A. Review design submittals and construction activities for compliance with all conditions of applicable permits and environmental regulations;

B. Review the Design-Builder's environmental compliance implementation;

C. Notify the Design-Builder of deficiencies in the compliance with the commitments, and permits.;

D. Report findings directly and concurrently to MDE Nontidal Wetlands and Waterway Construction Divisions, and USACE, notifying them and the Administration immediately of any reported or observed violations or non-compliance issues within the terms or conditions of the permit, the Water Quality Certification, or approved plans and specifications;

E. Document impacts to regulated resources by developing and maintaining a detailed tracking list of impacted resources;

F. Assist with the identification of ongoing opportunities for further avoidance and minimization of impacts to regulated environmental resources and protection of water quality; and

G. Coordinate and attend any meetings involving resource or regulatory agencies (including the USACE, MDE, DNR, USFWS, and/or EPA).

All activities and issues during design and construction involving USACE, MDE and the IEM, and/or involving DNR, USFWS, and EPA as needed, will be coordinated through the Administration by the Design-Builder. The Design-Builder shall not directly contact the regulatory agencies without written approval from the Administration.

13.1.4 Design-Builder's Responsibilities

The Design-Builder shall be responsible for providing all information required to obtain all permit approvals or modifications for permits listed in PR 13.1.5.B. The Design-Builder shall be responsible for compliance with any permit conditions throughout the design and construction of the Project.

The Design-Builder shall demonstrate compliance with all permits, permit requirements, approvals, and NEPA requirements by producing a Compliance Report each quarter, which tracks and confirms compliance with each commitment pertaining to the construction of the Project, and also tracks impacts to wetlands and Waters of the U.S. The checklist and memorandum shall be submitted to the Administration within one week after the end of each quarter.

13.1.5 Permits and Approvals

The Design-Builder shall achieve and maintain commitments and permits through a strong Environmental Compliance Plan and partnering with the Administration.

A. As part of this RFP, the Administration is providing the following permits and approvals based on the proposed activities:
   1. US Army Corps of Engineers (USACE) Corridor Permit
   2. MDE Non-Tidal Wetlands and Waterways Permit
   3. Phase II Nixon Farm Wetland Mitigation Plan Approval
   4. Phase I Wetland Mitigation Plan Approval
   5. Phase I Rosemary Lane Tributary Stream Mitigation Plan Approval
   6. Final NEPA document and Environmental Compliance Checklist
   7. Maryland Department of Natural Resources (DNR) Reforestation Site Review Permit
   8. FEMA Conditional Letter of Map Revision (CLOMR) for three floodway crossings.
   9. Section 106 Determination and Concurrence of No Adverse Effect

B. The Design-Builder shall be responsible for providing all information required to obtain the following permits and/or approvals and shall submit through the Administration:
   1. Final US Army Corps of Engineers (USACE) Corridor Permit
   2. Final MDE Non-Tidal Wetland and Waterways Permit
   3. Phase II Wetland Mitigation Plan Approval
   4. Phase II Rosemary Lane Tributary Stream Mitigation Plan Approval
   5. USACE and MDE Permits for optional TMDL Terrapin Branch Stream Restoration
   6. MDE Hydrology and Hydraulics Approval
   7. MDE Water Quality Certification Modification
   8. MDE Dam Safety Approval
   9. SWM/ESC Approval Authority Erosion and Sediment Control Approval
   10. SWM/ESC Approval Authority Stormwater Management Permit
   11. MDE NPDES Permit
   12. FEMA Letter of Map Revision (LOMR) for the three floodway crossings. The Design-Builder is responsible for all application fees associated with this permit.
   13. Water Appropriation and Use Permit (from MDE) will be required if the

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Design-Builder intends to use water from streams or groundwater for any purpose other than rerouting the water with stream diversions or as required by COMAR 26.17.06 and 26.17.07

14. All other approvals, permits and licenses, permit modifications, pay all charges, fees and taxes and give notices necessary or appropriate for the implementation of the Project beyond those obtained by the Administration. This includes but is not limited to approvals for on or off-site staging, stockpiling areas, disposal sites and borrow pits.

13.2 NEPA

13.2.1 – General

See ITP 1.2.2 (Project History) for further details on the NEPA Process for this project.

13.2.2 - Environmental Summaries (ES)/Reevaluation Process

Modifications and/or design changes proposed by the Design-Builder, which occur inside or outside of the limits of disturbance (LOD), such as shifts in alignment, staging areas or alignment shifts, etc., shall be reviewed for impacts by the Design-Builder, including impacts to the natural, social and cultural environments. The LOD has been provided as part of the Additional Information on ProjectWise. In addition, the environmental summary/reevaluation process is triggered by the following activities:

A. Change in scope or design;

B. Change in the limits of disturbance;

C. Change in surrounding environment;

D. New information becomes available;

E. Change that occurs outside of the planning area evaluated in the approved NEPA Decision Document and the approved NEPA Reevaluations, as applicable, such as staging areas and alignment shifts;

F. Final Design review, and

G. Changes in applicable laws and regulations.

The Design-Builder shall provide all the information needed such as narratives and figures to the Administration prior to construction for any of the items identified above and prior to initiation of construction for the affected Design Unit. The Administration will prepare the NEPA documentation based on the information provided by the Design-Builder. The Administration will coordinate approvals with the regulatory agencies and Federal Highway Administration (FHWA). Delays due to environmental summary/reevaluation approval for design changes, requested by the Design-Builder, shall not result in additional costs to the Administration nor be the basis of a claim or time extensions against the Administration. The step by step process for Environmental Summary Reevaluation for design changes is described below. If the Design Builder proposes a design change

that is outside of the LOD the following is the step by step process to obtain approval:

1. Design-Builder determines a design change is warranted
2. Design-Builder environmental staff conducts a quick review to determine if any environmental, social or cultural impacts will occur due to the change
3. Design-Builder presents information to the SHA Project Engineer and SHA Environmental Manager including Environmental Summary (ES) narrative and figures
4. SHA Project Engineer, in consultation with the MDOT SHA Environmental Manager, denies the change with comments, or conditionally approves the change.
5. SHA Environmental Manager determines specific agency involvement
6. If MDOT SHA conditionally approves the change, SHA Environmental Manager and/or the Environmental Management Team (EMT) prepares the Environmental Summary (ES) and sends documentation letters required to regulatory agencies (such as MD SHPO letter, permit modification, etc.)
   a. Permit modification (signed and mailed within 1 week of Design-Builder submission)
   b. MD SHPO response (SHA mailed within 2-4 weeks of Design- Builder submission containing all required information depending on the extent of the resource, MD SHPO response within 30 days) (additional information is included in PR 13.2.3 Cultural Resources)
   c. Rare Threatened or Endangered (RTE) species and fisheries responses (typically takes 30 days to receive responses from DNR and USFWS)
7. Obtain all agency approvals (1 -2 months depending on the complexity of the change)
8. SHA submits the ES to FHWA for formal approval (4 weeks)

Note: FHWA could request more information before they will approve an ES. Supplying the additional information is the responsibility of the Design-Builder at no additional cost to the Administration.

13.2.3 - Cultural Resources

Historic Properties, including archaeological sites and historic standing structures, are afforded protection by Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and the Maryland Historical Trust Act of 1985, as amended, State Finance and Procurement Article §§ 5A-325 and 5A-326 of the Annotated Code of Maryland.

There are four eligible standing structures identified within the Area of Potential Effects (APE); two of the four will have a direct impact from the project: Great Expectations (HO-999) and the Enoch Shelby House (HO-1154). Effects to both properties were found to be not adverse. No mitigation is currently proposed.

Maryland State Highway Administration senior archaeologist Ms. Lisa Kraus (410-545-2884 or via email at lkraus@sha.state.md.us) (the SHA Archaeologist) shall act as the archaeological liaison with the SHA Construction Engineer. The SHA Archaeologist shall be available to report to the job site within 24 hours of notification to inspect any archaeological features that might be discovered during construction.

Should cultural resources be encountered during Design-Build activities, the following requirements will apply:

A. Unauthorized Project Impacts are prohibited;

B. Material changes to the highway alignment that result in impact beyond those identified will not be allowed without the prior written consent of the Administration;

C. Proposed changes shall be supported by the necessary investigations, documentation, and submittals needed for these approvals by applicable resource management agencies; and

D. Time and cost implications, including additional mitigation, resulting from design changes recommended by the Design-Builder shall be solely borne by the Design-Builder.

13.2.3.1 Unanticipated Discoveries of Archeological Resources During Design-Build Activities

In the event that previously unidentified archeological resources, including human remains, are discovered during ground disturbing activities, the Design-Builder shall immediately notify the Administration's Project Engineer, and shall immediately halt construction work involving subsurface disturbance in the area of the archeological resource, minimally defined as a 50-yard radius from the identified discovery. Examples of archaeological resources include, but are not limited to, accumulations of shell, pottery, burned rocks, bone, charcoal, dark soil staining containing artifacts; stone tools or chips; evidence of building foundations; concentrations of tin cans, bottles, or ceramics appearing to be greater than 50 years old; or other unanticipated human-constructed features. The design-builder shall implement the provisions of this section in any situation where there may be reasonable doubt whether a discovery is archaeological. The Administration's Project Engineer shall contact Administration Archeologist Dr. Julie Schablitsky (410-545-8870), Assistant Division Chief of the Environmental Planning Division, who shall notify the MD SHPO and other required parties of the discovery.

The Administration and MD SHPO, or an archeologist approved by them, shall immediately inspect the work site and determine the area and nature of the

archeological resource. Following this inspection, the Engineer may release the area to resume construction if the archaeologist determines the discovery does not require additional consultation.

Should the archaeologist determine the resource requires additional consultation, within no more than three working days of the original notification of discovery, the Administration, in conjunction with MD SHPO, shall determine the National Register eligibility of the resource. If the resource is determined eligible for the National Register, the Administration shall prepare a plan for its avoidance, protection, recovery, or destruction without recovery. Such a plan shall be approved by MD SHPO prior to implementation.

Work in the affected area shall not proceed until consultation is complete.

13.2.3.2 Human Remains

A. Should any human remains (hereafter, "Remains") be encountered during construction, all construction work in the vicinity of the Remains shall immediately be halted to prevent damage to the Remains, or to any additional Remains that might be present in the vicinity. The Design-Builder shall immediately notify the Administration's Engineer, who shall coordinate with the SHA Archaeologist, Ms. Carol Ebright (410-545-2879).

1. The SHA archaeologist shall inform law enforcement and MD SHPO and shall perform a preliminary inspection of the Remains to evaluate the age and cultural affiliation of the remains.

2. If determined archaeological and the Remains cannot be avoided by construction, the SHA Archaeologist shall consult with MD SHPO and other parties as appropriate on a treatment plan.

3. Construction shall be temporarily suspended in the immediate vicinity of the Remains until the archaeological investigation has been completed, as provided for in the Standard Specifications for Construction and Materials under Section PR5.04 (Cultural Resources) and Section PR4.04 (Work Suspension). Construction can and should continue in all other parts of the project area.

4. If the Administration's Engineer determines that the Remains are located in a part of the project that will affect the critical path of construction, investigations will be limited to the minimum time required to complete necessary investigation, removal, or other treatment.

5. Upon completion of implementation of the treatment plan and concurrence from MD SHPO, the SHA archaeologist will notify the Engineer construction may resume in the area of discovery.

Work in the affected area shall not proceed until the above procedure is complete.

13.2.4 - Terrestrial Wildlife (TW)

13.2.4.1 Rare, Threatened and Endangered Species (RTE)

No federally listed rare, threatened, or endangered species, nor any critical habitats, refuges or fish hatcheries, have been identified in the vicinity of the Project. However, perennial stream reaches in the area are expected to support warm and cool water resident fish species typical of the region. While not a stocked stream, these reaches are a tributary of the mainstem of Middle Patuxent River, which is stocked with adult trout during the spring season approximately 6 miles downstream of the project location. Depending upon flow and in-stream conditions, small numbers of stocked trout may be found near the project site.

The fisheries resources in the above area should be adequately protected by the instream work restrictions referenced in the MDE and USACE corridor permits., and in PR 13.3.2.5. Stringent sediment and erosion control methods, and other Best Management Practices typically used for protection of stream resources shall be effectively applied.

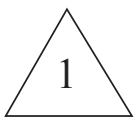
13.3 Wetlands and Waterways

Direct impacts to wetlands and waterways are anticipated to occur under the Project. Wetlands and waterways were identified, delineated and surveyed within the Project limits. Surveyed boundaries of waterways and wetlands have been provided as part of the Environmental Features information on ProjectWise. The Design-Builder shall be responsible for providing all required information to obtain all required permits for impacts to wetlands and waterways and for meeting all requirements of those permits.

13.3.1 – Wetlands and Waterways Permitting and Agencies Coordination

The Design-Builder shall be responsible for providing all required information to obtain all permit approvals or modifications for permits listed in PR 13.1.5.B. Any delays while obtaining permit approvals or modifications to permits shall be at no additional cost to the Administration or be cause for any contract claims or time extensions.

Coordination for wetlands and waterways permitting and coordination with wetlands and waterways agencies shall follow the requirements below:



1. A Pre-Permitting meeting shall be held once the notice of selection has been made, and prior to meeting with the SWM/ESC Approval Authority.

This meeting will be scheduled by the Administration, upon request by the Design-Builder, and will include the Design-Builder's Project Design Manager, Construction Manager, erosion and sediment control lead, stormwater design lead, wetlands and waterways permitting lead, as well as, the Administration's EPD Project Coordinator, Design Project Manager, EPD Regional Environmental Coordinator, HHD Project Coordinator and others as needed. The purposed of the meeting is to discuss the permitting process and preview and discuss the Design Builder's approach to wetlands and waterways permitting including avoidance and minimization during design.

2. Monthly meetings with the Administration, Design-Builder, USACE and MDE shall be required to discuss design elements related to wetlands and waterways permits. This meeting will be scheduled by the Administration and attendees shall be identified by the Administration and the Design-Builder. The USFWS, DNR, and other permitting agencies shall be invited to attend as needed. Meetings can be reduced at the discretion of the USACE and MDE.
3. No discharge or indirect impacts to wetlands or waterways is permissible without required permits.
4. No work in wetlands, wetland buffers, waterways, or the 100-year floodplain shall occur without required permits.
5. The Design-Builder shall not directly contact the USACE or MDE or other wetland and waterways permitting agencies without written approval from the Administration.
6. All submittal information to obtain all required wetland and waterways permits and any modifications shall not follow the IDQM process but shall be submitted directly to the Administration's Project Manager and EPD Project Coordinator. No advanced notification is required prior to submitting to the Administration but advanced notification is encouraged. The Administration will review each submittal and provide comments within 28 calendar days beginning the day after receipt of the submittal. Electronic copies of the submission shall be provided through ProjectWise to the Administration. If the submittal is acceptable to the Administration, the Administration will notify the Design-Builder and the Design-Builder shall provide an electronic copy via ProjectWise and hard copies (if requested by USACE and/or MDE) of all information. Hard copies shall be hand delivered directly to the Administration's EPD Project Coordinator. The Administration will forward the submittal to the regulatory agencies. Review time for the USACE and MDE shall not be the basis of a claim or time extensions against the Administration.
7. Though the Administration will coordinate with the regulatory agencies, it is the Design-Builder sole responsibility for obtaining all required permits and providing sufficient and permittable information. Delays due to the regulatory agencies approval process shall not be the basis of a claim or time extensions against the Administration.
8. The Design-Builder shall submit to the Administration a Conceptual Avoidance and Minimization Plan as discussed in PR 13.3.1.3.
9. The Design-Builder shall provide Avoidance and Minimization Memos with all

ESC and SWM submittal packages as described in TC 13.3.1.3.

10. All plan packages that follow the IDQM process outlined in PR 1.19, shall be submitted to the Administration. The Administration will review each submittal to determine if they will need to be forwarded to the USACE and MDE for review and comment. If the submittal is acceptable to the Administration and needs to be forwarded to the USACE and MDE, the Administration will notify the Design-Builder and the Design-Builder shall provide an electronic copy via ProjectWise and hard copies (if requested by USACE and/or MDE) of all information. Hard copies shall be hand delivered directly to the Administration's EPD Project Coordinator.
11. If the USACE, MDE, and/or other agencies (including EPA, USFWS, DNR, and MD SHPO) provide comments on the submitted information, the Administration will forward the comments to the Design-Builder. The Design-Builder shall address all comments to the satisfaction of the Administration and the regulatory and commenting agencies. It is the Design-Builder's responsibility to provide sufficient submittals to address regulatory agencies' comments.
12. It is at the USACE and MDE's discretion as to when the JPA is considered complete. Timeliness of approval from USACE and MDE will be dependent on quality of the Design-Builder's submittals. Delays due to the regulatory agencies approval process shall not be the basis of a claim or time extensions against the Administration.

13.3.1.1 Permit Modifications

The Administration has obtained a USACE Corridor Permit and an MDE Nontidal Wetlands and Waterway Permit for the project. It shall be the Design-Builder's responsibility to submit JPA Modification(s), the Rosemary Lane Tributary Phase II Stream Mitigation Plans, Phase II Wetland Mitigation plans, final construction plans, and any other information requested in the MDE and USACE permits to receive the required final corridor and wetlands and waterway permits. The Phase II Mitigation Plan for the Terrapin Branch Stream Mitigation from MD144 to the I-70 Interchange has been deferred to future MD 32/I-70 interchange improvements and is not a requirement of this project. Submittals shall be made per PR 13.3.1.

The Design- Builder shall be responsible for responding to any comments made by the USACE, MDE, DNR, USFWS, EPA, and MD SHPO as part of the JPA Amendment process.

The Design-Builder shall coordinate directly with the Administration's Environmental Programs Division (EPD) during the JPA Modification or Amendment Process.

The Design-Build Team is responsible for making any necessary adjustments to

the JPA for final permit approvals. The final design shall be acceptable to the Administration, USACE, and MDE.

13.3.1.2 Public Notice / Hearing depending on MDE comments

MDE's process includes a public notice period for the project and interested persons may request a public hearing during this time. If a public hearing is requested and required by MDE, the Design-Builder shall present a short presentation about the project during the hearing, provide display boards showing the project design, and shall provide any other information requested by MDE or the Administration. The Design-Builder shall prepare any required mailings information for the public notice and hearing and provide the information to the Administration. The Administration will coordinate the location of the hearing, and distribution of the mailings. The Administration shall provide a Court Reporter if required by MDE.

13.3.1.3 Further Avoidance/Minimization

The Design-Builder shall incorporate additional avoidance and minimization measures throughout design for impacts to wetlands, wetland buffers, waterways, or the 100-year floodplain to the greatest extent feasible and practical as the project is developed.

A. Conceptual Avoidance and Minimization Plan

The Administration has obtained a USACE Corridor Permit and an MDE Nontidal Wetlands and Waterway Permit for the project. If a JPA modification is required for the project, it shall be the Design-Builder's responsibility to first submit and receive approval of a Conceptual Avoidance and Minimization Plan that further reduces impacts to wetlands, wetland buffers, waterways, and the 100-year floodplain below those shown in the Administration's submitted JPA. The plan shall contain concise information (including but not limited to narrative descriptions, graphic illustrations, drawings, charts, plans and specifications) that will enable the Administration, USACE and MDE to clearly understand and evaluate the reduction in impacts for approval. Submittals shall be made per PR 13.3.1.

The Conceptual Avoidance and Minimization Plan shall become the Design-Builders total maximum impacts allowable for the MD 32 Project, once the plan is approved by Administration, USACE, and MDE. The Design-Builder shall not impact additional wetlands or waterways above the limit set.

B. Avoidance and Minimization Memos

The Design-Builder shall provide a brief avoidance and minimization memo with all ESC and SWM submittal packages detailing compliance with the Design-Builder's Conceptual Avoidance and Minimization Plan and discussing any further Avoidance and Minimization measures that the Design-Builder has taken that have further reduced or avoided impacts below those impacts shown on Design-Builder's Conceptual Avoidance and Minimization Plan. This should include any design measures (including but not limited to ESC, SWM, roadway typical section and other features) the Design-Builder has modified to further avoid or minimize temporary and permanent impacts to wetlands, wetland buffers, waterways, and the 100- year floodplain.

C. **Pre- and Post-Construction Wetland and Stream Condition Report**

Prior to construction, the Design-Builder shall prepare the Pre-Construction Wetland and Stream Condition Report and submit to the Administration. The report shall detail the existing condition of wetlands and streams that will be temporarily and/or permanently impacted by construction as a baseline for comparison with post-construction conditions. The report shall include photographic documentation and descriptions of existing vegetation. Photographs of each resource shall show the area to be impacted, as well as, areas upstream, downstream, and adjacent to the existing resource. The Design-Builder may reference appropriate portions of the Wetland Delineation Report for the pre-construction condition of wetlands and waterways, but shall expand on the information to the satisfaction of the Administration. The report shall be amended post- construction with the post-construction conditions of temporarily impacted wetlands and waterways. The report shall include a project description, background information, existing stream and wetland conditions, mitigation design approach and techniques, design discharge and analysis, hydrologic and hydraulic modeling, and any FEMA requirements.

13.3.1.4 Phase II Final Mitigation Plans

The Design-Builder shall follow the required design guidelines outlined in the Phase II Mitigation Checklist provided in PR 2, as well as any other requirements to the USACE and MDE's satisfaction. The Design-Builder shall obtain future SHA compensatory mitigation credit for unused mitigation in the Phase II Mitigation Plans. The Administration will be responsible for assigning future projects or setting up as a mitigation Bank separately from the Project. MDE and USACE approval of the Phase II Final Mitigation Plan is required for final Wetland and Waterway Permit issuance. Refer to PR 13.3.1.1 for submittal process.

The Design-Builder shall prepare a Monitoring Plan that details proposed Pre- and

Post- Construction wetland and stream monitoring for the project prior to implementing the study. The Monitoring Plan will be reviewed by the Administration, and if the submittal is acceptable to the Administration, the Administration will notify the Design-Builder and the Design-Builder shall provide an electronic copy via ProjectWise and hard copies (if requested by USACE and/or MDE) of all information. Hard copies shall be hand delivered directly to the Administration's EPD Project Coordinator. The Administration will forward the submittal to the regulatory agencies. Review time for the USACE and MDE shall not be the basis of a claim or time extensions against the Administration.

13.3.1.5 Submittals

The Design-Builder shall submit the following (but not limited to):

A. Conceptual Avoidance and Minimization plan

B. JPA and Impact Plate Amendments for USACE and MDE Permit Modifications

C. Phase II Wetland Mitigation Plans

D. Phase II Stream Mitigation Plans - Rosemary Lane Tributary

E. Hydrology and Hydraulics Reports for all required culverts, bridges and the mitigation site

F. Preliminary Plans

G. Avoidance and Minimization Memos

H. Final Plans

I. Pre-Construction and Post-Construction Survey of Proposed Wetland and Waterways Impacts per PR 13.3.2.7.5 and Pre- and Post-Construction Wetland and Waterways Condition Report

J. Surveyed as-built 22x34 plans of post construction conditions in the same format as the RFP Plans

K. The revised impact tables and plates that were included in the Joint State/Federal Nontidal Wetlands and Waterways Permit application that show final impacts to wetlands, wetland buffers, streams, and the 100-year floodplain as outlined in PR 13.3.2.9

13.3.1.6 Modifications

The Design-Builder shall not alter the design in such a manner that increases or creates new impacts to wetland, wetland buffer, waterway, or floodplain compared

to those impacts that are authorized by the permits and as originally defined in the Joint Permit Application submittal impact plates and tables. If the Design-Builder determines that changes to impacts are to be considered through design and/or construction, the Design-Builder shall be responsible for providing the Administration with all necessary information required to request and to obtain the permits, approvals or modifications from the regulatory agencies. In addition to changes in impacts, requests for waivers to conduct instream work during the time-of-year restriction require permit modifications. Changes to the scope of work within regulated resources may also require a permit modification. The Design-Builder shall obtain concurrence from the Administration for any changes in design and/or construction activities that affect any permit conditions and would require a modification and approval from the regulatory agencies. Requests for modifications to the permits listed shall be accompanied by documentation provided by the Design-Builder to demonstrate that there is no practical alternative. The Design-Builder shall be responsible for addressing any comments or issues the regulatory agencies and/or the Administration may have, including those pertaining to avoidance and minimization measures. Any modification shall be accepted by the Administration prior to the modification being forward to the regulatory agencies for approval. Any revisions shall be completed in a timely fashion and shall be at no additional charge to the Administration.

Additional mitigation required with approval of modifications shall be the responsibility of the Design-Builder and at no cost to the Administration. The Design-Builder shall provide all required information to EPD for EPD to submit to the USACE and MDE in regard to permit modifications, which includes but is not limited to comment letters, phone conversations transcripts, transmittals, reports, plans, impact plates and revisions to plans.

All conditions in the permits shall be adhered to unless modifications are accepted and approved by the Administration and the regulatory agencies.

It is not the responsibility of, nor guaranteed by, the Administration that approval or authorization of the proposed permit modification will be granted by the USACE and MDE. Delays due to permit modification approval for permits listed in PR 13.1.5, requested by the Design-Builder, will not result in additional costs to the Administration nor will the Contract be extended.

Coordination with EPD for permit modification requests shall follow the process below:

1. Design-Builder determines a design change is warranted.
2. Design-Builder environmental staff determines if there are any additional impacts to wetlands, wetland buffers, waterways, or the 100-year floodplain.
3. Design-Builder presents information to the SHA Project Engineer and SHA EPD Project Coordinator including design plans, a narrative, and a modification

package.

4. SHA Project Engineer and EPD Project Coordinator will review the information. EPD may provide comments or request additional information as needed for submission to the USACE and MDE. SHA's EPD Project Coordinator may require corrective action to the submittals prior to final concurrence in order to ensure the modification process is implemented correctly. Any and all corrections shall be completed in a timely fashion for review and concurrence and shall be at no additional charge to the Administration.
5. EPD Project Coordinator determines specific agency involvement.
6. EPD Project Coordinator sends documentation prepared by the Design-Builder to the regulatory agencies (such as revised plates, Phase II mitigation plan, permit modification, etc.)
7. Permit modifications must be approved by the USACE and MDE prior to initiation of construction for the affected Design Unit/submittal package. USACE and MDE could request more information before potential approval of the Permit Modification. Supplying the additional information is the responsibility of the Design-Builder and shall be at no additional cost to the Administration.

13.3.2 Wetland and Waterway Design Requirements

13.3.2.1 – Avoidance and Minimization Requirements

The Administration proposed avoidance and minimization techniques during the build alternative design phases which reduced impacts to regulated wetlands and waterways.

Until the acceptance of the Design-Builder's Conceptual Avoidance and Minimization Plan, the wetland and waterway impacts that were approved in the MDE and USACE permits present the total maximum impacts that may be allowable by the agencies for the MD 32 Project. The Design-Builder shall not impact additional wetlands or waterways above the limit set in the impact plates and JPA that was approved by MDE and the USACE or the Design-Builder's Conceptual Avoidance and Minimization Plan after acceptance. The Design-Builder shall design the project in accordance with the USACE Provisional Permit, and all other requirements from the USACE and MDE for final Permit approval.

The Design-Builder shall focus its efforts to continue to minimize impacts to wetlands, wetland buffers, waterways, and floodplains in all areas of the project, especially sensitive areas where the Administration has made specific wetland/waterway avoidance and minimization commitments. No additional stormwater management facilities shall be placed in wetlands or waterways. Additionally, preference shall be placed on minimizing impacts to wetland buffers

due to stormwater management. Engineering designs shall continue to emphasize avoidance and minimization of impacts to regulated resources including evaluating the feasibility and effectiveness of using measures such as retaining walls, steeper fill slopes (2:1 or steeper where appropriate), increased headwall heights, reduced roadway sections and any other feasible minimization efforts. This avoidance and minimization technique does not apply to the stream mitigation sites. Side slopes at mitigation sites shall be designed as required by the USACE and MDE. The Design-Builder will provide additional avoidance and minimization practices to USACE and MDE in avoidance and minimization memos in addition to the design plans.

13.3.2.2 - Stream Relocations

Stream relocations shall be designed to the geomorphic characteristics of stable local streams to avoid downstream scour, channel degradation, and fish blockages. Concrete channels shall not be utilized for this project. Where the RFP plans show a right-of- way bump-out for a stormwater management pond or erosion and sediment control basins or traps in the vicinity of a stream, the pond or basin or trap shall be constructed in a manner that does not impound the stream. For any stormwater management pond constructed in the vicinity of a stream, the pond shall be located a sufficient distance from the stream to maintain a 15-foot-wide cleared area beyond the toe of any berms surrounding the pond, plus an additional 30-foot-wide, or larger, vegetated buffer along the stream. All stream relocation designs shall be reviewed by the Administration and approved by the USACE and MDE prior to implementation.

13.3.2.3 - Groundwater

The Design-Builder shall maintain hydrology within wetlands and waterways that have temporary disturbance or no disturbance as identified on the impact plates approved by MDE and the USACE.

The Design-Builder shall be responsible for design measures that maintain and discharge natural groundwater flows and seeps associated with waters of the U.S. and wetlands.

The Design-Builder shall provide protective measures at cut slopes, ditching, and other activities adjacent to non-impacted or temporarily impacted wetlands, to ensure that the source of hydrology to that wetland is preserved. If it is determined that the wetland has been altered hydrologically, it will be considered an additional impact, for which the Design-Builder shall be responsible for providing permit modification documentation as well as mitigation at the designated ratios, per COMAR Section 26.23.04, for the impacts.

13.3.2.4 - Surface Water

The hydrology of roadside ditches to be replaced in-kind shall be the same or better

condition after construction based on the pre-construction survey. The agencies may require additional mitigation if these systems are not maintained and additional mitigation shall be at the cost of the Design-Builder.

For details on Erosion and Sediment Control and Stormwater Management, see the Drainage, Stormwater Management, and Erosion & Sediment Control Performance Specification.

The Design-Builder shall not discharge or allow the release of any sediment laden construction water unless properly treated by an MDE approved device. The Design-Builder shall obtain Administration approval of all dewatering operations prior to pumping and discharge. Water to be pumped and discharged shall be in conformance with the COMAR Standards (Section 26.08.02).

To minimize potential for untreated discharge, the Design-Builder shall designate, design construct, utilize, maintain, and upon conclusion of operations, properly close concrete wash-out pits for all concrete production, transport and placement operations. The location of concrete wash-out pits shall be approved by the Administration prior to use. The pits shall be managed such that no concrete waste or wash water is discharged into wetlands or waters of the U.S. This may include the implementation of drying beds with proper sediment controls and treatment of excess wash water on-site or proper off- site disposal.

If construction discharges exceed water quality standards identified in COMAR, the Design-Builder shall immediately notify the Administration and resolve any Project related deficiencies within 24 hours.

The Design-Builder shall not degrade water quality downstream of the project site. Water quality shall be greater than or equal to current water quality baseline data provided as part of the additional information on ProjectWise.

The Administration can request spot-check inspections by the IEM at any time to verify compliance.

13.3.2.5 - Aquatic Biota

Comply with all water quality standards stated The Design-Builder shall:

A. Conduct all work to avoid/minimize fish mortality from both construction related water quality impairment and in-stream activities. The Design-Builder shall notify the Administration 48 hours prior to the commencement of any stream dewatering or other in-stream activities.

B. Comply with all water quality standards stated in the COMAR for the protection of aquatic biota.

C. Minimize culvert length to the greatest extent practicable. New culverts shall be appropriately sized and depressed per COMAR requirements for passage of aquatic life. Where existing culverts are being extended, appropriate measures to promote/restore passage of aquatic life may be required.

D. Conduct all in-stream work in compliance with the Maryland mandated stream closure period for the appropriate stream closure period. The project area contains Use IV-P streams (March 1 through May 31, inclusive in any year). The Design-Builder is responsible for ensuring all stream restriction periods are adhered to and appropriate stream use restriction periods are shown on applicable plans. Any riprap placed shall be constructed so as not to obstruct the movement of aquatic species, unless the purpose of the activity is to temporarily impound water. Existing riparian vegetation in the area of the stream channel should be preserved as much as possible to maintain aquatic habitat and shading to the stream.

E. For all perennial streams the Design-Builder shall relocate fish and other aquatic organisms downstream of the sandbag diversion or work area in a timely manner to minimize mortality to the extent practicable. All aquatic biota relocations will be performed in accordance with regulatory agency permits and regulations.

13.3.2.6 - Wetland and Stream Mitigation Requirements

Impacts to wetlands and waters of the U.S. associated with the Project will result in functional losses. SHA has obtained approval of the Phase I Mitigation Plan for the Nixon Farm Wetland Mitigation Site, the Rosemary Lane Tributary Stream Restoration Site, and a potential Wetland Mitigation site. The Phase II Nixon Farm Wetland Mitigation Plan has been approved and will provide wetland mitigation credit for the MD 32 corridor project limits. Wetland mitigation at Nixon Farm was authorized separately, constructed, and is currently being monitored. The Phase II Mitigation Plan for the Terrapin Branch Stream Mitigation from MD144 to the I-70 Interchange has been deferred to future MD 32/I-70 interchange improvements and is not a requirement of this project.

Additional wetland mitigation to meet the MD 32 corridor mitigation commitments will be required beyond the credit received at the Nixon Farm Mitigation Site. SHA conducted a wetland mitigation site search to identify locations suitable for design and construction of an additional site by the Design-Builder to meet the MD 32 corridor wetland mitigation requirements. A potential wetland mitigation site has been identified within the proposed MD 32 right-of-way adjacent to the Middle Patuxent River and Terrapin Branch, as indicated in the Phase I Mitigation Plans. This wetland mitigation site is available to the Design Builder as a potential option to meet the MD 32 corridor wetland mitigation credits that are required beyond

Nixon Farm Mitigation site.

The Design Builder shall use the following formula to determine the proposed acreage of wetland mitigation credits at the wetland mitigation site based on requirements in the Final USACE Corridor Permit and MDE Non-Tidal Wetland and Waterways Permit:

Proposed Wetland Mitigation Site Credit = (x – y)* 1.2

x = Wetland Mitigation Credit Requirement for MD32 from Linden Church Road to I-70

y = 1.5 acres of available Nixon Farm Wetland Mitigation Credit

The Design Builder shall determine the wetland mitigation credit requirement for MD32 from Linden Church Road to I-70 based on the final design impacts and MDE's acreage replacement ratios.

The Design Build Team shall be responsible for producing and receiving authorization for the following Mitigation Plans:

(1) Rosemary Lane Tributary Fish Blockage Removal and Stream Restoration from MD32 to the confluence of the Middle Patuxent River – Phase II Mitigation Plan
(2) Wetland Mitigation Site – Phase II Mitigation Plan

The Phase II final compensatory mitigation plans must be reviewed and authorized by the EPD Coordinator, MDE and the USACE, and the work initiated prior to completion of the roadway construction. For further details on mitigation sites, the Administration's Phase I and Phase II Mitigation plans, permits, and permit modifications can be found in the Additional information on Project Wise.

The Design-Builder shall be responsible for the following:

A. Final approval of the Phase II Mitigation Plans from MDE and USACE for the Rosemary Lane Tributary Stream Restoration Site.

B. Final approval of the Phase II Mitigation Plan from MDE and USACE for the proposed Wetland Mitigation Site.

C. The Design-Build Team shall be responsible for producing a completed set of Phase II Final Mitigation Plans for the Rosemary Lane Tributary Stream Restoration Site and the Wetland Mitigation Site that are in compliance with all MDE and USACE permits and permit modifications.

D. The Design-Builder shall obtain approval of all Phase II Final Mitigation Plans from MDE and USACE, which is required for final permit issuance.

E. The Design-Builder is responsible for the stream and wetland mitigation design and construction. The mitigation shall compensate for impacted stream length and wetland acreage. The mitigation design shall be in accordance with the USACE and MDE mitigation guidance found in PR 2 and any additional requirements from USACE and MDE.

F. The Design-Builder shall design stream and wetland mitigation sites capable of providing functional-uplift in relation to the existing conditions of the impacted wetlands and waters of the U.S. The sites shall be designed to be permissible and approved by the agencies. The restoration shall use natural materials, native species and utilize on-site materials to the greatest extent possible and practicable. Erosion control materials used for permanent stabilization of the sites shall not contain synthetic materials.

The Administration may require corrective action at the stream and wetland mitigation sites to ensure the sites function as intended and per USACE and MDE authorization conditions. The Design-Builder shall be responsible for any corrective actions required by SHA, USACE, and MDE at the stream and wetland mitigation sites.

The Administration shall be responsible for completing the required monitoring of the wetland and stream mitigation sites.

The Design-Builder shall be responsible for preparing as-builts as discussed in PR 1.26.2.2 As-Built Drawings for Administration Approval.

13.3.2.7 Construction Practices

Prior to performing any work on the Project, the Design-Builder shall install temporary orange safety fence and fabricate and install prohibitive signage in English and Spanish adjacent to non-impacted areas of wetlands and their buffers as identified in the MDE Nontidal Wetlands & Waterways and USACE Section 404 Permits for the Project along the limits of disturbance and/or right of way. The signage dimensions and text shall be per the “Wetland Prohibitive Signage Detail” provided as part of the Additional Information on ProjectWise. The orange safety fence shall be installed at a maximum of 25 feet from the proposed toe of cut/fill adjacent to wetlands, and the Administration, USACE, and MDE shall concur/approve of the locations. The wetland fencing locations should be staked prior to the pre-construction meeting. All personnel of the Design-Builder or subcontractors shall be alerted to these designated protection areas.

The Design-Builder's Stream Restoration Design and Permitting Specialist shall be present onsite at all times when stream restoration construction is being performed, or when the Design-Builder or any of the Design-Builder's subcontractors is performing work that may affect or impact in anyway the stream being restored. The Stream Restoration Design and Permitting Specialist shall have full authority to manage the construction of all stream -related work elements.

Failure of the Design-Builder to accord and support the authority of the Stream Restoration Design and Permitting Specialist, as provided hereinabove, shall be a basis for the Administration, in the exercise of its sole discretion, to shut down the Contract until the Design-Builder complies with this requirement.

The Design-Builder also shall be aware and shall understand that the failure of the Stream Restoration Design and Permitting Specialist to comply with any applicable regulatory requirement, to implement any element of the Contract Documents including Ready for Construction plans or to assure compliance by any workman onsite with such requirements or elements, shall be a basis for the Administration, also in the exercise of its sole discretion, to remove the Stream Restoration Design and Permitting Specialist from the Contract. The project will remain shut down until the Design-Builder replaces the and Stream Restoration Design and Permitting Specialist with an individual of equal qualifications, and the Design-Builder's designation of the replacement Stream Restoration Design and Permitting Specialist has been approved by the Administration.

13.3.2.7.1 Occupying Wetlands/Waterways and Best Management Practices for Work in Nontidal Wetlands, Wetland Buffers, Waterways, and 100-Year Floodplains

See Contract Provisions CP – Occupying Wetlands.

13.3.2.7.2 Best Management Practices for Work in Nontidal Wetlands, Wetland Buffers, Waterways, and 100-Year Floodplains

The Design-Builder shall follow the Best Management Practices for work in nontidal wetlands, wetland buffers, waterways, and 100-year floodplains:

A. The Design-Builder shall not stockpile or store excess fill, construction material, equipment nor debris in un-permitted nontidal wetlands, nontidal wetland buffers, waterways, or the 100-year floodplain.

B. The Design-Builder shall not place materials in a location and manner, which adversely impacts surface or subsurface water flow into or out of nontidal wetlands, nontidal wetland buffers, waterways, or the 100-year floodplain.

C. The Design-Builder shall not use excavated material as backfill if it contains waste metal products, unsightly debris, toxic material, or any other deleterious substance. If additional backfill is required, the Design-Builder shall use clean materials that are free of waste metal products, debris, toxic material, asphalt, or any other deleterious substance.

D. The Design-Builder shall not operate heavy equipment in a manner that will damage un-permitted nontidal wetlands, nontidal wetland buffers, waterways, or the 100-year floodplain.

E. The Design-Builder shall repair and maintain any serviceable structure or fill so there is no permanent loss of nontidal wetlands, nontidal wetland buffers, or waterways, or permanent modification of the 100-year floodplain in excess of that lost under the originally permitted structure or fill.

F. The Design-Builder shall restore any nontidal wetlands, wetland buffers, waterways, or 100-year floodplain temporarily impacted by any construction to the full satisfaction of the Administration, regulatory agencies, and in accordance with the requirements of the USACE and MDE permits.

G. The Design-Builder shall use the following species for all stabilization in the nontidal wetland and nontidal wetland buffer: annual ryegrass (Lolium multiflorum), millet (Setaria italica), barley (Hordeum sp.), and/or oats (Uniola sp.). Other non-persistent vegetation may be acceptable, but must be approved by the Administration and MDE Nontidal Wetlands and Waterways Division. Kentucky 31 fescue shall not be utilized in wetland or buffer areas. Areas shall be seeded and mulched to control erosion after construction activities have been completed.

H. The Design-Builder shall make post construction grades and elevations the same as original grades and elevations in temporarily impacted areas after construction has been completed.

I. The Design-Builder shall protect aquatic species. In-stream work is determined by the classification of the stream and the time of year restrictions specified in the MDE Water Quality Certification.

J. The Design-Builder shall control stormwater runoff from impervious surfaces to prevent washing of debris into the waterway

K. The Design-Builder shall construct culverts and place any riprap so as not to obstruct the movement of aquatic species.

L. The Design Builder shall use disposal areas for excess excavation that do

not impact wetlands or waterways. The Design-Builder shall track the disposal of all excess excavation to insure that there is no unauthorized discharge of fill in regulated wetlands or waterways and shall notify the Administration of the intended disposal site location for excess excavation or rubble waste removed from the project.

13.3.2.7.3 Conversion from Forested and Scrub-Shrub Wetlands to Emergent Wetlands

Vegetation in converted wetlands may be cleared, but shall not be grubbed. The topography and hydrology connections shall remain the same as, or be restored to pre-construction conditions. The Design-Builder shall replace damaged vegetation, and shall present a proposed planting list to the Administration for review and written comment prior to implementation of replacement vegetation.

13.3.2.7.4 Temporary Impacts-Stream, Wetland and Floodplain Restoration Efforts

Temporary impacts are defined as waterways and wetlands that are temporarily altered during construction, but are restored to pre-construction conditions after construction is completed. Stream stabilization measures may be required to insure stability of the restored section and could be considered as permanent impacts. USACE and MDE will determine, at their sole discretion, whether or not any stream stabilization measures considered a permanent impact will count against avoidance and minimization. Impacts shall be avoided and/or minimized to the greatest extent possible.

Construction details for any temporary stream crossings, temporary stream diversions, temporary stream relocations, and utility installations across waterways shall be prepared for Administration review and for MDE and USACE authorization prior to proceeding with construction. Earthen materials will not be permitted in the construction of temporary stream diversions; stream crossings; or cofferdams, due to the potential for washout during storm events.

The restoration plan for temporary impacts shall include but are not limited to the following elements:

A. Removal of all construction and temporary fill material;
B. De-consolidation and/or scarification of compacted soils;
C. Replacement of topsoil and/or organic matter lost to erosion and sediment control measures;
D. Re-establishment of grades to preconstruction conditions;
E. Removal of temporary stream crossings;

F. Restoration of stream banks with woody vegetation as specified in PS 301- Planting and Landscape Architectural and PS 303-Drainage;
G. Avoid disturbance to riparian vegetation, particularly within 30 feet of stream banks, and
H. With the exception of underground utility corridors, areas within 30 feet of stream banks shall be replanted with native vegetation that is similar to that of the pre-construction species composition. Underground utility corridors shall be seeded within herbaceous species only.
I. Re-establishment of hydrology connections

13.3.2.7.5 Pre-Construction and Post-Construction Survey of Proposed Wetland and Waterways Impacts

For any Wetlands and Waterways that the Design-Builder will impact temporarily, the Design-Builder shall confirm the pre-construction elevation of the wetland or waterway, and ensure the final elevation is appropriate to maintain existing hydrology to the satisfaction of the Administration, the USACE, and MDE. Results of the survey shall be documented in the Pre- and Post- Construction Wetland and Waterways Condition Report.

13.3.2.8 Loss of Wetland Hydrology

Within one year of the completion of the construction project, an inspection will be conducted by the Administration and the regulatory agencies to determine whether any temporarily wetlands have altered their hydrology. If it is determined that temporarily impacted wetlands are no longer functioning as a regulated wetland, the Design- Builder shall be responsible for costs associated with the additional mitigation required. This additional mitigation shall not be applied to the proposed wetland mitigation site. Mitigation ratios for the lost wetlands shall be in accordance with COMAR.

13.3.2.9 Closeout of Wetlands and Waterways Permitting

Once the Wetlands and Waterways As-built plans have been approved by the Administration and all punch-list items that would affect the wetlands and waterways Joint State/Federal Nontidal Wetlands and Waterways Permit have been resolved to the satisfaction of the Administration, the Design-Builder shall provide revised impact tables and plates in the same format as the Joint State/Federal Nontidal Wetlands and Waterways Permit application that show final impacts to wetlands, wetland buffers, streams, and the 100-year floodplain. The plates shall callout the temporary and permanent impacts, and shall be accompanied by the Pre- and Post-Construction Wetland and Waterways Condition Report that details the

activities that took place within the resources and any efforts that were taken to restore the area. The Design- Builder shall also update the Phase II Mitigation Plan as required by the USACE and MDE. This information shall be provided to the Administrations EPD Project Coordinator. The Administration may provide comments or request additional information to suffice as necessary for submission to the USACE and MDE for final acceptance. SHA's EPD Project Coordinator may require corrective action to the submittals prior to final acceptance in order to ensure the permitting process is implemented correctly. Any and all corrections shall be completed in a timely fashion for review and concurrence and shall be at no additional charge to the Administration. The Design-Builder shall also submit any required closeout form to the USACE in accordance with the Permit. The Design-Builder shall submit electronic copies of all materials.

13.4 Forest and Plantings

Reforestation work shall include the performance of all required and applicable Maryland Reforestation Law associated with the Project.

13.4.1 Forest Avoidance and Minimization

Direct impacts to forest are anticipated to occur under the Project, and boundaries of forests are depicted on the Forest Impact Plans. Prior to performing any Work, the Design-Builder shall be responsible for performing all tree preservation measures in accordance with Section 120-Tree Preservation of the Standard Specifications for Construction and Materials.

Specimen trees (trees greater than 30" in diameter measured at 4.5' from the ground) were identified, evaluated and are depicted on the Landscape Plates. The Design-Builder shall avoid as many specimen trees as possible without affecting resources with equal or greater regulatory protection. As the design advances, it may be found that specimen trees are located near the outer edge of the required LOD/ROW or just outside the LOD/ROW. If this condition exists, the Design-Builder shall coordinate with the Administration to mark and provide a buffer for any such tree to avoid its removal during clearing and grubbing activities. An adequate buffer is defined as the critical root zone (drip line). Critical Root Zones for individual significant or specimen trees, as defined by the Maryland Department of Natural Resources: Measured from the center of the tree's trunk; 1.5 foot of radius per inch of DBH (Diameter at Breast Height).

Before reforestation is approved by DNR, every reasonable effort shall be made by the Design-Builder to minimize the cutting or clearing of trees. Only the minimum number of trees may be cut, and sound design practices shall be utilized.

The Department of Natural Resources has analyzed the forested area adjacent to the project site. The analysis suggests that this forested area contains Forest Interior

Dwelling Bird Species (FIDS) habitat. The conservation of this habitat is strongly encouraged by the Department of Natural Resources. The Design-Builder shall adhere to the following guidelines to minimize the project's impacts on FIDS habitat and other native forest plants and wildlife:

a. Avoid placement of new roads or related construction in the forest interior. If forest loss or disturbance is unavoidable, restrict development to the perimeter of the forest (i.e., within 300 feet of the existing forest edge), and avoid road placement in areas of high quality FIDS habitat (e.g., old-growth forest). Maximize the amount of remaining contiguous forested habitat.
b. Do not remove or disturb forest habitat during April-August, the breeding season for most FIDS. This seasonal restriction may be expanded to February-August if certain early nesting FIDS (e.g., Barred Owl) are present.
c. Maintain forest habitat as close as possible to the road and maintain canopy closure where possible.
d. Maintain grass height at least 10" during the breeding season (April-August).

13.4.2 Forest Mitigation

Land disturbed by construction activities shall be revegetated as soon as practical after construction is completed in accordance with the Drainage, Stormwater Management, and Erosion & Sediment Control and Planting & Landscape Architectural Performance Specifications. The Design Builder shall maximize all potential on-site reforestation opportunities to minimize off-site plantings by the Administration.

Mitigation shall be the responsibility of the Design-Builder for additional impacts proposed beyond those originally approved by DNR for the Project, and may include a site search, agency reviews and approvals, design, and obtaining right of way and construction. If available and compensation agreed, the Administration may allow the Design-Builder to use excess mitigation at the approved mitigation sites.

13.5 Hazardous Materials

A. The Design-Builder shall prepare and implement a plan for management and disposal of controlled hazardous materials and contaminated soil and groundwater that may be encountered during structure demolition, land clearing, or excavation activities.

B. The plan shall address worker safety and health in accordance with applicable federal, state, and local regulations.

C. The plan shall provide procedures for management, handling, transportation, and disposal of demolition debris and contaminated soils and groundwater that contain controlled hazardous substances in accordance with applicable federal, state, and local regulations.

13.6 Tracking of Sediment

The Design-Builder shall implement means to reduce tracking of sediment such as:

A. Elongated and widened stabilized construction entrances;

B. Use of wash racks;

C. Use of street cleaning equipment;

D. Increased maintenance of entrances; and

E. On-site concrete wash-out pits in proximity to all major pour sites

13.7 TMDL Credit for Stream Restoration

Stream restoration will be designed to the geomorphic characteristics of stable local streams to avoid downstream scour, channel degradation, and fish blockages. Concrete channels are not to be utilized for this project. All stream relocation designs shall be reviewed by the Administration and approved by the USACE and MDE prior to implementation.

The Design-Builder can design, acquire regulatory authorization and construct stream restoration for TMDL credit for the reach of Terrapin Branch from MD 144 downstream to Nixons Farm Lane (the southernmost driveway crossing upstream of MD 32 crossing of Terrapin Branch).

A. Price for design, acquiring authorization and construction will be $595.00 per linear foot of stream restoration
B. Design justification, along with supporting computations, will be submitted to SHA for review and comment.
C. The Design-Builder is responsible for submitting all appropriate permit applications with the USACE and MDE.
D. TMDL credit will be awarded as one impervious acres of credit for each 100 linear feet of stream restoration.
E. It is the responsibility of the Design-Builder to satisfy all SHA and regulatory requirements prior to construction.

13.8 Wildlife Fencing

One of the goals of this project is to improve safety along the corridor. An average of 12 accidents per year have been caused by deer strikes that have occurred between Rosemary lane and I-70 over a 10-year period. The Administration desires to promote wildlife crossing at the proposed wildlife bench at the Middle Patuxent River, potentially through the use of wildlife fencing. Measures to be considered by the Design Build Team for the most effective reduction of wildlife strikes include wildlife fencing to redirect wildlife to protected crossings (culverts/bridges) of appropriate size/openness. If wildlife fencing is proposed, breaks in wildlife controls will be avoided at ditch, culvert and bridge crossings.

PR 15 INTELLIGENT TRANSPORTATION SYSTEMS (ITS) PERFORMANCE SPECIFICATION

15.1 General

It is the Administration's desire to implement ITS devices on this project. Should the Design-Builder choose to include ITS in their proposal, the Design-Builder shall design, construct and implement the elements of the Intelligent Transportation System (ITS) in accordance with the requirements of this specification**,** including performance requirements, Standards and References, warranties, design and construction criteria, and required submittals. The Design-Builder shall retain the services of a Maryland registered Professional Engineer with a minimum of five (5) years proven experience in ITS design.

The Design-Builder shall furnish, install, test and integrate all equipment, software, and materials necessary to provide a fully functional Intelligent Transportation System (ITS) to facilitate traffic monitoring and surveillance, motorist information, average speeds, and incident management along MD 32 from Linden Church Road to I-70. All equipment supplied must be fully compatible from a hardware and software perspective with the Administration's Coordinated Highway Action Response Team (CHART) system. The sub-systems shall include:

A) Up to Three Closed Circuit Television (CCTV) cameras and associated equipment cabinets, including uninterruptible power supplies (UPS)
B) 62.5 micron 12-strand multi-mode fiber cable for CCTV T1 communications, if needed.

The approximate locations for the ITS equipment is shown in Table 1, below:

Table 1: ITS Devices

DEVICE	LOCATION	REMARKS
CCTV	MD 32 at Fox Chase Road	The exact location of the pole will be determined by the Design-Builder in consultation with CHART and Office of Maintenance Communications Division.
CCTV	MD 32 at Burntwoods Road	The exact location of the pole will be determined by the Design-Builder in consultation with CHART and Office of Maintenance Communications Division.
CCTV	MD 32 south of SHA Dayton Shop	The exact location of the pole will be determined by the Design-Builder in consultation with CHART and Office of Maintenance Communications Division.

All system elements to be designed and installed within the Project right-of-way will be operated by the Administration and shall be integrated with both the SOC and CHART system. All ITS Work shall be based on a systems engineering analysis meeting the requirements in 23 CFR 940.11.

Some ITS devices may require electrical and communications services that are located at great distances from those sites. As a result, dry transformers and heavy cables for power, and fiber-optic based communications services may be needed. This is particularly true of CCTV cameras that require T1 data services which have a limited transmission distance (500-600ft.) over copper lines. At these sites, two cabinet setups will be required: one adjacent to the Verizon communications source, and the other at the CCTV site. Each cabinet will contain a fiber-optic transceiver unit with 62.5-micron, 12-strand multimode fiber in an SHA-approved conduit system between them. The Design-Builder will be responsible for all communications service infrastructure, including conduits, 6-pair jelly-filled copper cable or 12-strand multi-mode fiber (as required), and manholes/hand holes.

The Design-Builder will be responsible for all power connections, including cost, coordination and applications, necessary to provide a 120/240 VAC service to the load centers in the cabinets, including conduits, manholes/hand holes, cables, SS disconnect switches, base-mounted metered or un-metered service pedestals, and any dry transformers needed for providing such power connections over long distances.

Routers and specialized communications equipment will be installed and commissioned by the SHA Communications Division (Radio Shop).

The Design-Builder shall coordinate the ITS work in this contract with the SHA Communications Division (Radio Shop), provide access as required, perform testing and deliver a fully functional system.

The Design-Builder shall provide the Engineer with detailed descriptions and data sheets of all equipment and services proposed on the Project. All submittals shall be in accordance with Section 800 Traffic "Catalog Cuts and Working Drawings". The Design-Builder shall provide the Engineer with detailed setup/configuration and software documentation. The Design-Builder shall also provide to the Engineer all licenses required for equipment, services, hardware and software supplied.

The Design-Builder shall provide site installation plans to the Engineer before installation and as-built drawings after installation. The as-built drawings shall include but not be limited to equipment, configurations, wiring diagrams, components, location diagrams, and connection data.

The Design-Builder shall provide the Engineer with the configuration information of all installations.

The Design-Builder shall identify and provide all permits, government fees and licenses required to execute the Contract if required. The Design-Builder shall provide copies of these executed documents to the Engineer.

The Design-Builder shall provide the Engineer with a recommended spare parts list.

15.2 Standards & References

The Design-Builder shall design and construct the ITS in accordance with this ITS Performance Specification and the relevant requirements of the Guidelines and References in PR 2.

15.3 Performance Requirements

The Design-Builder shall design and construct the ITS using the criteria specified within this Section to:

A) Provide a fully functional ITS meeting the Contract requirements.
B) Integrate the Project ITS system equipment with the regional and statewide CHART network to provide continuous and uninterrupted service of the ITS equipment and associated communications throughout the project area.
C) Facilitate system integration by using materials and components that are consistent and 100 percent compatible with those of the existing system(s) used by the Administration's CHART system.
D) Maintain the operation of all existing ITS components within the Project limits throughout the duration of construction, except as otherwise stated herein.
E) Provide a final product that facilitates and accommodates routine maintenance of ITS components without impacting normal traffic operations.
F) Construct and integrate Project ITS components at the earliest practical time to improve Maintenance of Traffic.
G) Test all equipment installed, and provide the results of those tests to the Administration's Communications Division. The Design-Builder must coordinate the testing with Communications Division personnel.
H) Upon request, provide training of CHART personnel for high level administration, maintenance and operation of all Design-Builder supplied equipment

15.4 Design and Construction Requirements

If existing ITS devices are impacted by this projects, the maximum outage time shall be 24 hours unless otherwise approved by the Administration. All proposed and existing ITS components within the Project shall be working limits shall be working upon completion of the Project. Any existing ITS component that is impacted by the construction of this Project shall be disconnected, reconnected, and made fully operational by the Design-Builder as part of this Project. All abandoned cables shall be made safe.

15.4.1 Existing Administration Systems

The Design-Builder shall perform design and construction necessary to deliver functional and fully operational ITS elements that are fully compatible with the Administration and CHART communication network. ITS elements shall be compatible and shall comply with existing maintenance requirements.

The Design-Builder shall design, provide, install, and assist with the integration and testing of all constructed and interconnected System elements, in accordance with procedures presented to the Administration for review and written comment, so as to satisfy requirements and demonstrate compatibility and interoperability with the existing systems and communication networks. Design, construction, installation, and integration activities shall include equipment installation, functional integration, and testing at multiple levels. Configuration changes required to the CHART system will be completed by the Administration.

The Design-Builder shall perform design, construction, installation, relocation, integration assistance and testing of existing (if impacted), relocated, temporary and permanent operational ITS field elements for the Project.

The ITS shall be implemented using a construction sequencing approach maximizing the ability to use temporary or permanent ITS field elements to actively monitor and manage recurring and non-recurring Project traffic congestion, as well as to detect and confirm incidents during construction and post construction activities.

The Design-Builder shall coordinate and provide requested data to the Administration and CHART for modifications and updates of existing databases to add new ITS field elements. Updated data shall include device identification, interfaces for fiber optic communications network and updates to graphical user interfaces. All software and database modifications, and associated modules, files and documentation to compile updates to the system shall become the sole property of the Administration, and shall be delivered as a condition of Acceptance for Maintenance.

The Design-Builder shall design and install a grounding system and transient protection devices that are suitable for the specific installation and equipment being supplied for each type of ITS element. The Design-Builder shall ensure that all equipment, devices, interconnect wiring, communication devices, communication lines, power supplies, antennas, operator controls, and power service are protected from external and internal electrical transient surges and line noise sources, including power surges, lightning, induced voltages, and static discharge. Systems and devices shall be designed and installed in accordance with the National Electric Code.

The Design-Builder shall provide operational and maintenance training to Administration personnel if requested for all ITS elements prior to transfer of maintenance responsibilities.

No part or attachment of any equipment shall be substituted or applied contrary to the manufacturers' recommendations and standard practices.

The Design-Build Contractor shall understand that any work not specifically mentioned in this Specification, but which is necessary, either directly or indirectly, for the proper performance of the work, shall be required and completed, and be performed just as if it were described in this Specification at no additional cost to the ADMINISTRATION. This shall include software or firmware upgrades needed at any time prior to project completion to guarantee the proper performance or compliance of the equipment with the CHART system, and any hardware changes or additions associated with those upgrades.

15.4.2 Plan Sheet Requirements

The Design-Builder shall prepare and present 1"=50' ITS plans with a scale appropriate for the Project, generally. Plans shall include existing and proposed geometry, existing and proposed utilities, right-of-way, landscape features, applicable drainage features, applicable structural facilities, and other information required for coordination of utilities. Plans shall show the location of new ITS equipment, removal and relocation of existing ITS equipment if necessary, conduit, cable types and installation method, manholes/handholes/junction boxes, ground rod locations, electrical service locations, telecommunications service locations, and other details pertinent to the construction.

15.4.3 Existing ITS Equipment

The Design-Builder shall perform a survey and inventory to verify existing and proposed ITS field element locations and annotate any variations with the existing and prevailing field conditions. Field location adjustments may be allowed if compelling conditions warrant relocation.

15.4.4 Power requirements

The Design-Builder shall provide alternating current (AC) metered power service to every ITS cabinet without interruption of existing metered service. In addition, all CCTV sites shall have an Uninterruptible Power Supply (UPS) system in a separate cabinet with sufficient capacity to allow the operation of the camera system for 24-28 hours. The CCTV controller cabinet and UPS cabinet shall share a common foundation. Foundation details for ITS cabinets can be found in the Administration's OOTS Shelf Typicals. The Design-Builder shall use shared foundations with base mounted Type 332 and NEMA 5 UPS cabinet where feasible.

The Design-Builder shall be solely responsible for all Work, materials, and costs associated with obtaining power and maintaining power throughout construction for all ITS devices, including coordination with the power company and obtaining power supply for all ITS devices required for this Project. The Design-Builder shall be responsible for completing all electrical service application materials necessary for obtaining service from the appropriate power company. All materials shall be submitted to the power company.

The Design-Builder shall be responsible for all ongoing monthly electricity costs for any new ITS elements installed under this Project until Partial Acceptance for Maintenance of the ITS elements.

15.4.5 Location of ITS Equipment

All ITS elements shall be installed within the Project right-of-way at the approximate locations shown in Table 1. All ITS elements shall be located in an area where access to equipment will not affect traffic operations or require traffic control unless otherwise identified. Maintenance access to all ITS devices, including cabinets, shall be provided by an all-weather maintenance pull-off, or by a widened shoulder with a minimum width of 12 feet, and a minimum length of 100 feet, unless otherwise specified. Where provided, an all-weather maintenance pull-out shall be sufficient to accommodate access and egress of a single unit maintenance vehicle load in all weather conditions. The pullout roadway surface shall consist of a permanent pavement suitable for access vehicle loading conditions. The pullout shall be located behind guardrail or other roadside barrier suitable for protection of maintenance personnel and shall be located downstream of the ITS element.

The Design-Builder may install barrier wall, guardrail, or crash protection devices to protect equipment that is temporarily in the clear zone due to maintenance of traffic *I* construction staging.

The Design-Builder shall locate all underground existing facilities and design all ITS elements to avoid or minimize conflicts with these facilities.

The Design-Builder shall ensure that all equipment, devices, interconnect wiring, communications devices, communications lines, power supplies, antennas, operator controls, and power service are protected to eliminate damage from external and internal sources, including power surges, lightning, induced voltages, and static discharge. The Design-Builder shall design and install a grounding system and protection devices that are suitable for the specific installation procedures and equipment supplied.

15.4.6 ITS Work Elements

The Administration will operate and control messages for all electronic displays that are potentially in the public view. The Design-Builder shall not activate any display or ITS component without prior coordination with the Administration.

The Design-Builder shall design, furnish and install all required materials and equipment for operational elements of the ITS, as listed below. For each of these elements, the Design-Builder shall design and construct all wiring and cabling connections to provide both local and remote operations for a complete and accepted ITS element including the following:

A) Each of the CCTV cameras shall be capable of local control (PTZ and all remotely-controllable functions) from their respective controller cabinets. All CCTV functions (camera video and control) shall be transmitted to The Administration's CHART System and the Statewide Operations Center via T1 data circuits. The Administration's CHART System/SOC shall have complete control of all camera functions at all times. CCTV cameras and encoders shall meet current CHART system requirements.

15.4.7 Communications Systems

The Design-Builder shall design, furnish, and install a communication system capable of transporting data to/from field devices. The communications system shall support the following minimum functional requirements:

Provide two-way data communications between the CHART system and field devices using leased T1 phone lines or wireless cellular modems to update, poll, monitor, and control traffic management elements.

15.4.7.1 Design Criteria

Work to be performed as part of this Project shall include, but is not limited to:

A) Assist with the integration of existing and proposed ITS field devices, within the Project limits, into the CHART system communications network.
B) Provide fiber optic cable to support the CCTV sites along MD 32, if needed.

The Design-Builder shall furnish, install and test telephones and supporting systems, if required.

The Design-Builder shall coordinate with the Administration's Communications Division and CHART SOC to develop an appropriate IP/Network Plan.

The Design-Builder shall be responsible for the design and installation of any modification to the existing/previously installed communications network or cabinet locations along roadways that would tie into the Project network in the project area. These modifications shall serve to support and integrate the existing/previously installed field devices. The Design-Builder shall be responsible for integrating the existing/previously installed and proposed field devices to the proposed IP/Ethernet network. Existing Administration-owned fiberoptic cables are generally not available for local ITS communications use.

All fiber optic cable used for T1data or cabinet-to-cabinet communications on this project shall be 62.5-micron multi-mode, non-dispersion shifted optical fiber with a rodent-resistant outer jacket. For cabinet to cabinet patch panels shall be installed in both cabinets. The Design-Builder shall ensure compatibility with the existing fiber used by the Administration, and shall make connections with existing/previously installed fiber if required.

The Design-Builder shall provide documentation for all fiber work performed on this Project.

15.4.8 CCTV

15.4.8.1 Design Criteria

Each CCTV Camera shall be located in accordance with the AASHTO Roadside Design Guide and in areas where access to equipment shall not require traffic control. Maintenance access to CCTV sites may be provided by an all-weather maintenance pull-off, or by a widened shoulder with a minimum width of 12 feet, and a minimum length of 100 feet. This maintenance pull-off must allow room for such a bucket truck vehicle.

CCTV sites shall be selected to yield the optimum unobstructed camera view of the roadway. In situations where a camera is to be located at the intersection of two roadways, the pole location may be selected so that both roadways may be viewed, unless the Design-Builder is directed otherwise by CHART. All sightline views for CCTV sites must be approved by CHART and OOTS.

15.4.8.2 Material Requirements

The Design-Builder shall be responsible for all site installation, insurance, interim storage, labor, and transportation costs associated with equipment pickup and transportation between Design-Builder- provided storage and field sites. All materials shall be provided in accordance with the requirements of this specification.

15.4.8.3 Construction Requirements

The Design-Builder shall locate the base/foundation of the CCTV camera pole to avoid existing underground utilities, and place the camera base/foundation at a site that is flatly graded so the associated cabinet and any handholes are installed level with the finished grade.

The Design-Builder shall install foundations for CCTV poles to SHA standards.

The Design-Builder shall install two 3-inch diameter conduits in each CCTV pole foundation as shown in the Hinged CCTV Camera Pole Details, with one oriented toward the intended camera cabinet location. The Design-Builder shall provide a "locator wire" or tape that allows future non-destructive identification from the surface grade.

15.4.9 ITS Cabinet Requirements

This work shall consist of design and construction of ITS equipment cabinet bases, electrical power work, junction boxes, conduit, grading, cables and conductors. ITS cabinets shall be required for each of the new ITS device locations and shall be utilized as the device communication connection points. ITS cabinets shall be, at a minimum, Type 332/334, NEMA-3X rated. Front and rear concrete pads shall be furnished and installed at all cabinet sites to provide level and dry surfaces for a maintenance technician to stand on while servicing the cabinet sites. This work includes excavation, gravel base, backfilling, and treated timber cribbing. Concrete pads shall be provided for all doors on ITS cabinets.

All Type 332/334 cabinets provided for ITS equipment shall have heating, ventilation, and LED lighting systems, and shall have a pull-out "laptop" drawer/shelf situated in an appropriate rack position below the device controller to allow ease of maintenance by SHA technicians.

15.4.9.1 Design Criteria

Each ITS equipment cabinet shall be located in accordance with the AASHTO Roadside Design Guide and in areas where access to equipment shall not require traffic control. Maintenance access to ITS cabinets may be provided by an all-weather maintenance pull-off, or by a widened shoulder with a minimum width of 12 feet, and a minimum length of 100 feet.

15.4.9.2 Material Requirements

The Design-Builder shall be responsible for all site installation, insurance, interim storage, labor, and transportation costs associated with equipment pickup and transportation between Design-Builder- provided storage and field sites. All materials shall be provided in accordance with the requirements of this specification.

15.4.9.3 Construction Requirements

The Design-Builder shall locate the base of the ITS equipment cabinet to avoid existing underground utilities, and place the ITS equipment at a site that is flatly graded so the handholes are installed level with the finished grade.

The Design-Builder shall design and install cabinet bases for ITS cabinets.

The Design-Builder shall install two 3-inch diameter conduits for fiber optic communication drop cable from the fiber distribution handhole to the cabinet. The Design-Builder shall provide a "locator wire" or tape that allows future non-destructive identification from the surface grade. The Design-Builder shall provide two (2) empty conduit stubouts to any pad-mounted ITS cabinet. The conduit stubs from the cabinet shall terminate in the ground for future power and communication usage. Cabinets shall be configured for their specific application (e.g., DMS, etc.) and site location. Each cabinet shall be identified by a specific cabinet ID derived using an approved naming convention.

The Design-Builder shall provide a cabinet heater/thermostat in the cabinet to reduce condensation and enhance the performance of the electronics installed in the cabinet. The cabinets shall not be insulated for heat retention.

15.4.10 ITS Electrical Power

The Design-Builder shall provide appropriate power elements to ITS elements as part of this Project. The Design-Builder shall be responsible for all design and construction of elements that are required to provide adequate power to all ITS elements of this Project. The Design-Builder shall comply with the National Electric Code (NEC) for all power work, all enclosures, service disconnects, and transformers. Equipment shall be NEMA-3X rated at a minimum.

All ITS power service points shall utilize a 120/240-V base-mounted metered service pedestal whose design has been approved by the appropriate utility company. In addition, a NEMA-4X rated stainless-steel safety switch shall be installed on the controller cabinet as a service disconnect if the controller cabinet is located more than 50 feet from the metered service pedestal, or across a roadway.

The Design-Builder shall determine the appropriate load required for each cabinet, performing voltage drop calculations, and sizing the wire for each cabinet and DMS. Each cabinet shall include an additional load allowance of 12 Amps for powering convenience outlets. These calculations shall be part of the design review information. The voltage drop, as measured between the power service point (at the meter) and the device(s) it is serving, shall not exceed five percent. Conductors shall be sized appropriately to satisfy this requirement.

Power service arrangements shall be reviewed and approved by the power service provider and by the Administration.

15.4.11 Cabling and Conductors

The Design-Builder shall furnish and install conductors and cables in accordance with the design standards listed in this performance specification. The minimum gauge for all electrical conductors shall be #12 AWG.

The Design-Builder shall furnish and install all video and control cables and connectors for the CCTV and DMS locations in accordance with the manufacturer's recommendations and signal attenuation requirements, on a per site basis. The maximum conduit fill ratio shall be 25%.

15.4.12 Vaults and ITS Manholes/Handholes

Design of manholes/handholes below finish grade shall conform to Administration standards. The Design-Builder shall prepare all necessary drawings and instructions for any manholes and handholes, and any pull boxes that are to be installed above ground, in barriers or walls, or any other unique application not covered by Administration standards.

15.4.12.1 Design Criteria

Communication vaults may be required at certain field locations if there is a need for additional space for splices, coiling or other communication related features. Communication vaults shall not be located within ditches. Communications vaults shall be constructed of concrete.

15.4.12.2 Construction Requirements

Communication vaults that connect with fiber optic conduit and cable runs shall be spaced no more than 600 ft. apart. Handholes used for all other conduit and cable runs shall be spaced no more than 300 ft. apart. Handholes along fiber optic lines may be placed as needed to facilitate the installation of fiber optic cable. All vaults, manholes, handholes and pull boxes shall be installed with underdrain in accordance with Standard No. MD 811.04. The stone surrounding these structures shall not be considered a suitable outfall. Underdrain shall be connected to a suitable outlet such as underdrain outlet pipe to a slope or drainage structure.

15.4.13 ITS Conduits

The Design-Builder shall design and construct all conduits, including all necessary hardware, fasteners, and accessories, in accordance with the requirements of this document. Longitudinal conduits for T1 communications networks shall not be installed under the paved surfaces.

15.4.13.1 Material Requirements

The Design-Builder shall design and construct all buried conduit to meet the material requirements of the Contract Documents.

All vertical run conduit located above ground shall be galvanized rigid steel. PVC coated rigid galvanized steel conduit shall be used from the nearest manholes/handhole below grade to a minimum of 2' above grade.

All materials used in the installation of conduit, such as bends, adapters, couplings, and fittings, shall meet or exceed all of the recommendations of the conduit manufacturer for suitable installation.

The Design-Builder shall use complete conduit sections in 20 feet (nominal) sections when PVC conduit is used and include mid-body gasket to provide watertight integrity. The Design-Builder shall use complete conduit rigid bend sections complete with bell and spigot. When used, PVC shall be shall be Schedule 80. HDPE shall be Schedule 80 equivalent (SDR 13.5)

The Design-Builder shall provide flat profile, low stretch polyester, sequential footage marked, 2500 lb. tensile strength Mule Tape or approved equivalent in each empty conduit or cell.

The mounting rail for the locator wire connection device shall be zinc dichromate plated steel.

15.4.13.2 Construction Requirements

When crossing finished curbs and gutters, sidewalks, concrete flatwork, and textured or decorated surfaces, conduit shall be installed so as not to damage these sections. Any section damaged by the operations of the Design-Builder shall be replaced entirely at no additional cost to the Administration.

The Design-Builder shall place all conduits in the same trench before surfacing. Galvanized rigid steel shall be used in all above ground conduit installations, unless otherwise specified; and PVC or high density polyethylene (HDPE) shall be used in all underground conduit installations. PVC coated rigid galvanized steel conduit shall be used from the nearest manholes/handhole below grade to a minimum of 2' above grade. The Design-Builder shall install plugs on all empty conduits inside all handholes.

Any installation of buried conduit shall be located away from potential guardrail installations.

Mule Tape shall be installed in all empty conduits. The Design- Builder shall leave

2 ft. of Mule Tape outside of the end cap and fasten it securely.

Conduits shall be installed in a manner that allows the backfill to completely surround all exterior surfaces of the conduit. Multi-duct conduits shall be separated by use of a commercially available conduit spacer or Administration-approved equivalent.

Non-metallic conduit that contains a conductor shall conform to the abrasion requirements per Section 346-8 of the NEC. Grounded bushings shall be installed on the ends of metal conduits per Section 347-12 of the NEC.

The Design-Builder shall construct all conduits into structures. Installation of multi-duct conduit on structures shall require additional Design-Builder prepared details specific to each particular structure and situation. The Design-Builder shall prepare any necessary details and instructions for multi-duct conduit on structures, including all materials, location of assembly relative to other structural features, expansion/contraction fittings, and the method used for passing conduit through diaphragms and abutments.

Conduit expansion fittings shall be installed at locations where the conduit crosses structural expansion joints.

The Design-Builder shall install the following cables and conductors in separate conduit runs and junction boxes:

A) Power service conductors (120 V and above);
B) Communication cables;
C) CCTV coaxial and control cables.

The Design-Builder shall not install any combination of the above categories of cables and conductors in a common conduit or junction box, unless within the junction box that is installed immediately adjacent to the cabinet, which can accommodate any cables or conductors that are less than 120 V. Power service conductors shall enter the cabinet through a separate junction box with no other cables or conductors. Only fiber optic cable shall be installed in multi-duct conduit.

15.4.14 Integration and Testing

The Design-Builder shall assist the radio shop with the integration of the following devices into the CHART system under this Contract:

A) CCTV Systems;
B) Fiber Optic Communication Systems.

For all devices connected to the proposed fiber optic cable installed under this Project, integration shall include field site integration and subsystem integration. The Design-Builder shall develop an ITS test plan for conducting all required tests. This test plan shall be submitted to the Administration for review and written comment. The Design-Builder shall not be allowed to conduct any testing until the Administration has approved the test plan. The Design-Builder shall permit the Administration to adjust the proposed schedule of the test by up to seven days, at no cost to the Administration, to allow for availability of personnel. Administration personnel or an authorized Administration representative will witness and sign off on all tests. This person is the only person who can sign off that each test is complete.

15.4.15 Tests Applicable To All Devices

The Design-Builder shall conduct, pass, and document a subsystem communication throughput test over the communication path between each field device and the EOF. The Design-Builder shall document that the bit error rate (BER) over the path, for each cabinet, is zero over a five-minute period. The Design- Builder shall supply the bit error rate test equipment. The test shall occur after all communication installation for a particular site has been completed, the communication paths between the device and the EOF have been functional for at least 48 hours, and all fiber tests have been successfully passed. The Design-Builder shall notify the Administration a minimum of 72 hours prior to the commencement of testing.

After successful completion of all subsystem test procedures, and after all mainline lanes as well as ramps are open, each site shall be tested for proper communication operation for 30 consecutive days. During the testing period, all Design-Builder provided, installed or relocated equipment at the site shall operate without failures of any type. If any component malfunctions or fails to provide the capabilities specified herein during the 30-day test period, the Design-Builder shall troubleshoot to find the exact cause of the failure. If the failed equipment is Administration-furnished, the equipment shall be removed and replaced by the Design-Builder with replacement equipment from the Administration. This troubleshooting shall occur within 48 hours of notification by the Administration.

After the component malfunction has been corrected to the satisfaction of the Administration, the Design- Builder may be required to restart the 30-day test period. In the event of a failure in equipment furnished by the Administration, the 30-day test will be suspended until failures with the Administration provided hardware are corrected, at which time the test will resume.

15.4.16 Cable Conductor Test, Field Operation Test, and 30 Day Burn In Tests

The Design-Builder shall conduct, pass, and document a local field operations test for CCTV, HAR, and DMS device testing to demonstrate that all hardware, cables, and connections furnished and installed by the Design-Builder operate correctly and that all functions are in conformance with the requirements described herein. The Design-Builder shall verify the power supply voltages and the functionality of the cabinet fans and heaters. A five (5) day pretest notification shall be required and a completion notice shall also be required.

A 30-Day Device Burn in test is also required.

The Design-Builder shall submit documentation indicating successful passing of each test to the Administration for approval prior to final acceptance. The Design-Builder shall not perform any testing until the Administration has approved the testing Plans prepared by the Design-Builder.

15.4.17 Maintenance During Construction

The Design-Builder shall maintain the existing/previously installed and new ITS until Acceptance for Maintenance.

15.5 Verizon Coordination

It is the Design-Builder's responsibilities to contact Verizon to verify that T1 data line service can be obtained at or within reasonable distance of the proposed CCTV locations. A number of variables can affect the availability of T1 service which may force the Design-Builder to change the intended location of a CCTV site or sites, so no further design work should be done until this verification has been obtained, and a written and signed commitment has been received from Verizon. Failure to do this may result in substantial re-design and/or device relocation costs which will be borne by the Design-Builder. The Administration will not be liable for any of the costs incurred resulting from ambiguities in the T1 data line source location(s).

The typical turnaround time for Verizon is 30-60 days. It may be necessary to modify the thirty percent plans after this verification is obtained if the design must be changed due to a lack of T1 data service availability.

PR 16 PUBLIC OUTREACH PERFORMANCE SPECIFICATION

16.01 General

This Performance Specification outlines the requirements for Public Outreach (PO) and defines the roles and responsibilities for this effort.

The PO program includes Administration and Design-Builder activities, including the following:

A. Public Outreach;

B. Community involvement and meetings;

C. Communications with the public;

D. Public notices;

E. Media relations; and

F. Maintenance of Traffic (MOT) plan.

The residents, businesses, elected officials, communities, motorists, and other interest groups within the project area have been kept informed and their engagement in the construction process is critical to the successful completion of the Project. In support of the Administration, the Design-Builder shall commit to significant assistance of the Administration with regard to community participation and interaction activities during the development of the design and throughout the construction of the Project.

The Design-Builder shall provide a Public Relations Coordinator who is responsible for assisting the MDOT SHA and Design-Build Team in developing integrated communication plans, including planning, research, implementation and evaluation. The Coordinator must have strong writing skills, excellent communication skills, community outreach skills and experience handling sensitive and/or controversial issues. The Administration reserves the right to request a resume to verify qualifications. Duties include but are not limited to:

- Research, write and edit draft news releases, fact sheets, traffic alerts, briefing memos, advertising copy, speeches, web content, social media content, newsletters and brochures that will be submitted for approval to MDOT SHA.
- Collects and provides clips of media coverage of the project for inclusion in MDOT SHA's daily report.
- Gathers information on construction updates and project timelines and works with MDOT SHA to input and distribute the data through all applicable communication channels such as mainstream, social media, and website postings.
- Drafts responses to correspondence, emails, and other inquiries, including Customer Care Management System (CCMS) assignments.

- Assists with website content management and development, including writing, editing and potentially uploading content on multiple websites; as well as photographs and video of the project progress.

- Facilitates and coordinates obtaining any aerial or digital photography, graphical maps of traffic patterns and project design, art or other materials needed for public relations

- Coordinates and participates in a variety of community/stakeholder events and meetings. Coordinates with MDOT SHA the DBT's development of graphics, presentations, videos, power point, slide shows or other visual presentations for those events and meetings.

- Helps implement/coordinate special events on the project and/or VIP and media events, including materials preparation and logistics.

- Develops and writes copy for marketing materials such as, but not limited to, e-blasts, inserts, newsletters, brochures, fliers, fact sheets, calendars and maps. Manages distribution including zip code mailings, door hanger posting, etc.…

- Researches inquiries from the public, elected officials and/or media and develops response to be provided by the Coordinator or other designed project or SHA official.

16.02 Guidelines and References

The Work shall be in accordance with this Public Outreach Specification.

16.03 Requirements

The community involvement and participation element is intended to carry forward the dialogue with residents, landowners, community groups, local officials, and other similar groups. This effort shall include activities such as, but not limited to, the Design-Builder supporting the Administration in meetings with individual land owners, local officials, and community groups and public meetings to keep the public involved in design and construction activities.

Public Outreach is intended to keep the public informed of major activities and decisions through design and construction. This element will involve the preparation and distribution of Project information to the assigned Administration representative for further dissemination to the public and media.

The Design-Builder shall make a good faith effort to address any concerns the public may have, and take under consideration any suggestions or wishes they express if those suggestions are reasonable in regard to cost, time, and construction effort. Documentation shall be in the form of meeting minutes and correspondence, including e-mails. The Design-Builder shall direct requests

it receives to the Administration and shall assist in preparing responses. All design or construction modifications are subject to written acceptance by the Administration.

16.03.01 Administration Public Outreach Responsibilities

The Administration and the Design-Builder have shared responsibility for the PO Program. The Administration will be the lead on Public Outreach activities, with active support provided by the Design-Builder, to include project research, adequate support staff, graphic design, materials, and printing.

The Design-Builder shall have primary responsibility for performing the activities specified in this Public Outreach Specification as was well as in the Contract Documents.

The Administration's responsibilities include the following activities:

A. Maintain Questions & Answers/Frequently Asked Questions of any approved communication efforts by the Design-Builder; and

B. Liaising with and monitoring the Design-Builder's performance for compliance with the Contract's public outreach requirements.

16.03.02 Design-Builder Responsibilities and Requirements

16.03.02.01 Design-Builder's Response to Inquiries and Comments

A. Questions or comments from residents, businesses, or other member of the public shall be referred to the Administration within 4 hours. The Design-Builder shall take necessary steps to facilitate such contact.

B. If Design-Builder receives a complaint regarding its conduct of work on the Project, the Design-Builder shall notify Administration within 4 hours. The Design-Builder shall provide necessary information, staff support, and representation to assist in resolving the issue.

C. If Design-Builder receives a complaint regarding flooding, erosion, water quality, or any other drainage or environmental concern, the Design-Builder shall notify the Administration's Highway Hydraulics Division within 4 hours. The Design-Builder shall provide necessary information, staff support, and representation to assist in resolving the issue.

D. On occasions specified by the Administration, the Design-Builder shall commit its Project Manager to serve as a spokesperson for the Project for technical and safety issues with certain audiences.

16.03.02.02 Public Notifications

A. The Design-Builder shall facilitate the Administration's notification of the public and community in general and specifically affected businesses and residents along the Project. As directed by the Administration, this may include personal contact to affected parties of construction progress and upcoming events.

B. The Design-Builder shall provide the specific notifications listed in Table 1.

C. Utility shut-off/diversion announcements shall be coordinated in advance with the Administration and the utility company. The Design-Builder shall prepare a written notice to the affected parties.

TABLE 1
NOTIFICATIONS

Notice	Requirement
Lane Closure	Written notices posted at least 7 days in advance of planned closures at start and end of Project and at intermediate intersections/junction with United States (US), state, or county highways and roads. Notice provided to Refer to Maintenance of Traffic Performance Specifications.
Critical Utility Shut-off/Diversion	Written notice at least 72 hours in advance of, but not more than 96 hours before, shut-off and/or diversions. Copy of notice to Administration and Utility Company.
Business/Commercial Utility Shutdown	Written notification of Utility shutdown or diversion for businesses and commercial property at least 72 hours in advance of shut-down. Notice shall be coordinated in advance with Administration and Utility Company.
Residential Utility Shutdown	Written notification of Utility shutdown or diversion for residential property 72 hours in advance of shut-down. Notice shall be coordinated in advance with Administration and Utility Company.
Weekly Construction Updates	Construction updates shall be provided weekly and shall identify all Planned traffic shifts, lane closures and utility shut-downs and activities.
Road and Driveway Closures	Written notice and personal contact at least 72-hours in advance of closure. Copy of notice to Administration. Refer to Maintenance of Traffic Performance Specifications

16.03.02.03 Public Contact Records

The Design-Builder shall maintain a consistent system for documenting all contact with business owners, residents, media and property owners. Unless otherwise directed, the Design-Builder should not act as spokesman for the Project. The Design-Builder shall provide Administration an electronic copy of all public contact records. File should be received by the 1st of each month and should include all contacts made prior to the 25th of the previous month.

16.03.02.04 Construction Schedule/Maintenance of Traffic and Access

Information regarding Project design and construction shall be readily available in a form that can be quickly disseminated to the public. Information provided to the public shall be consistent with information contained in the Baseline Progress Schedule, schedule updates, and the applicable Maintenance of Traffic Plan.

16.03.02.05 Signage

The Design-Builder shall install signs throughout the Project to be placed at the start and end of the Project, at intersections with County and State highways, at Design-Builder's main office (if along the Project alignment), and at all field offices. The signs shall identify the Administration by its MDOT SHA official logo and show the name of the Project, the Project hotline number, and

the Project Web site address if applicable. Signs and lettering shall be sized appropriate for the speed limit in the area using MUTCD size guidelines.

16.03.02.06 Telephone Trees

The Design-Builder shall establish and manage an emergency response telephone tree. All appropriate emergency response agencies shall be included on this telephone tree for immediate response in the event of an emergency. The telephone tree shall be divided into areas of expertise so the proper people are called for specific emergency situations.

16.03.02.07 Public Forums

At the specific request of the Administration, the Design-Builder shall participate in Administration organized public forums to give the public the opportunity to discuss the Project. The Design-Builder, in coordination with the Administration, shall hold a public meeting to advise the public of the construction prior to beginning construction activities.

The Design-Builder shall provide all graphics and printed materials for these forums and work with the Administration in developing all materials.

16.03.02.08 Construction Progress Photographs

The Design-Builder shall provide to the Administration high-resolution construction progress photographs in electronic format at least monthly or at any time that a new significant activity commences. Monthly submission should include at a minimum of 10 (ten) new progress photos. In addition, the Design-Builder will facilitate requests and make arrangements for the Administration to take additional photos on an as-requested basis. Distinct from progress documentation photos, the purpose of photos identified in this section is to facilitate public information via the Project Web site, newsletters and other such materials.

16.03.03 Other Design-Builder Activities

The Design-Builder is encouraged to provide additional, cost-effective services to enhance the overall Public Outreach Community Relations Program. Additional services should adhere to the standards indicated in the Public Outreach Plan and be a supplement to the services outlined in this Performance Specification. Any such enhancements may be implemented at any time during the Project and subject to Administration's written acceptance.

These activities may include part of the federal Transportation Management Plan guidelines to draft a Public Information & Outreach plan for the project, which shall include:

- Standard language for constituent response (i.e. correspondence, phone inquiries, memos, etc.) in accordance with the Administration's guidelines.
- Creation/printing of overall project brochure and supporting materials
- Creation/printing of community updates for distribution
- Development of community contacts list

- Educating the public on work zone safety

16.03.04 Media Relations

An ongoing media relations effort will be handled by the Administration. The Design-Builder shall assist in providing timely information to the Administration regarding construction activities for use in media events.

NEITHER THE DESIGN-BUILDER NOR ANY SUBCONTRACTOR NOR THEIR EMPLOYEES SHALL INTERFACE WITH THE MEDIA WITHOUT THE EXPRESSED CONSENT OF THE ADMINISTRATION, EXCEPT AS SPECIFICALLY DIRECTED BY THE ADMINISTRATION. IN EMERGENCY SITUATIONS, THE DESIGN-BUILDER SHALL IMMEDIATELY NOTIFY THE ADMINISTRATION OF ANY SITUATIONS THAT MAY INVOLVE THE MEDIA.

MARYLAND DEPARTMENT OF TRANSPORTATION

STATE HIGHWAY ADMINISTRATION

CONTRACT NO. HO7565370

F.A.P. NO. AC-NHPP-118-1(69)N

Competitive Sealed Proposals Procurement Phase Two – Request for Proposals (RFP) Design-Build

Part III – Contract Provisions (CP)

MD 32 – LINDEN CHURCH ROAD TO I-70

Howard County

Disadvantaged / Minority Business Enterprises are encouraged to respond to this Solicitation Notice.

MDOT SHA will only be responsible for the completeness of documents, including all addenda, obtained directly from MDOT SHA.
Failure to complete and include the Addendum Receipt Verification Form may cause the proposal to be irregular.

VENDOR I.D. NUMBER

_____

MDOT SHA USE ONLY

NOTICE TO CONTRACTORS

CARGO PREFERENCE ACT (CPA)

All Contractors and Sub-Contractors are to be in compliance with the requirements of 46 CFR Part 381 and incorporate by reference the recommended clauses in 46 CFR 381.7(a)-(b) - ("Contractor and Subcontractor Clauses. "Use of United States-flag vessels")

(a) Agreement Clauses. "Use of United States-flag vessels:

"(1) Pursuant to Pub. L. 664 (43 U.S.C. 1241(b)) at least 50 percent of any equipment, materials or commodities procured, contracted for or otherwise obtained with funds granted, guaranteed, loaned, or advanced by the U.S. Government under this agreement, and which may be transported by ocean vessel, shall be transported on privately owned United States-flag commercial vessels, if available.

"(2) Within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (a)(1) of this section shall be furnished to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development. Maritime Administration, Washington, DC 20590."

(b) Contractor and Subcontractor Clauses. "Use of United States-flag vessels: The contractor agrees-

"(1) To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment. material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels.

"(2) To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States. a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b) (1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590.

"(3) To insert the substance of the provisions of this clause in all subcontracts issued pursuant to this contract".

Guidance documents for this requirement, including the 12/11/2015 policy memo, the 12/8/2015 legal opinion and a page of Q&A's are available on the CPA construction Program Guidance page:

https://www.fhwa.dot.gov/construction/cqit/cargo.cfm

This requirement applies to material or equipment that is acquired for a specific Federal-aid highway project. It is not applicable to goods or materials that come into inventories independent of an FHWA funded-contract.

CONTRACT PROVISIONS

SPECIAL PROVISIONS

GENERAL PROVISIONS

TERMS AND CONDITIONS

CATEGORY 100 PRELIMINARY

CATEGORY 200 GRADING

Addendum No. 1
06-01-2018

CATEGORY 300 DRAINAGE

CATEGORY 400 STRUCTURES

CATEGORY 500 PAVING

CATEGORY 700 LANDSCAPING

CATEGORY 800 TRAFFIC

CATEGORY 900 MATERIALS

SECTION 950 TRAFFIC MATERIALS

PROPOSAL FORM PACKET

CONTRACTOR REGISTRATION REQUIREMENTS

On all Federal-Aid funded contracts, the Administration is requiring that Contractors have an active Dun and Bradstreet Data Universal Numbering System (DUNS) and be registered in the Central Contract Registration (CCR) database prior to Award of Contract.

The Contractor DUNS number is a unique nine-digit number issued by Dun & Bradstreet, followed by the optional 4 digit DUNS Plus number (reported as "999999999.9999"). A DUNS number can be obtained on-line at http://fedgov.dnb.com/webform.

The Central Contractor Registration (CCR) is no longer the primary registrant database for the U.S. Federal Government.

The System for Award Management (SAM) is the Official U.S. Government system that consolidated the capabilities of CCR/FedReg, ORCA, and EPLS. There is NO fee to register for this site. Entities may register at no cost directly from this page. User guides and webinars are available under the Help tab. Contractors can now register on-line at https://www.sam.gov.

NOTICE TO ALL HOLDERS OF THIS CONTRACT DOCUMENT

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM (NCHRP) REPORT 350 AND THE MANUAL FOR ASSESSING SAFETY HARDWARE (MASH) COMPLIANCE FOR DEVICES USED IN THE MAINTENANCE OF TRAFFIC AND TRAFFIC CONTROL

Except as otherwise specified in this section, all items for the temporary traffic control, including those listed under the following categories and permanent roadside hardware such as concrete barriers, W-beam barriers, cable barriers, end terminals, crash cushions, sign supports and all other breakaway hardware, shall be crashworthy in conformance with the appropriate test level as required by the safety crash testing and performance criteria published in the National Cooperative Highway Research Program (NCHRP) Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features" or the Manual for Assessing Safety Hardware (MASH). When conformance with NCHRP Report 350 or MASH is required, provide the Engineer with the manufacturers' certifications that the devices comply with the specified criteria. All temporary and permanent roadside devices shall comply with MASH 2016 criteria by the relevant dates in accordance with the Joint Implementation Agreement memorandum dated January 7, 2016 between the American Association of State Highway and Transportation Officials (AASHTO) and Federal Highway Administration (FHWA). This document may be downloaded from:

https://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/docs/memo_joint_implementation_agmt.pdf

Unless specifically waived in the Contract Documents, only devices approved by the Administration may be used.

Category 1 Devices

These devices include cones, tubular markers, flexible delineator posts, and drums, none of which have any accessories or attachments, and are used for channelization and delineation.

Category 2 Devices

These devices include Type I, II, and III barricades, portable sign supports with signs, intrusion alarms, drums, vertical panels, and cones, any of which having accessories or attachments.

Category 3 Devices

(a) Truck Mounted Attenuators (TMAs) and Trailer Truck Mounted Attenuators (TTMAs).

(b) Temporary Barrier.

(1) Concrete Barrier.

(2) Traffic Barrier W Beam and Water Filled Barrier.

(3) Steel/Aluminum Barrier.

(c) Temporary End Treatments.

Category 4 Devices

These devices include area lighting supports, arrow panels, and portable variable message signs that may be portable or trailer-mounted.

Category 1, 2 and 3 devices shall always conform to NCHRP Report 350 or MASH Criteria. The AASHTO/FHWA Joint Implementation Agreement for MASH states that temporary work zone devices including category 4 devices manufactured after 12/31/2019 must be successfully tested to the 2016 edition of MASH before 12/31/2019 and relevant devices manufactured on or before 12/31/2019 and successfully tested to NCHRP 350, the 2009 edition of MASH, or otherwise authorized may continue to be used throughout their normal service life. Use of Category 4 devices shall comply with the provisions of Part 6 of the MD MUTCD.

NOTICE TO ALL HOLDERS OF THIS CONTRACT DOCUMENT

MARYLAND MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MdMUTCD) REQUIREMENTS

The 2011 Maryland Manual on Uniform Traffic Control Devices (MdMUTCD) is the legal State standard for traffic control devices. All traffic control devices (temporary or permanent) utilized on Administration projects shall be in conformance with the requirements provided in the 2011 Edition of the Administration's MdMUTCD for Streets and Highways.

OCCUPYING WETLANDS/WATERWAYS FOR DESIGN-BUILD

The Contractor is hereby alerted to the importance of preserving waterways and wetland areas. The Administration, in conjunction with the various environmental agencies, has developed these Contract Documents so as to minimize or eliminate disturbance and damage to existing waterways and wetland areas. Any design changes must result in further avoidance and minimization of disturbance of wetlands and waterways. In order to accomplish this, the following must be rigidly adhered to:

(a) Prior to performing any work on the project, the areas of wetland will be identified and marked by orange safety fence or as directed by the Engineer. All personnel of the Contractor or sub-contractors shall be alerted to these designated areas.

(b) The Contractor or sub-contractors shall not impact any wetland or waterway, whether it be permanently or temporarily unless otherwise stipulated in the permit and approved as an authorized action by the appropriate regulatory agency. No fill shall be placed in these areas without an appropriate permit. No storage of equipment or materials will be allowed in wetlands.

(c) The Contractor or sub-contractor shall not impact a wetland or waterway that is not covered by an existing wetland permit.

(d) If the Contractor impacts any wetland or waterway for which they do not have a wetland permit, they shall be responsible for contacting the State Highway Administration's Environmental Programs Division prior to restoring the wetland areas and mitigating the wetland impacts to the full satisfaction of the environment regulatory agencies, which could include monetary compensation.

(e) The cost of restoration and mitigation of the impacted areas shall be at no additional cost to the Administration.

(f) The Design-Builder will prepare permit modifications at the conclusion design and at the conclusion of construction. The modification will be based on surveyed as-built plans and will include standard 8.5"x 11.0" plates and a revised Joint State/Federal Nontidal Wetlands and Waterways Permit application.

(g) This Contract will include the oversight of an Environmental Monitor supplied by the Administration. His duties will be to make sure the Contractor abides by all conditions in the environmental permits. He will also assist the Contractor in developing ideas to minimize impacts to the wetlands. The Contractor will still be responsible for all violations occuring as stated above.

The importance of not abusing waterways and wetland areas cannot be overemphasized. It is possible that abuse of waterways and wetland areas could jeopardize the operation of the total Contract and could be cause for a shut-down. If a shut-down occurs because of the Contractor's failure to secure the required permits(i.e. the Contractor's method of work includes impacts not approved by previously acquired permits), the Contractor's negligence or operations, all costs and damages to the Contractor and to the State will be at the Contractor's expense. Non-compliance with these requirements will not be considered for an extension of Contract time.

BEST MANAGEMENT PRACTICES FOR WORKING IN NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, AND 100-YEAR FLOODPLAINS

1. NO EXCESS FILL, CONSTRUCTION MATERIAL, OR DEBRIS SHALL BE STOCKPILED OR STORED IN NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.

2. PLACE MATERIALS IN A LOCATION AND MANNER WHICH DOES NOT ADVERSELY IMPACT SURFACE OR SUBSURFACE WATER FLOW INTO OR OUT OF NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.

3. DO NOT USE THE EXCAVATED MATERIAL AS BACKFILL IF IT CONTAINS WASTE METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIAL, OR ANY OTHER DELETERIOUS SUBSTANCE. IF ADDITIONAL BACKFILL IS REQUIRED, USE CLEAN MATERIALS FREE OF WASTE METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIAL, OR ANY OTHER DELETERIOUS SUBSTANCE.

4. PLACE HEAVY EQUIPMENT ON MATS OR SUITABLY OPERATE THE EQUIPMENT TO PREVENT DAMAGE TO NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.

5. REPAIR AND MAINTAIN ANY SERVICEABLE STRUCTURE OR FILL SO THERE IS NO PERMANENT LOSS OF NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, OR WATERWAYS, OR PERMANENT MODIFICATION OF THE 100-YEAR FLOODPLAIN IN EXCESS OF THAT LOST UNDER THE ORIGINALLY AUTHORIZED STRUCTURE OR FILL.

6. RECTIFY ANY NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, OR 100-YEAR FLOODPLAIN TEMPORARILY IMPACTED BY ANY CONSTRUCTION.

7. ALL STABILIZATION IN THE NONTIDAL WETLAND AND NONTIDAL WETLAND BUFFER SHALL CONSIST OF THE FOLLOWING SPECIES:

   ANNUAL RYEGRASS (LOLIUM MULTIFLORUM), MILLET (SETARIA ITALICA), BARLEY (HORDEUM SP.), OATS (UNIOLA SP.)AND/OR RYE (SECALE CEREALE). THESE SPECIES WILL ALLOW FOR THE STABILIZATIONOF THE SITE WHILE ALSO ALLOWING FOR THE

   VOLUNTARY REVEGETATION OF NATURAL WETLAND SPECIES. OTHER NON-PERSISTENT VEGETATION MAY BE ACCEPTABLE, BUT MUST BE APPROVED BY THE NONTIDAL WETLANDS AND WATERWAYS DIVISION. KENTUCKY 31 FESCUE SHALL NOT BE UTILIZED IN WETLAND

OR BUFFER AREAS. THE AREA SHOULD BE SEEDED AND MULCHED TO REDUCE EROSION AFTER CONSTRUCTION ACTIVITIES HAVE BEEN COMPLETED.

8. AFTER INSTALLATION HAS BEEN COMPLETED, MAKE POST CONSTRUCTION GRADES AND ELEVATIONS THE SAME AS THE ORIGINAL GRADES AND ELEVATIONS IN TEMPORARILY IMPACTED AREAS.

9. TO PROTECT AQUATIC SPECIES, IN-STREAM WORK IS PROHIBITED AS DETERMINED BY THE CLASSIFICATION OF THE STREAM:

   A. USE I WATERS: IN-STREAM WORK SHALL NOT BE CONDUCTED DURING THE PERIOD MARCH 1 THROUGH JUNE 15, INCLUSIVE DURING ANY YEAR.
   B. USE III WATERS: IN-STREAM WORK SHALL NOT BE CONDUCTED DURING THE PERIOD OCTOBER 1 THORUGH APRIL 30, INCLUSIVE, DURING ANY YEAR.
   C. USE IV WATERS: IN-STREAM WORK SHALL NOT BE CONDUCTED DURING THE PERIOD MARCH 1 THROUGH MAY 31, INCLUSIVE, DURING ANY YEAR.

10. STORMWATER RUNOFF FROM IMPERVIOUS SURFACES SHALL BE CONTROLLED TO PREVENT THE WASHING OF DEBRIS INTO THE WATERWAY.

11. CULVERTS SHALL BE CONSTRUCTED AND ANY RIPRAP PLACED SO AS NOT TO OBSTRUCT THE MOVEMENT OF AQUATIC SPECIES, UNLESS THE PURPOSE OF THE ACTIVITY IS TO IMPOUND WATER.

REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding $10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the

provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work

classification required by the contract work. This information is to be reported on Form FHWA-1391. The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding $2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 “Contract provisions and related matters” with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH–1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b.(1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for

determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b.(1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g. , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH–347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/esa/whd/forms/wh347instr.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed,

as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH–347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity

requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

(1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;

(2) the prime contractor remains responsible for the quality of the work of the leased employees;

(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and

(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.
2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost $25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1**. Instructions for Certification – First Tier Participants:**

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. “First Tier Covered Transactions” refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (https://www.epls.gov/), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. **Instructions for Certification - Lower Tier Participants:**

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost $25,000 or more - 2 CFR Parts 180 and 1200)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. “First Tier Covered Transactions” refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (https://www.epls.gov/), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the

department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed $100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such recipients shall certify and disclose accordingly.

AFFIRMATIVE ACTION REQUIREMENTS
UTILIZATION OF DISADVANTAGED BUSINESS ENTERPRISES
FOR FEDERAL-AID CONTRACTS

CONTRACT GOALS

FOR THE PURPOSE OF THIS CONTRACT, A GOAL OF **16** PERCENT HAS BEEN ESTABLISHED FOR SOCIALLY AND ECONOMICALLY DISADVANTAGED BUSINESSES THAT ARE OWNED AND CONTROLLED BY – THOSE INDIVIDUALS WHO ARE BLACK AMERICANS, HISPANIC AMERICANS, ASIAN-PACIFIC AMERICANS, SUBCONTINENT ASIAN AMERICANS, NATIVE AMERICANS, OR WOMEN PURSUANT TO THE MARYLAND DEPARTMENT OF TRANSPORTATION (MDOT) MINORITY BUSINESS ENTERPRISE PROGRAM:

The Design-Builder's good faith efforts to achieve the overall contract goal shall include a good faith effort to achieve DBE participation in professional services (including design, supplemental geotechnical investigations, surveying and other preliminary engineering; quality control as defined in the Contract; environmental compliance activities; utility coordination; permitting; and public information) for this contract of no less than 25**%** percent of the portion of the contract price allocable to professional services.

It is the policy of the Maryland Department of Transportation that disadvantaged business enterprises as defined in 49 CFR Part 26 and the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) shall have an equal opportunity to participate in the performance of the contracts financed in whole or in part with Federal funds under these agreements. Consequently, the disadvantaged business enterprise requirements of 49 CFR Part 26 and SAFETEA-LU apply to this agreement.

The bidder agrees to ensure that disadvantaged business enterprises as defined in 49 CFR Part 26 and SAFETEA-LU have an equal opportunity to participate in the performance of contracts and subcontracts financed in whole or in part with Federal funds provided under this agreement. In this regard, all bidders shall take all necessary and reasonable steps in accordance with 49 CFR Part 26 and SAFETEA-LU to ensure that disadvantaged business enterprises have an equal opportunity to compete for and perform on Federally funded contracts. The Maryland Department of Transportation and their bidders shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of this Contract.

A. GENERAL

For the purpose of these requirements, the following terms as defined below shall apply:

Administration Representative – A DBE/MBE Officer or employee of an Administration who enforces the laws and regulations pertaining to disadvantaged and minority business enterprise and contract compliance.

Affirmative Actions – Specific steps taken to eliminate discrimination and its effects, to ensure nondiscriminatory results and practices in the future, and to involve disadvantaged and minority business enterprises fully in contracts and programs.

Business Enterprises – Any legal entity which is organized in any form other than as a joint venture (e.g., sole proprietorship, partnership, corporation, etc.) to engage in lawful commercial transactions.

Certified Business – A business which by order of the Chair/MBE Advisory Council or his/hers designee, has been certified as a bona fide DBE/MBE. MDOT certification does not equate to a pre-qualification status.

DBE – Disadvantaged Business Enterprise – Reference 49 CFR, Part 26, Subpart A) a small business concern: (1) which is at least 51 percent owned by one or more socially and economically disadvantaged individuals. Where stock ownership is involved, the disadvantaged owner(s) shall own at least 51 percent of each class of voting stock and at least 51 percent of the aggregate of all classes of stock that have been issued (also applies to publicly owned businesses); and (2) whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who have ownership. In this specification the terms MBE and DBE have the same meaning.

DBE/MBE Directory – A compilation of businesses certified by MDOT as disadvantaged, minority, or socially and economically disadvantaged businesses. The directory will be published annually with quarterly supplements. It will also be provided in automated format and on the Internet to be updated as changes are made.

DBE/MBE Participation Packet – The documents submitted by the bidder or proposer pursuant to the appropriate special bid provisions. The DBE/MBE Participation Packet consists of the Certified DBE Utilization and Fair Solicitation Affidavit and the DBE Participation Schedule, both of which must be submitted with your bid or initial price proposal. The DBE Participation Packet also includes the following documents, which shall be submitted after bids or proposals are opened: Outreach Efforts Compliance Statement (MDOT-OP-018-2), DBE Subcontractor Project Participation Affidavit (MDOT-OP-019-2), MDOT Joint Venture Disclosure Affidavit (D-EEO-006), and Minority Contractor Unavailability Certificate (OOC46).

DBE/MBE Program – A program developed by MDOT to implement the requirements of Title 14, Subtitle 3 of the State Finance and Procurement Article, Annotated Code of Maryland; Title 10, Subtitle 3 of the State Finance and Procurement Article of the Annotated Code of Maryland for Leases of State-Owned Property; and 49 CFR, Part 26, Subparts A and C for all Federal Department of Transportation Financial Assistance Programs.

Director, Office of Equal Opportunity – The individual designated for the Administration's overall MBE compliance.

Joint Venture – An association of a DBE/MBE firm and one or more other firms to carry out a single, for-profit business enterprise, for which the parties combine their property, capital, efforts, skills, and knowledge, and in which the DBE/MBE is responsible for a distinct, clearly defined portion of the work of the contract and whose share in the capital contribution, control, management, risks, and profits of the joint venture are commensurate with its ownership interest.

Small Business Administration (SBA) 8(a) Certification – The SBA 8(a) Certification Program is a Federal Program which establishes firms as disadvantaged and eligible for participation in the Federal SBA Program.

Socially and Economically Disadvantaged Individual Pursuant to 49 CFR, Part 26 – Those individuals who are citizens of the United States (or lawfully admitted permanent residents). For convenience, these individuals and groups are referred to as "minorities" in this document and who are:

1. Found by the MDOT to be socially and economically disadvantaged on a case-by-case basis;

2. Any individual in the following groups, members of which are rebuttably presumed to be socially and economically disadvantaged.

a. "Black Americans," which includes persons having origins in any of the Black racial groups of Africa;

b. "Hispanic Americans," which includes persons of Mexican, Puerto Rican, Cuban, Dominican, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race;

c. "Native Americans," which includes persons who are American Indian, Eskimos, Aleuts, or Native Hawaiians;

d. "Asian-Pacific Americans," which included persons whose origins are from Japan, China, Taiwan, Korea, Burma (Myanmar), Vietnam, Laos, Cambodia (Kampuchea), Thailand, Malaysia, Indonesia, the Philippines, Brunei, Samoa, Guam, the U.S. Trust Territories of the Pacific Islands (Republic of Palau), the Commonwealth of the Northern Marianas Islands, Macao, Fiji, Tonga, Kirbati, Juvalu, Nauru, Federated States of Micronesia, or Hong Kong;

e. "Subcontinent Asian American," which includes persons whose origins are from India, Pakistan, Bangladesh, Bhutan, the Maldives Islands, Nepal or Sri Lanka;

f. Women;

3. Only those persons whose personal net worth does not exceed $750,000 may be found to be economically disadvantaged.

B. DBE/MBE and Good Faith Effort Requirements

1. This contract includes a DBE participation goal for subcontracting and/or procurement of materials and/or services. Bidders (or offerors) must make a good faith effort to meet the DBE participation goal **before bids or proposals are due**, including outreach efforts. A bid or initial proposal must include both a completed and executed Certified DBE Utilization and Fair Solicitation Affidavit and DBE Participation Schedule. The failure of a bidder to complete and submit these documents shall result in a determination that the bid is not responsive. The failure of an offeror to complete and submit these documents shall result in a determination that the proposal is not susceptible of being selected for award.

2. In making a good faith effort to achieve the DBE goal, prior to completing the Certified DBE Utilization and Fair Solicitation Affidavit and the DBE Participation Schedule and prior to submitting a bid or initial proposal the bidders (or offerors) including those bidders or offerors that are certified DBEs must:

a. Identify specific work categories within the scope of the procurement appropriate for subcontracting and/or procurement of materials and/or services;

b. Solicit DBEs in writing at least 10 days before bids or initial proposals are due, describing the identified work categories and providing instructions on how to bid on the subcontracts and/or procurement of materials and/or services;

c. Attempt to make personal contact with the DBEs solicited and to document these attempts;

d. Assist DBEs to fulfill, or to seek waiver of, bonding requirements; and

e. Attend prebid or other meetings the procurement agency schedules to publicize contracting opportunities to DBEs.

3. All firms bidding on a Federal-Aid Contract shall submit the name and address of all subcontractors, service providers and suppliers that submitted quotes on the Contract. All subcontractors, service providers and suppliers shall complete and submit the form entitled Contractor Information, to the Administration.

4. The bidder shall seek commitments from disadvantaged business enterprises by subcontracting and/or procurement of materials and/or services, the combined value of which equals or exceeds the appropriate percent (goal) of the total value of the prime contract. A bidder may count toward its DBE goals expenditures for materials and supplies obtained from DBE regular dealers and/or manufacturers provided that the DBEs assume the actual and contractual responsibility for the provision of the materials and supplies. The bidder may count its entire expenditure to a DBE manufacturer (i.e., a supplier that produces goods from raw materials or substantially alters them before resale). The bidder may count sixty (60) percent of its expenditures to a DBE regular dealer that is not a manufacturer, provided that the DBE supplier performs a commercially useful function in the supply process. The apparent low bidder shall submit to the Administration, within ten (10) business days after notification that it is the apparent low bidder, an acceptable Affirmative Action Plan for the utilization of Disadvantaged Business Enterprises in this Contract. The Contract will not be awarded without the Bidder's AAP being approved by the Administration.

The Affirmative Action Plan shall include as a minimum:

a. The name of an employee designated as the bidder's liaison officer for minority affairs.

b. A complete DBE Subcontractor Project Participation Affidavit (MDOT-OP-019-2), using contractors whose names appear in the DBE/MBE directory or who are otherwise certified by MDOT as being a disadvantaged business enterprise. Except as permitted by law and approved by the Administration, this affidavit shall include all DBE firms identified on the DBE Participation Schedule with a percentage of participation that meets or exceeds the percentage of participation indicated in the bid or initial proposal.

c. A completed Outreach Efforts Compliance Statement (MDOT-OP 018-2).

5. When a bidder intends to attain the appropriate goal for disadvantaged business enterprise participation by use of a joint venture, the bidder shall submit a Joint Venture Disclosure Affidavit (Form D-EEO-006-A) showing the extent of disadvantaged business participation. If a bidder intends to use a joint venture as a subcontractor to meet its goal, the affidavit shall be submitted through the bidder by the proposed subcontractor and be

signed by all parties. A DBE, even in a joint venture arrangement shall be certified as a DBE by MDOT prior to being included in the Affirmative Action Plan.

6. Where the proposed DBE participation does not meet the DBE contract goals, sufficient evidence to demonstrate that the bidder has taken all necessary and reasonable steps to make a good faith effort to meet these goals shall be required.

7. Determination of Bid Responsiveness for Federal-Aid Contracts

If the bidder is unable to secure from DBEs by subcontracting and/or by procurement of materials and/or services, commitments which at least equal the appropriate percent (goal) of the values of the prime Contract at the time of bid, he shall request, in writing, a waiver of the unmet portion of the goal. This request must be initiated by checking the appropriate box on the Certified DBE Utilization and Fair Solicitation Affidavit submitted with the bid or initial proposal.

The waiver may be granted by the Administrator. To obtain approval of a waiver, the bidder shall submit the following information:

a. A detailed statement of efforts made prior to bid to contact and negotiate with DBEs including: (i) the dates, names, addresses, and telephone numbers of DBEs who were contacted; (ii) a description of the information provided to DBEs requesting the plans, specifications, and anticipated time schedule for portions of the work to be performed and (iii) a detailed statement of the reasons why additional prospective agreements with DBEs were not reached;

b. A detailed statement of the efforts made to select portions of the work proposed to be performed by DBEs in order to increase the likelihood of achieving the stated goals;

c. For each DBE that the Contractor considers not qualified, but from which a bid has been received, a detailed statement of the reasons for the bidder's conclusion; and

d. For each DBE contacted but unavailable, (i) a Minority Contractor Unavailability Certificate (Form OOC46) signed by the disadvantaged business enterprise, or (ii) a statement from the bidder shall be submitted that states that the DBE refused to sign the Certificate.

8. Guidance concerning good faith efforts. The following is a list of the types of actions and factors that will be used to determine the bidder's or offeror's good faith efforts to obtain DBE participation. It is not intended to be a mandatory checklist, nor is it intended to be exclusive or exhaustive. Other factors or types of efforts may be relevant in appropriate cases.

(1) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of certified DBEs who have the capability to perform the work of the contract. The bidder must solicit this interest within sufficient time to allow the DBEs to respond to the solicitation. The bidder must determine with certainty if the DBEs are interested by taking appropriate steps to follow up initial solicitations.

(2) Selecting portions of the work to be performed by DBEs in order to increase the likelihood that the DBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the bidder or offeror might otherwise prefer to perform these work items with its own forces.

(3) Providing interested DBEs with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.

(4) (a) Negotiating in good faith with interested DBEs. It is the bidder's or offeror's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to facilitate DBE participation.

(b) A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBEs is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable. Also, the ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidders and offerors are not, however, required to accept higher quotes from DBEs if the price difference is excessive or unreasonable.

(5) Not rejecting DBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The contractor's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the contractor's efforts to meet the project goal.

(6) Making efforts to assist interested DBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or contractor.

(7) Making efforts to assist interested DBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.

(8) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state, and Federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBEs.

(9) In determining whether a bidder or offeror has made good faith efforts, you may take into account the performance of other bidders or offerors in meeting the contract goal. For example, when the apparent successful bidder or offeror fails to meet the contract goal, but others meet it, the Administration may reasonably raise the question of whether, with additional reasonable efforts, the apparent successful bidder or offeror could have met the goal. If the apparent successful bidder or offeror fails to meet the goal, but meets or exceeds the average DBE participation obtained by other bidders or offerors, the Administration may view this, in conjunction with other factors, as evidence of the apparent successful bidder or offeror having made good faith efforts.

9. Bidder Use of DBE Special Services

The bidder shall consider, whenever possible, utilizing the services of minority-owned banks. Most minority banks are full-service corporations that can provide an array of financial services such as Treasury and Tax Loan fund accounts, time and demand deposit accounts, payroll services, and if needed, organization investment counseling.

10. Bidder Records

The bidder shall maintain records showing actions which have been taken to comply with procedures set forth herein.

11. Bidder Cooperation

The bidder shall cooperate with the Administration Representative in any reviews of the Contractor's procedures and practices with respect to DBEs which the Administration Representative may from time to time conduct.

12. Bidder DBE Modifications

During the life of the Contract, all plans to modify the approved DBE participation program will require the approval of the Administrator or his authorized representative. This shall include any changes to the items of work to be sublet or materials and services to be obtained which differ for those in the original DBE participation program. Any such request for revisions shall be directed to the appropriate District Engineer for their disposition.

C. RECORDS AND REPORTS

1. The Contractor shall keep such records as are necessary to determine compliance with its Minority Business Enterprise utilization obligations. The records kept by the Contractor shall be designed to indicate:

a. The name of disadvantaged and non-disadvantaged subcontractors and suppliers, the type of work materials or services being performed on or incorporated in this project, and the monetary value of such work materials or services.

b. Documentation of all correspondence, contacts, telephone calls, etc., to obtain the services of disadvantaged business enterprises on this project.

c. The progress and efforts made in seeking out disadvantaged contractor organizations and individual disadvantaged contractors for work on this project.

2. Information required to be submitted for Federally Assisted contracts in accordance with 49 CFR Part 26:

a. All bidders (not only the apparent successful bidder) shall provide the following information:

(1) The age of the bidding firm; and

(2) The annual gross receipts of the bidding firm.

b. All bidders (not only the apparent successful bidder) shall provide the following information for each firm quoting or considered as subcontractors:

(1) The name of firm; and

(2) The address of firm.

c. The Administration will contact each of the firms quoting or considered as subcontractors to obtain:

(1) The age of the firm; and

(2) The annual gross receipts of the firm

If this information already has been gathered by the Administration on a firm and it is current, it will not be requested.

3. The Contractor shall submit reports on a monthly basis of those contracts and other business transactions executed with disadvantaged business enterprises with respect to the records referred to in Subparagraph 1.a above, in such form, manner, and content as prescribed by the Administration. The reports shall be due monthly on the 15th calendar day of each month. If the Contractor cannot submit their report on time, they shall notify the Administration's Representative and request additional time to submit the report. Failure of the Contractor to report in a timely manner may result in a finding of noncompliance. Additional reports may be required by the Administration upon written request.

4. To ensure compliance with the certified DBE contract participation goals, the Contractor shall:

a. Submit monthly, a report listing unpaid invoices, over 30 days, from all certified DBE subcontractors and the reason payment has not been made;

b. Include in its agreement with certified DBE subcontractors a requirement that the DBE subcontractors are to submit monthly to the Administration, a report identifying the prime Contractor and listing the following:

1. Payment received from the Contractor in the preceding 30 days; and

2. Invoices for which the subcontractor has not been paid.

5. All such records shall be retained for a period of three years following acceptance of final payment and shall be available for inspection by the U.S. Department of Transportation, the Maryland Department of Transportation, and the Administration.

D. ADMINISTRATIVE PROCEDURES FOR ENFORCEMENT

1. Whenever the Administration believes the prime Contractor or any subcontractor may not be operating in compliance with the terms of these provisions, the Administration Representative will conduct an investigation. If the Administration Representative finds the prime Contractor or any subcontractor not in compliance with these provisions, he will make a report of non-compliance and notify such Contractor in writing of the steps that will, in the judgment of the Administration, bring the Contractor into compliance. If the Contractor fails or refuses to comply fully with such steps, the Administration Representative will make a final report of noncompliance to the Administrator, who may direct the imposition of one or more of the sanctions listed below:

a. Suspension of work on a project, pending correction;

b. Withholding payment or a percentage thereof, pending correction;

c. Referral of DBE/MBE to MDOT Office of MBE for review for decertification or minority business fraud investigation;

d. Referral to MDOT Office of MBE for review/referral to the Attorney General's Office for review for initiation of debarment;

e. Referral to the Attorney General's Office for review for debarment or for criminal prosecution through the MDOT Office of General Counsel; or

f. Any other action as appropriate.

The Administrator will determine which sanction(s) should be imposed in order to promote the purpose of the MDOT DBE/MBE Program.

2. If the documents used to determine the status of a DBE contain false, misleading, or misrepresenting information, the matter may be referred to the MDOT Office of MBE for appropriate action.

3. Loss of DBE Certification

a. When a prime Contractor has made a commitment to use a DBE who has lost its certification but the subcontract has not been executed prior to the notice of loss of certification, the prime Contractor is required to obtain an eligible, certified DBE for the contract or demonstrate to MDOT that it has made a good faith effort to do so.

b. When a prime Contractor has executed a contract with a DBE subcontractor before the notice of loss of certification, the prime Contractor may continue to use the firm on the contract and may continue to receive credit towards its DBE goal, i.e., contract goal, for the work of that subcontractor.

c. The work carried out by a DBE Prime Contractor would be counted by MDOT up to the loss of certification. The work performed after the loss of certification would not be considered DBE participation.

d. When a DBE subcontractor has lost its certification, MDOT may not continue to count the DBE participation which takes place after the loss of certification as DBE work when counting participation towards the overall goal of the modal administration or the Department.

e. If a DBEs loss of certification is the result of exceeding the size standards while performing on a contract, the DBE participation may be counted for both the contract goal and the overall goal.

E. SUBCONTRACTING.

Subcontracting by the Prime Contractor. Form B Request for Approval of Subcontractor shall be used by the Prime Contractor to request approval of a Subcontractor and also to ensure that a formal Subcontract has been or will be written and kept on file by the Prime Contractor. Completion and submittal of the form by the Prime Contractor acknowledges that the Administration's Contracting Officer may require the submission of the written Subcontract for review by the Administration and/or FHWA.

Lower Tier Subcontracting by an Approved Subcontractor. Form B Subcontractor's Request for Approval of Lower Tier Subcontractor shall be used by an Approved Subcontractor to request approval of a Lower Tier Subcontractor and also to ensure that a formal Subcontract has been or will be written and kept on file by the Subcontractor. Completion and submittal of the form by the Subcontractor acknowledges that the Administration's Contracting Officer may require the submission of the written Subcontract for review by the Administration and/or FHWA.

Form Acquisitions. Maryland State Highway Administration Form B may be acquired through the Administration's Contracts Award Team or District Office. All questions should be directed to the Office of Construction, Contracts Award Team.

It is the Administration's intention to randomly select during each calendar quarter a representative sample of written Subcontracts for review. This review will be conducted by the Office of Construction's Contracts Award Team.

NOTICE TO CONTRACTORS

CONCERNING THE MBE/DBE GOAL ON THIS CONTRACT

The Maryland Department of Transportation is committed to providing the maximum amount of contracting opportunities to certified Minority Business Enterprises (MBEs) and Disadvantaged Business Enterprises (DBEs). The previously established policy excluded consideration of the cost of supplying structural steel for MBE/DBE participation since there were no structural steel manufacturers certified by MDOT. This exemption is no longer applicable since MBE/ DBE firms have been certified under this category.

The Administration reserves the right to verify the accuracy of the dollar value included on the Contractor's Affirmative Action Plan, including the value associated with the manufacture, supply, and installation of structural steel.

MBE/DBE COMPLIANCE FIELD MEETING

A MBE/DBE compliance Field Meeting will be conducted to review the responsibilities of the Administration and the Contractor's personnel relative to MBE/DBE Compliance and documentation. The meeting will be held within two weeks after starting work on the project.

The Construction Project Engineer, who will notify the following of the date, time and location, will arrange the meeting. At least one week advanced notice will be required.

(a) Administrative Representatives.

(1) Director, Office of Equal Opportunity or Designee

(2) District Equal Opportunity Officer

(3) Regional Constructional Engineer

(4) Construction Project Engineer

(5) Construction Inspection Division Inspector

(b) Contract Representatives.

(1) Superintendent - Prime Contractor

(2) Equal Opportunity Officer - Prime Contractor

(3) Owner/Superintendent/Foreman MBE/ DBE - Subcontractor

The Construction Project Engineer and Equal Opportunity Representative will jointly conduct the meeting. The Contractor shall notify the appropriate subcontractors and ensure their attendance.

TRAFFIC CONTROL PLAN CERTIFICATION FOR DESIGN-BUILD

PRIOR TO THE COMMENCEMENT OF WORK ON THIS PROJECT, THE SUCCESSFUL BIDDER WILL BE REQUIRED TO COMPLETE A TRAFFIC CONTROL PLAN CERTIFICATION, CONTAINING THE INFORMATION SHOWN BELOW. THE CERTIFICATION FORM WILL BE PROVIDED TO THE SUCCESSFUL BIDDER UPON AWARD OF THE CONTRACT.

The Administration's Traffic Control Plan (TCP) has been reviewed and the following course of action shall be followed:

Option 1 ___See Note Below
The TCP is accepted and shall be used on this project.

Option 2 ___See Note Below
The TCP is accepted; however, revisions and/or additions shall be submitted for approval in conformance with the Administration's Specifications 104.01.

Option 3
The TCP is not accepted and revision shall be submitted for approval in accordance with the Administration's Specifications 104.01.

It is understood that the effective implementation of the approved TCP is the responsibility of the Contractor. Minor modifications may be made by the Traffic Manager if field conditions warrant and prior concurrence is obtained from the Engineer. Significant changes to the TCP will be submitted to the Engineer in writing, for approval, in conformance with the Administration's Specifications 104.01.

_____ _____
(DATE) (SIGNATURE)

_____
(PRINT SIGNATURE)

_____
(TITLE)

Note: Option 1 and 2 shall not be used on this project.
This is a Design-build project and the Design-Build Team must prepare a TCP based on the requirements in the Administrations Specifications 104.01.

PREVAILING WAGE
INSTRUCTIONS FOR THE CONTRACTOR

PAYROLLS.

Non-Federally Funded Contracts. The Division of Labor and Industry, Prevailing Wage Unit is requiring that all certified payroll records be submitted electronically. For instructions on how to register and submit go online to www.dllr.state.md.us/prevwage and follow the instructions for registering. The regulation addressing this change can be found at COMAR 21.11.11.02. For Non-Federally funded projects, which include prevailing wage rates**,** the prime Contractor and each subcontractor, shall submit the certified payroll electronically and provide one hard copy to the Project Engineer. All wages shall be paid in conformance with the State Finance and Procurement Article, Section 17-201-17-226 of the Annotated Code of Maryland and the Fair Labor Standards Amendments of 1974 (P.L. 93259). If the award amount of a Non-Federally funded job is less than $500,000, the project will be exempt from prevailing wage requirements.

A review has been made of the wage conditions in the locality and, based on the information available, the wage rates and fringe payments listed are determined by the Commissioner of the Department of Labor and Industry to be prevailing for the Contract for the described classes of labor in conformance with the law. It shall be the responsibility of the Contractor to fully comply with the law and to contact the Office of the Commissioner of Labor and Industry for interpretation of the provisions of the law.

Federally Funded Contracts. For Federally funded projects, the prime Contractor and each subcontractor shall submit one copy of the certified payroll to the Project Engineer.

General Requirements for Federally and Non-Federally Funded Contracts. All payrolls are subject to the following requirements:

(a) All payrolls shall be numbered, beginning at No. 1, and consecutively numbered through the end of the Contract.

(b) Contract and FAP numbers shall be shown on all payrolls (as applicable).

(c) All payroll submissions shall include:

(1) Federally Funded – employees' full name, classification, and Individual Identifying Number (IIN) e.g. (last four digits of social security number). Refer to FHWA 1273 (IV),(3),(b)1) for further requirements related to weekly payrolls.

(2) Non-Federally Funded – employees' full name, classification, address and social security number.

(d) All payrolls shall show the employee's basic hourly wage rate, overtime rate (if applicable), and the number of hours worked (tabulated both daily and weekly).

(e) When fringe benefits are required, indicate separately the amount of employer contributions to fringe benefit funds and/or programs. The fringe benefits shall be individually identified, but may be tabulated on a separate sheet. When required fringe benefits are paid in cash, add the required fringe benefit amount to the basic hourly rate to obtain the total prevailing wage rate for the employee.

(f) The employee's net pay and the itemized deductions shall be included in all payrolls.

(g) A Contractor may make deductions that are required by law or required by a collective bargaining agreement (between the Contractor and a bona fide labor organization). Deductions are also permitted if they are identified in a written agreement between the employee and employer that was made at the beginning of employment, provided that the Contractor presents the agreement to the Administration before the employee begins working on the Contract. Each payroll shall also include the U.S. Department of Labor and Hour Public Contracts Division Statement of Compliance Form WH-347 (or its equivalent), signed by an appropriate official of the Contractor/subcontractor. The Contractor's name, address, and telephone number shall also be shown.

(h) On Non-Federally funded projects, all apprentices shall be registered with the Maryland Apprenticeship and Training Council.

(i) Contractors employing a classification of worker for which a wage rate was not included on the original wage decision, shall submit to either the Wage and Hour Team (Federally Funded) or Department of Labor and Licensing (DLLR), (Non-Federally Funded), a request for an additional classification and rate prior to the employee's employment at the project.

(j) Payrolls for Non-Federally Funded projects shall be submitted within 14 calendar days after the end of each payroll period.

(k) Payrolls for Federally Funded projects shall be submitted within 7 calendar days after the end of each payroll period.

(l) Contractors and Subcontractors are required to maintain complete social security numbers and home addresses for employees. Government agencies are entitled to request or review all relevant payroll information, including social security numbers and addresses of employees. Contractors and Subcontractors are required to provide such information upon request.

OVERTIME.

Non-Federally Funded Contracts. Overtime rates shall be paid by the prime Contractors and subcontractors under their Contracts and agreements with their employees, which in no event shall be less than time and a half the prevailing hourly rate of wages for all hours worked in excess of ten hours in any one calendar day or forty hours in any one calendar week and work performed on Sundays and legal holidays.

Fringe benefits shall be paid for all hours worked, including the overtime hours. However, the fringe benefit amounts may be excluded from the half time premium due as overtime compensation.

Federally Funded Contracts. Overtime rates shall be paid as specified in Form FHWA 1273. Fringe benefits shall be paid for all hours worked, including the overtime hours. However, the fringe benefit amounts may be excluded from the half time premium due as overtime compensation.

PENALTIES.

Non-Federally Funded Contracts. When the Contractor is delinquent in submitting payroll records, processing of partial payment estimates will be held in abeyance, pending receipt of the records. The Contractor shall be liable to the Administration for liquidated damages in the amount of $10.00 for each calendar day the records are late.

The Contractor shall be liable to the Administration for liquidated damages in the amount of $20.00 for each day that an employee is paid less than the prevailing wage.

Federally Funded Contracts. When the Contractor is delinquent in submitting payroll records, processing of partial payment estimates will be held in abeyance pending receipt of the records.

ADDITIONAL CLASSIFICATIONS.

Federally Funded Contracts. If the wage determination lacks a necessary classification the Prime Contractor is responsible to submit the request for the additional classification, with a proposed rate, to the State Highway Administration's Wage and Hour Team. The request is to include a copy of the projects wage determination.

Non-Federally Funded Contracts. If the wage determination lacks a necessary classification the Prime Contractor is responsible to submit the request for the additional classification, with a proposed rate, to the Department of Labor and Licensing (DLLR).

INQUIRIES.

Request for information or questions shall be addressed to:

Maryland State Highway Administration
Office of Construction
Wage and Hour Team
7450 Traffic Drive, Building #4
Hanover, MD 21076
or
Email: wageandhourteam@sha.state.md.us

General Decision Number: MD180013 01/05/2018 MD13

Superseded General Decision Number: MD20170013

State: Maryland

Construction Type: Highway

County: Howard County in Maryland.

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.35 for calendar year 2018 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.35 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2018. The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/05/2018

SUMD2015-008 09/15/2015

	Rates	Fringes
CARPENTER	$ 26.01	12.55
CEMENT MASON/CONCRETE FINISHER	$ 24.61	9.64
ELECTRICIAN	$ 37.69	14.65
IRONWORKER, REINFORCING	$ 27.05	17.31
IRONWORKER, STRUCTURAL	$ 26.97	15.87
LABORER: Asphalt, Includes Raker, Shoveler, Spreader and Distributor	$ 18.39	5.87

LABORER: Concrete Surfacer	$ 20.99	5.87
LABORER: Grade Checker	$ 19.11	16.35
LABORER: Luteman	$ 21.75	5.87
LABORER: Mason Tender - Cement/Concrete	$ 19.11	16.35
LABORER: Pipelayer	$ 20.65	6.06
LABORER: Common or General, Includes Flagger	$ 16.50	5.87
OPERATOR: Backhoe/Excavator/Trackhoe	$ 26.45	12.15
OPERATOR: Bobcat/Skid Steer/Skid Loader	$ 23.49	12.15
OPERATOR: Boom	$ 23.49	12.15
OPERATOR: Broom/Sweeper	$ 23.49	12.15
OPERATOR: Bulldozer	$ 26.45	12.15
OPERATOR: Crane	$ 30.30	15.30
OPERATOR: Distributor	$ 23.24	1.88
OPERATOR: Gradall	$ 27.45	12.15
OPERATOR: Loader	$ 26.45	12.15
OPERATOR: Milling Machine	$ 26.45	12.15
OPERATOR: Paver (Asphalt, Aggregate, and Concrete)	$ 25.55	12.15
OPERATOR: Piledriver	$ 26.01	12.55
OPERATOR: Roller	$ 25.55	12.15
OPERATOR: Screed	$ 21.99	3.56
PAINTER: Bridge	$ 33.23	9.40
SCAFFOLD BUILDER	$ 26.01	12.55
TRUCK DRIVER: Dump Truck	$ 22.00	0.00
TRUCK DRIVER: Flatbed Truck	$ 19.10	0.00
TRUCK DRIVER: TackTruck	$ 22.94	7.87
TRUCK DRIVER: Water Truck	$ 25.70	6.96

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

NOTICE OF ACTIONS REQUIRED FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246)

1. The Offeror's or Bidders attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Specifications" set forth herein.

2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate work force in each trade on all construction work in the covered area, are as noted in Appendix A and B:

These goals are applicable to all the Contractors' construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the contractor also is subject to the goals for both its federally involved and nonfederally involved construction.

The contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this notification. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed.

4. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is noted on appendix B.

STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS (Executive Order 11246)

1. As used in these specifications:

a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;

b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;

c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.

d. "Minority" includes:

(i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

(ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish culture or origin regardless of race);

(iii) Asian and Pacific Islander (all persons having origins in any of the original people of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and,

(iv) American Indians or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7.a through 7.p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. The Contractor is expected to make substantially uniform progress toward its goal in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with reason therefore, along with whatever additional actions the Contractor may have taken.

d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7.b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the

policy with all management personnel and with all minority and female employees at least once a year and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO Policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to insure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7.a through 7.p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more if its obligations under 7.a through 7.p of these specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female work force participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's non-compliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).

10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

14. The Contractors shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at

which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents

(a.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

16. The Contractor will receive at the time of Award Federal Form CC-257 for his use in reporting monthly the Affirmative Actions for minority and female which he has employed.

APPENDIX A

The following goals and timetables for female utilization shall be included in all Federal and federally assisted construction contracts and subcontracts in excess of $10,000. The goals are applicable to the Contractor's aggregate on-site construction work force whether or not part of that work force is performing on a Federal or federally assisted construction contract or subcontract.

AREA COVERED: Nationwide

GOALS AND TIMETABLES

Timetable	Goals (percent)
From April 1, 1978 until March 31, 1979.....	3.1
From April 1, 1979 until March 31, 1980.....	5.0
From April 1, 1980 until further notice.....	6.9

APPENDIX B

Until further notice, the following goals for minority utilization in each construction craft and trade shall be included in all Federal or federally assisted construction contracts and subcontracts in excess of $10,000 to be performed in the respective geographical areas. The goals are applicable to each nonexempt contractor's total on-site construction work force, regardless of whether or not part of that work force is performing work on a Federal, federally assisted or nonfederally related project, contract or subcontract.

Construction contractors which are participating in an approved Hometown Plan (see 41 CFR 60-4.5) are required to comply with the goals of the Hometown Plan with regard to construction work they perform in the area covered by the Hometown Plan. With regard to all their other covered construction work such contractors are required to comply with the applicable SMSA or EA goal contained in this appendix B-80.

State	Goal (percent)
Maryland:	
019 Baltimore, MD:	
SMSA Counties:	
0720 Baltimore, MD.....	23.0
MD Anne Arundel; MD Baltimore;	
MD Carroll; MD Harford;	
MD Howard; MD Baltimore City	
Non-SMSA Counties.....	23.6
MD Caroline; MD Dorchester;	
MD Kent; MD Queen Annes;	
MD Somerset; MD Talbot;	
MD Wicomico; MD Worcestar	
Washington, DC:	
020 Washington, DC:	
SMSA Counties:	
8840 Washington, DC.....	28.0
MD Charles; MD Montgomery;	
MD Prince Georges	
Non-SMSA Counties.....	25.2
MD Calvert; MD Frederick	
MD St. Marys; MD Washington	
Pennsylvania	
Non-SMSA Counties.....	4.8
MD Allegany: MD Garrett	

TRAINING PROVISIONS

As part of the Contract's Equal Employment Opportunity Affirmative Action Program, on-the-job training shall be provided as follows:

The on-the-job training shall be aimed at developing full journeypersons in the type of trade or job classification involved. On this Contract **4** (number to be filled in by the Administration) persons will be trained.

In the event that a Contractor subcontracts a portion of the Contract work, the Contractor shall determine how many, if any, of the trainees are to be trained by the subcontractor, however, the Contractor shall retain the primary responsibility for meeting the training requirements imposed by this Provision. The Contractor shall also insure that this training Provision is physically included in each subcontract to insure that the workforce utilized by the subcontractor meet the goals for minority and female employment and training. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

The number of trainees in each classification shall be distributed among the work classifications on the basis of the Contractor's needs, minority and women employment goals specified for each trade in the Contract Provision, and the reasonable area of recruitment.

Prior to beginning construction, the Contractor shall submit to the Administration for approval a Manpower and Training Utilization (MTU) Schedule no later than at the preconstruction meeting.

The MTU schedule shall include:

1. The proposed training programs.

2. The number of trainees to be trained in each classification.

3. Anticipated starting and ending dates for training in each classification.

No Contract work may be undertaken until the Administration has accepted the schedule.

If the submitted training programs fail to meet the requirements as defined within these Provisions, the Administration will withhold one percent of the total category code one pay items from the payment due the Contractor. The Contractor shall submit a revised Manpower and Training Utilization Schedule when major changes in the Contract work schedule occur that substantially affect the previously submitted schedule.

The Contractor shall be credited for each trainee employee who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for the hourly cost of the trainee as specified in the schedule of prices.

Training and upgrading of minorities and women toward journeyperson status is a primary objective of this Training Provision. The purpose for this objective is to insure a pool of qualified minorities and women to replace those journeypersons who, in the natural course of events will leave the workforce. The program will also provide opportunities to the minorities and women trainees in geographic areas where shortages in minority and women journeypersons are prevalent and recognized due to the Contractor's inability to meet the Equal Employment Opportunity goals specified in this Contract.

The training requirements of this Training Provision are not intended nor shall they be used to discriminate against any applicant for training, whether a member of a protected class or not. It is the Contractor's responsibility to demonstrate good faith efforts to ensure an adequate workforce representation of minorities and women in all job classifications on this Contract. Therefore, the Contractor shall consider the employment Contract goals set for minorities and females when enrolling trainees. The Contractor's utilization of the on-the-job training goals will be weighed when an Equal Employment Opportunity workforce compliance determination is made.

The Contractor shall make every effort to enroll minority and women trainees (e.g., by conducting systematic and direct recruitment through public and private sources likely to yield minorities and women to the extent that these persons are available within a reasonable area of recruitment).

No employee shall be employed as a trainee in any classification which the individual has successfully completed a training program leading to journeyperson status or has been employed as a journeyperson. This includes a person gainfully employed as a journeyperson by virtue of informal on-the-job training. The Contractor should satisfy this requirement by including appropriate questions in the employee job application or by other suitable means. Regardless of the method used, the Contractor's records shall document the findings in each case. In the case of apprentices, evidence of indentureship and registration of the approved apprenticeship program shall be included in the Contractor's records.

The minimum length and type of training and rate for each classification shall be specified in the training program by the Contractor and approved by the Administration and the Federal Highway Administration.

The Administration will approve any program specified in the Administration's On-The-Job Training Manual. The Administration and the Federal Highway Administration will consider other programs if it is reasonably calculated that the programs conform to the Equal Employment Opportunity obligations of the Contract and will qualify the average trainee for journeyperson status in the specified classification by the end of the training period. Apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau, and training programs approved by, but not necessarily sponsored by the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training will also be acceptable, provided that the program being offered is administered in a manner consistent with the Equal Employment obligation of Federal-aid highway construction Contracts and meets the minimum requirements of this Training Provision.

Some offsite training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

Unless otherwise specified, the Contractor will be reimbursed 80 cents per hour of training given an employee on this Contract in conformance with an approved training program. As approved by the Engineer, reimbursement will be made for training persons in excess of the number specified herein. This reimbursement will be made even though the Contractor received additional training program funds from other sources, provided that the other sources do not specifically prohibit the Contractor from receiving other reimbursement. Reimbursement for offsite training indicated above will only be made to the Contractor where the Contractor does one or more of the following and the trainees are concurrently employed on a Federal-aid project:

1. Contributes to the cost of the training.

2. Provides the instruction to the trainee or pays the trainee's wages during the offsite training period.

No payment will be made to the Contractor if either the failure to provide the required training, or the failure to hire the trainee as a journeyperson is caused by the Contractor and evidences a lack of "good faith" on the part of the Contractor in meeting the requirements of this Training Provision. It is normally expected that a trainee will begin training on the project as soon as feasible after the start of work utilizing the skill involved and remain on the project as long as training opportunities exist in the work classification or until the program is completed. It is not required that all trainees be on board for the entire length of the Contract. A Contractor will have fulfilled their responsibilities under this Training Provision when:

1. Systematic and direct recruitment likely to yield qualified minority and women applicants is conducted through:

a. Public and private referral sources.

b. Advising the existing workforce of training opportunities.

c. Unions (if applicable).

2. Acceptable training has been provided to trainees enrolled in the program.

3. The number of specified trainees have completed the minimum hours required in an approved training program.

4. Trainees completing approved programs are retained in the workforce as journeypersons.

The Contractor shall pay the trainees at least 60 percent of the appropriate minimum journeyperson's hourly rate plus the full fringe benefits specified in the Contract for the first half of the training period, 75 percent for the third quarter of the training period plus full fringe benefits, and 90 percent for the last quarter of the training period plus full fringe benefits. However, in no case shall the total hourly rate be less than the U.S. Department of Labor's unskilled laborer wage rate for the project. In addition, all trainees shall be identified as such on the certified payroll.

The Contractor shall furnish the trainee a copy of the approved training program in which the trainee is enrolled. The Contractor shall provide each trainee with a certificate showing the type and length of training satisfactorily completed. The Contractor shall submit a Certificate to the trainee in the following instances:

1. Certificate of Completion when a trainee completes the total number of hours required to complete a training program.

2. Certificate of Training when a trainee does not totally complete the required program hours.

The Contractor shall provide for the maintenance of records and furnish periodic reports inclusive of the Administration's Contractor's Semiannual Training Reports, documenting his performance under this Training Provision. The Semiannual Training Report is to be submitted by the 10th of the month following the reporting period (July 10 and January 10).

If the Contractor fails to fully comply with these Training Provisions, the Administration's Representative will make a final report of non compliance to the Administrator, who may direct the imposition of one or both of the sanctions listed below:

1. Withholding a percentage of the progress payment.

2. Other action appropriate and/or within the discretion of the Administrator.

NOTICE TO ALL HOLDERS OF THIS CONTRACT DOCUMENT

HIGH VISIBILITY SAFETY APPAREL POLICY

BACKGROUND. Research indicates that high visibility garments have a significant impact on the safety of employees who work on highways and rights-of-way. In addition, high visibility garments may help to prevent injuries and accidents and to make highway workers more visible to the motoring public, which ultimately improves traffic safety.

STATEMENT OF POLICY.

(a) The High Visibility Safety Apparel Policy provides a standardized apparel program.

(b) The program seeks to improve the visibility of all persons who work on Administration highways and rights-of-way.

(c) All apparel shall contain the appropriate class identification label.

(d) Compliance with this policy is retroactive and becomes effective immediately. All affected employees shall receive high visibility apparel awareness training.

APPLICABILITY. This policy applies to all Administration employees and all other persons who work on Administration highways and rights-of-way. All workers shall wear, at a minimum, Class 2 ANSI/ISEA 107/2004 apparel.

(a) For Administration employees, this apparel shall have a fluorescent yellow-green background material color and be the outermost garment worn.

(b) Retro-reflective material color for Administration employee apparel shall be silver or white and be visible at a minimum distance of 1,000 feet. The retro-reflective safety apparel shall be designed to clearly recognize and differentiate the wearer from the surrounding work environment. The retro-reflective material may be contrasted by fluorescent orange background material not exceeding one and one half inches on either side of the retro-reflective material.

(c) For non-Administration employees, this apparel shall be either fluorescent orange-red or fluorescent yellow-green background material color and be the outermost garment worn.

(d) Retro-reflective material color for non-Administration employee apparel shall either be orange, yellow, white, silver, yellow-green, or a fluorescent version of these colors, and be visible at a minimum distance of 1,000 feet. The retro-reflective safety apparel shall be designed to clearly recognize and differentiate the wearer from the surrounding work environment.

REFERENCES.

(a) ANSI/ISEA 107/2004 standard – American National Safety Institute/International Safety Equipment Association

(b) MUTCD 2009 – Manual for Uniform Traffic Control Devices - Sections 6D.03B and 6E.02

(c) Visibility Research – The VCTR 1989 report concludes that fluorescent colors, when compared with non-fluorescent colors, enhance the daytime conspicuity of worker clothing.

DEFINITIONS.

(a) Apparel – The outermost high-visibility garment worn by employees who work on Administration highways and rights-of-way.

(b) Highways – All roads owned by the Maryland Department of Transportation and maintained by the Administration.

(c) High Visibility – The ability for workers to be distinguishable as human forms to be seen, day and night, at distances that allow equipment operators and motorists to see, recognize, and respond.

SPECIFICATIONS

All work on this project shall conform to the Maryland Department of Transportation, State Highway Administration's Specifications entitled, "2017 Standard Specifications for Construction and Materials" dated April 2017 revisions thereof, or additions thereto, and the Special Provisions included in this Request for Proposals.

In the following sections of the "2017 Standard Specifications for Construction and Materials." Dated April 2017, the word "Engineer" shall be taken to mean "Design-Build Engineer."

Category 100 Preliminary

Section 101.03.02	¶ 1, Sentence 1

Category 200 Grading

Section 201.03.04	¶ 6, Sentence 1
Section 201.03.10	¶ 1, Sentence 3
Section 204.02.03	¶ 1, Sentence 1
Section 206.04.02	¶ 5, Sentence 1

Category 300 Drainage

Section 302.03	¶ 1, Sentence 2
Section 306.04.03	¶ 1, Sentence 1
Section 310.03.02	¶ 1, Sentence 3
Section 314.02.03	¶ 1, Sentence 3

Category 400 Structures

Section 402.03.04	¶ 2, Sentence 2
Section 405.03	¶ 3, Sentence 3
Section 411.03	¶ 2, Sentence 1,4
Section 430.03.14	¶ 1, Sentence 2

Category 500 Paving

Section 522.03	¶ 1, Sentence 1

Category 600 Shoulders

Section 606.03.01	¶ 6, Sentence 1
Section 607.03.01	¶ 3, Sentence 2

Category 800 – Traffic

Section 804.03.03	¶ 1, Sentence 5

Section 804.03.03 ¶ 2, Sentence 1
Section 810.03.04 ¶ 1, Sentence 1

Category 900 – Materials

Section 910.02.03 ¶ 1, Sentence 1

PROJECT DESCRIPTION

Refer to ITP 1.2, Project Overview.

SPECIFICATIONS

All work on this project shall conform to the Maryland Department of Transportation, State Highway Administration's Specifications entitled, "Standard Specifications for Construction and Materials" dated May 2017 revisions thereof, or additions thereto, and the Special Provisions included in this Invitation for Bids.

EMPLOYMENT AGENCY

Columbia Workforce Center
7161 Columbia Gateway Drive
Columbia, Maryland 21046
Tel: 410-290-2600
Fax: 410-312-0834
dlwdalcolumbiajsoffice-dllr@maryland.gov

NOTICE TO CONTRACTOR

PROJECT SCHEDULE. Section 109 shall apply.

NOTICE TO BIDDERS. The Proposal Form Packet in this Invitation for Bids requires the following information be submitted for the Bidder and each firm quoting or considered as subcontractors:

(a) Name of firm.

(b) Address of firm.

(c) MBE, Non-MBE, DBE, or Non-DBE.

(d) Age of firm.

(e) Annual gross receipts per last calendar year.

Note that there are provisions for submitting copies for additional subcontractors, and that an "X" is required to indicate whether or not additional copies have been submitted.

AFFIRMATIVE ACTION PLAN (AAP) CONTRACT GOALS. In order to be in compliance with the revised MBE/DBE laws effective September 27, 2011 or later, the bidder is required to complete the AAP information within the MDOT MBE/DBE Form A and Form B (Parts 2 and 3) of the Proposal Form Packet for State, Federal, and State Small Business Reserve Procurements. Failure to complete the information may be grounds for the bid to be declared non-responsive.

BOOK OF STANDARDS. The Book of Standards for Highway and Incidental Structures is only available on the Administration's Internet Site at www.roads.maryland.gov. The Book of Standards can be located by clicking on Business, Business Center, Business Standards and Specifications; and Book of Standards for Highway and Incidental Structures.

2017 STANDARD SPECIFICATION FOR CONSTRUCTION AND MATERIALS BOOK. The 2017 Standard Specifications for Construction and Materials Book is now only available on the Administration's Internet Site at www.roads.maryland.gov. The 2017 Specification Book can be located by clicking on Business, Business Center, Business Standards and Specifications; and Standard and Supplemental Specifications for Construction and Materials which is available for MediaWiki format.

PAYMENT OF STATE OBLIGATIONS. Electronic funds transfer will be used by the State to pay Contractor for this Contract and any other State payments due Contractor unless the State Comptroller's Office grants Contractor an exemption.

By submitting a response to this solicitation, the Bidder/Offeror agrees to accept payments by electronic funds transfer unless the State Comptroller's Office grants an exemption. The selected Bidder/Offeror shall register using the attached form COT/GAD X-10 Vendor Electronic Funds (EFT) Registration Request Form. Any request for exemption must be submitted to the State Comptroller's Office for approval at the address specified on the COT/GAD X-10 form and must include the business identification information as stated on the form and include the reason for the exemption.
An electronic form and additional information can be found at
http://comptroller.marylandtaxes.com/Vendor_Services/Accounting_Information/Electronic_Funds_Transfer/

BRIDGE UNDERCLEARANCE. The minimum underclearances shall be maintained whenever resurfacing a roadway. This may require grinding the existing pavement prior to placing the resurfacing material. Immediately after completing the resurfacing operation and when the lane closures are still in the effect, the Contractor, in the presence of the Engineer, shall measure the minimum vertical underclearance. The Engineer will submit results to the Office of Structures. The cost of these measurements will be incidental to other pertinent items specified in the Contract Documents.

REQUEST FOR INFORMATION.

Refer to ITP Section 2.2.5.

RIGHT-OF-WAY STATUS.

In accordance with the requirements of Title 23, Code of Federal Regulations, Part 635, the right of way (has been or is being) acquired in accordance with 49 CFR Part 24 and all applicable policy and procedure covering the acquisition of real property. State (has) legal and physical possession and right to enter on all lands as follows:

Total number of parcels required…….. 55
1. Parcels acquired (escrow closed or Final Order of Condemnation recorded) … 0
2. Parcels covered by Order of Immediate Possession (SRC) …… 0
3. Parcels covered by Right of Entry …….. 0
4. Parcels covered by other acquisition documents as follows ……... 2

Item No.	*Property Owner*	*Date of Option Contract*
109848	Estate of Catherine Ann Dorsey	November 7, 2016
109849	Estate of Catherine Ann Dorsey	November 7, 2016

RIGHT OF WAY CLEARANCE:
All necessary arrangements have been made for remaining right of way clearance work to be undertaken and completed as required for proper coordination with the construction schedule as follows:

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Item No.	*Property Owner*	*Date of Order*
102679	Mohammad N. Roshan and Fanila Roshan	February 28, 2019
102680	Richard G. Nelson and Beth J. Nelson	February 28, 2019
111359	Joseph M. Bell, et. ux.	May 31, 2019
111461	Cloverland Farms Dairy	August 2, 2018
111462	Ingrid Melber	August 2, 2018
111463	Donald W. Carter, Jr., and Debra M. Carter	August 2, 2018
111464	Ten Oaks Investors, LLC	August 2, 2018
111465	Edward B. Clark	August 2, 2018
111481	Barbara A. Brutsch & Patricia L. Gray, et. al.	February 28, 2019
111482	Fox Valley Estate Homeowners Assoc.	February 28, 2019
111483	Bong Soo Bae & Moo J. Bae	February 28, 2019
111484	Christine M. Sloan and Michael J. Sloan	February 28, 2019

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111485	Thomas J. McKeever, Jr. & Christine A. McKeever	February 28, 2019
111486	Kevin K. Pfeffer	February 28, 2019
111487	Yong Hwan Oh and Kyung Sook Oh	February 28, 2019
111488	Elias T. Zambidis & Ann Peters	February 28, 2019
111489	Eric Lapinski, Charles S. Lapinski, et. al.	February 28, 2019
111500	Thomas Drew Henderson and Jill Deanne Henderson, T/E	February 28, 2019
111501	Richard E. Raver & Wife	February 28, 2019
111502	Edmond G. Gauvreau & Susan M. Gauvreau	February 28, 2019
111503	Howard M. Hays and Hash Jennifer Hays	February 28, 2019
111504	Erik P. Lillehoj & Hyun S. Lillehoj	February 28, 2019
111505	Sylvia P. Thomas	February 28, 2019
111506	Jose Luis Castro & Marquez Carolina Marin, Trustees	June 30, 2018
111507	2800 Nixon Farm Lane, LLC	February 28, 2019
111508	William F. Gossage, Jr. & Mark B. Gossage, J/T	February 28, 2019
111509	William F. Gossage, Sr.	February 28, 2019
111510	Howard County, Maryland	February 28, 2019
111511	Fox Chase Estates HOA	February 28, 2019
111512	Howard County, Maryland	February 28, 2019
111513	William F. Gossage, Jr.	February 28, 2019
111514	William F. Gossage, Sr.	February 28, 2019
111515	Andrew Welten and Kimberly A. Dmec, T/E	February 28, 2019
111516	Peter Hong & Peter Hong, T/E	February 28, 2019
111517	Vitaly Gurvich & Myroslavia Gurvich	February 28, 2019
111518	Robert O. Wilcox, Sr. & Mary E. Wilcox	February 28, 2019
111519	Von Black, Trustee	February 28, 2019
111520	Arthur Olverson	February 28, 2019
111521	Chengen Li and Rui Sun	February 28, 2019
111522	Thomas J. Bauer and Margaret M. Bauer	February 28, 2019
111523	Herbert H. Cross II	February 28, 2019
111524	Michael D. Luzius and Lisa L. Luzius	February 28, 2019
111525	Maurita C. Brice, et. al.	February 28, 2019
111526	Richard L. Turcotte	February 28, 2019
111527	Charles D. Bussing and Stacy Bussing	February 28, 2019
111528	Raymond J. Letecky and Naomi M. Litecky	February 28, 2019
111529	Majid Hussain	February 28, 2019
111530	Triple Creek Farm Properties, LLC	February 28, 2019
111531	ETB Enterprises, LLC	February 28, 2019
111532	Hassan Habibi and Ahmad Habibi	February 28, 2019
111533	Mark S. Wah and Katherine Ann Wah	February 28, 2019
111534	Howard County, MD	February 28, 2019
111559	William F. Gossage, Jr.	February 28, 2019

Refer to ITP 1.2.5.6 for additional right-of-way information.

RAILROAD STATEMENT. Federal Aid Contracts Only. Federal Aid Contract No. AC-NHPP-118-1(69)N

For this project, Maryland SHA is providing the following statement of coordination (check one):

☒ No Railroad coordination required (no RR facilities are affected) (check this box when there is no railroad facility within or near the terminus of the project limits)

☐ All Railroad work has been completed prior to the project (check this box if traffic control devices within or near the terminus of the Federal-Aid project limits comply with the current edition of the Manual on Uniform Traffic Control Devices)

☐ The necessary arrangements have been made for all railroad work to be undertaken and completed as required for proper coordination with physical construction schedules. (Appropriate notification shall be provided in the PS&E for railroad coordination concurrent with the project construction)

☐ For AREAWIDE Contracts, Maryland SHA will provide a Statement of Coordination when the Modification to the 25C is submitted, prior to NTP. (Check this box for all AREAWIDE Projects)

REQUIRED ENVIRONMENTAL PERMITS, APPROVALS AND AUTHORIZATIONS.

For permit information, please refer to ITP Section 1.2.5.7 Permits. All permits obtained by MDOT SHA will be inserted here upon approval.

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

Larry Hogan, Governor
Boyd Rutherford, Lt. Governor
Mark Belton, Secretary
Joanne Throwe, Deputy Secretary

Forest Service
2 South Bond Street, Suite 101
Bel Air, Maryland 21014

REFORESTATION LAW: PROJECT REVIEW

CONTRACT #:	HO7565370	PDMS #:	N/A
COUNTY:	Howard	REVIEWED BY:	T. Ericson

TO:	Joel Bush	DATE:	March 29, 2018
AGENCY:	MD SHA	PROJECT:	MD 32 Linden Church Rd to I-70 – Phase II
ADDRESS:	707 N. Calvert St., Mail Stop C-303 Baltimore, MD 21202		

This memorandum is to inform you that the above referenced contract was reviewed by this office on: March 29, 2018

Our review of this project indicated that **115.92** acres of forest land will be cleared. The following conditions are to apply to this project:

XX 1. Reforestation of **120.44** acres must be conducted on site within one year of this project's official construction completion date. Further determination of on-site reforestation will be done at the time this project is completed.

2. Reforestation of **0.0** acres must be conducted off site on public lands within the same county or watershed in which the clearing occurred. This reforestation must be completed within one year of the construction completion of the project.

3. Other conditions: Pay fee-in-lieu of planting of $0.00 into the State Reforestation Fund
0.0 acres at $4,356.00 an acre ($0.10 per square foot) = $0.00

All reforestation that is carried out by you or your agency must have the planting plans approved by the Department of Natural Resources-Forest Service. As stated earlier in the review process, state agencies who are unable to locate public lands for mitigation planting must provide a detailed explanation of why they cannot fulfill the planting obligations before any payment (in lieu of planting) will be accepted into the reforestation fund. This explanation must be submitted prior to construction completion. If the fee-in-lieu is approved, billing will be based on a fee of 10 cents per square foot of forest cleared for construction projects for which bids were let out July 1, 1992 or later.

The review of this project indicated that a total of **115.92** acres of forest land is to be cleared. So the resulting bill, if no reforestation is carried out by you or your agency, would be **$504,947.52**. Please note that this dollar amount is an estimate; final determination is pending final review of the project.

Attached is a copy of our completed review form for your records. A copy of this form has also been placed on file with our Reforestation Law Compliance Section. If you should have any questions, please contact:

Tod Ericson phone #: 410-836-4568

MODIFICATION OF PERMIT

PERMIT NUMBER: 16-NT-3193/201661182

EFFECTIVE DATE: August 1, 2018

EXPIRATION DATE: December 8, 2021

PERMITTEE: Maryland State Highway Administration
707 N. Calvert Street, Mailstop C-303
Baltimore, Maryland 21202
Attn: Todd Nichols

IN ACCORDANCE WITH ENVIRONMENT ARTICLE §5-503(a) AND §5-906(a), ANNOTATED CODE OF MARYLAND (2007 REPLACEMENT VOLUME), COMAR 26.17.04, 26.23.01 AND 26.08.02, NONTIDAL WETLANDS & WATERWAYS PERMIT NUMBER 16-NT-3193/201661182**,** ISSUED TO Maryland State Highway Administration, ("PERMITTEE"), IS HEREBY MODIFIED BY THE WATER AND SCIENCE ADMINISTRATION ("ADMINISTRATION") AS DESCRIBED BELOW:

To modify the Permit as follows: To authorize the following specific impacts attributable to Phase II (Linden Church Road to I-70 Interchange) of the previously authorized Maryland 32 corridor dualization project, including restoration of a length of the Middle Patuxent River. Phase II will permanently impact 44,718 square feet of forested nontidal wetland, 2,325 square feet of scrub/shrub nontidal wetland, 49,980 square feet of emergent nontidal wetland, 198,986 square feet of 25-foot nontidal wetland buffer, 1,813,703 square feet of 100-year floodplain, 11,599 linear feet (177,531 square feet) of perennial stream and 1,762 linear feet (8,340 square feet) of intermittent channel. Phase II will temporarily impact 19,576 square feet of forested nontidal wetland, 76,365 square feet of emergent nontidal wetland, 1,430 square feet of scrub/shrub nontidal wetland, 131,022 square feet of 25-foot nontidal wetland buffer, 5,177 linear feet (59,571 square feet) of perennial stream and 1,386 linear feet (7,732 square feet) of intermittent channel.
As a result of refined plans and further efforts at avoidance and minimization, total permanent nontidal wetland impacts for the entire MD 32 (including Phase I and Phase II) dualization project will be 50,263 square feet less than what was previously authorized. There will be an increase of 80,923 square foot of temporary nontidal wetland impacts related to the restoration of a reach of the Middle Patuxent River.

Special Conditions:

1. Additional wetland mitigation shall be accomplished for the MD 32 corridor wetland impacts, beyond the wetland mitigation already constructed, based on the final revised wetland mitigation credit at the original wetland mitigation site and the revised total mitigation requirement. A Phase II Mitigation Plan shall be submitted to the Section no later than 90 days after the issuance of this Permit, unless an extension has been granted in writing by the Section. The Phase II Mitigation Plan must be approved by the Section, through the Phase II Mitigation Plan Approval Letter and its associated exhibits ("Approval Letter"), prior to commencing the impacts authorized in this Permit. The Permittee shall successfully construct the mitigation site and meet project standards and other requirements, as specified in the Approval Letter and COMAR 26.23.04, in advance or concurrently with the activities authorized in this Permit.

In the event of discrepancy with the mitigation requirements found in this Condition, the standards and requirements set forth in Approval Letter shall govern. The Permittee is required to notify the Section upon the start of grading and the completion of planting of the mitigation project. The Permittee shall submit monitoring reports for the mitigation project to the Section as specified in the Approval Letter.
If the Permittee as stated in the Permit, changes, the Permittee must notify the Section. If the mitigation obligation is to be transferred to another party, the Permittee must notify the Section.

2. Permittee shall finalize access agreements with property owners on which regulated activities will be conducted. At least 30 days prior to the start of construction, the Permittee shall provide to the Department's Nontidal Wetlands Division confirmation that the Permittee has the property owners' permission to undertake the wetland and waterway activities authorized by the Permit.

THIS MODIFICATION SHALL BE CONSIDERED AS PART OF NONTIDAL WETLANDS & WATERWAYS PERMIT NUMBER 16-NT-3193/201661182. ALL OTHER CONDITIONS AND ELEMENTS OF THE PERMIT REMAIN IN EFFECT.

Denise M. Keehner
Program Manager
Wetlands and Waterways Program

cc: Compliance Division w/ file

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS
ATTN: REGULATORY BRANCH
2 HOPKINS PLAZA
BALTIMORE, MD 21201

AUG 0 2 2018

Operations Division

Maryland State Highway Administration
Attn: Mr. Todd Nichols
707 North Calvert Street
Baltimore, Maryland 21202

Dear Mr. Nichols:

This is in reference to your March 5, 2018, permit modification request to Department of the Army (DA) authorization, **CENAB-OP-RMN (MD SHA Contract No. HO1415170/MD 32 from MD 108 to I-70/Highway Dualization) 1995-01083-M12,** issued on February 2, 2007. The project includes the dualization of MD 32 from MD 108 to I-70. The project involves the construction of a southbound MD 32 with associated turn around and ramp reconstruction, resurfacing of existing northbound MD 32, traffic barrier and pavement marking installation, temporary construction access and dewatering operations, and stormwater management facilities. Break out interchange projects were completed at Burntwoods Road and Linden Church Road. The MD 32 alignment dualization will be completed as a two phase design-build project. The on-going construction for Phase I (Southern Phase) will dualize MD 32 from MD 108 to Linden Church Road. The Phase II (Northern Phase) Dualization of MD 32 extends from Linden Church to I-70. All the work is located in the Middle Patuxent River watershed, near Clarksville, Howard County, Maryland.

The MD 32 Dualization Phase II modification request updates and revises previously authorized impacts associated with upgrading MD 32 from a two-lane to a four-lane divided highway from Linden Church Road to I-70. The Phase II widening of MD 32 will occur along the west side of the existing roadway to accommodate the four-lane divided roadway with a 34-foot wide median for approximately 6.5 miles. In addition to the mainline improvements, access roads will be proposed or modified and private driveways will be reconfigured to consolidate access points along the MD 32 corridor. Phase II improvements include bridge replacements for the Middle Patuxent River stream crossing (Station 471) and the Terrapin Branch stream crossing (Station 487+50). The project also includes drainage improvements and stream and wetland mitigation restoration on the Rosemary Lane Tributary and at the proposed Gossage site (located east of the MD 32 at the existing Middle Patuxent River crossing). Future corridor improvements not included in the Phase II Dualization include interchange upgrades at the Dayton Shop, Rosemary Lane, MD 144, the I-70 ramps, and stream mitigation at the Terrapin Branch site located between MD 144 and the I-70 Interchange.

As updated/revised, Phase II of the MD 32 Dualization project would permanently impact approximately 49,980 square feet of emergent nontidal wetlands, 2,325 square feet of shrub-scrub nontidal wetlands, and 45,804 square feet of forested nontidal wetlands. The project will permanently impact approximately 1,529 linear feet (5,432 square feet) of ephemeral stream, 1,762 linear feet (8,340 square feet) of intermittent stream, and 11,599 linear feet (177,531 square feet) of perennial stream. Phase II of the project will temporarily impact approximately 76,365 square feet of emergent nontidal wetlands, 1,430 square feet of shrub-scrub nontidal wetlands, and 18,490 square feet of forested nontidal wetlands. Phase II also will temporarily impact approximately 762 linear feet (2,940 square feet) of ephemeral stream, 1,386 linear feet (7,732 square feet) of intermittent stream, and 5,177 linear feet (59,571 square feet) of perennial stream. The Phase II Dualization project impacts will occur in unnamed tributaries to the Middle Patuxent River, the Middle Patuxent River, Terrapin Branch, Clyde's Branch, and adjacent nontidal wetlands. Compensatory mitigation for Phase II impacts will be provided at the Rosemary Lane Stream Restoration Site, the proposed Gossage Wetland Mitigation Site, and the Nixon Farm Wetland Mitigation Site. Wetland mitigation for Phase I is also included at Nixon Farm Mitigation Site. The Nixon Farm site was authorized separately, constructed, and is currently being monitored.

As a result of the changes, the revised MD 32 corridor project will permanently impact approximately 77,833 square feet of forested nontidal wetlands, 2,325 square feet of shrub-scrub nontidal wetlands, 64,628 square feet of emergent nontidal wetlands, and 19,610 linear feet of stream channel. The revised project will temporarily impact approximately 31,704 square feet of forested nontidal wetlands, 1430 square feet of shrub-scrub nontidal wetlands, 78,977 square feet of emergent nontidal wetlands, and 7,700 linear feet of stream.

We have evaluated your modification request and have determined that it "is not contrary to the public interest." Therefore, the modification is approved with the following special conditions:

a. The Permittee shall continue to further avoid and minimize impacts to waters of the U.S., including jurisdictional wetlands, during the design–build process. In addition, per Special Condition 10, final construction plans (electronic copy) for impacts to waters of the U.S., including jurisdictional wetlands, that change the amount or location of impacts authorized herein, must be submitted to the Corps (Mr. Jack Dinne, john.j.dinne@usace.army.mil), for Corps review and approval, prior to any work in waters of the U.S., including jurisdictional wetlands.

b. At Station 471+73.65, MD SHA will relocate a portion of the Middle Patuxent River and construct a new MD 32 bridge crossing. The new two span/one pier bridge will be approximately 112 foot long and include at least a ten-foot wide animal passage bench on one side. Any riprap stabilization within the animal

passage bench must be buried under compacted soil. In addition, at approximately Station 450, a portion of unnamed tributary at Rosemary Lane (immediately upstream of the Rosemary Lane Stream Restoration) will be relocated for a culvert crossing. Final construction plans (electronic copy) for the crossings must be submitted to the Corps (Attn: Mr. Jack Dinne, john.j.dinne@usace.army.mil), for Corps review and approval, prior to any work in waters of the U.S., including jurisdictional wetlands.

c. Final construction drawings (electronic copy) for temporary stream diversions, causeways, cofferdams, and temporary access through wetlands or across waters of the U.S. must be submitted to the Corps for review and approval (Attn: Mr. Jack Dinne, john.j.dinne@usace.army.mil) prior to construction. Please note that Phase II activities occur in Use IV waters with the applicable time of year work restrictions (i.e., no in-stream work from March 1 – May 31, inclusive).

d. The Permittee must provide the Corps a revised impact summary (Attn: Mr. Jack Dinne, john.j.dinne@usace.army.mil) upon completion of the construction of each phase. A final impact accounting report must be submitted two growing seasons after restoration of all temporary impacts. Final impacts must be field verified by the Corps.

e. Per Compensatory Mitigation Condition 2, final compensatory mitigation for Phase II impacts must be initiated prior to completion of the authorized work. Final Compensatory Mitigation Plan(s) for the Rosemary Lane Stream Restoration Site and the proposed Gossage Wetland Mitigation Site must be reviewed and approved by the Corps (Attn: Mr. Jack Dinne, john.j.dinne@usace.army.mil) and the work initiated prior to completion of the authorized work. The Phase II Final Mitigation Plans must include a schedule for mitigation work completion consistent with Compensatory Mitigation Condition 2.

The permit modification request for revised MD 32 Phase II Dualization project impacts to nontidal wetlands and nontidal streams is hereby approved as shown on the enclosed plans for roadway improvements the Phase II from Linden Church Road to I-70, dated February 2018. **Please note that the authorization time limit is also extended to December 31, 2023.**

All other aspects of your February 2, 2007 DA authorization, including the general conditions and special conditions, remain unchanged, and adherence must be strictly maintained.

If you have any questions concerning this matter, please contact Mr. Jack Dinne of this office at (410) 962-6005 or john.j.dinne@usace.army.mil.

By Authority of the Secretary of the Army:

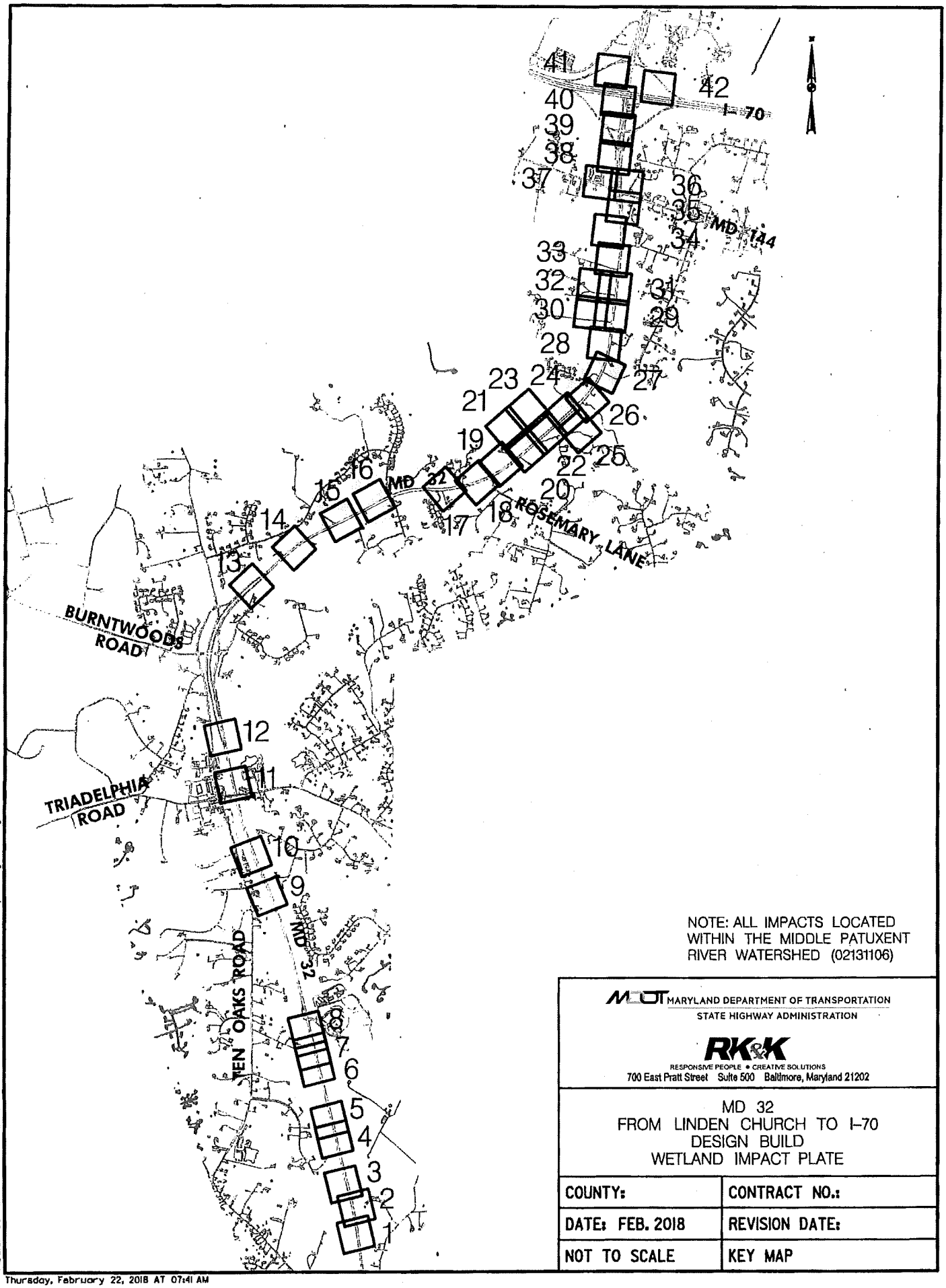
Issued For and in Behalf of
John T. Litz, PMP
Colonel, U.S. Army
Commander and District Engineer

Joseph P. DaVia
Chief, Maryland Section Northern

Enclosures

Cc (via email):
Mr. Sean McKewen, MDE – Nontidal Wetlands Division
(sean.mckewen@maryland.gov)

To identify how we can better serve you, we need your help. Please take the time to fill out our customer service survey at:
http://www.nab.usace.army.mil/Missions/Regulatory.aspx



NOTE: ALL IMPACTS LOCATED WITHIN THE MIDDLE PATUXENT RIVER WATERSHED (02131106)

MDOT MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

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MD 32
FROM LINDEN CHURCH TO I-70
DESIGN BUILD
WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
NOT TO SCALE	KEY MAP

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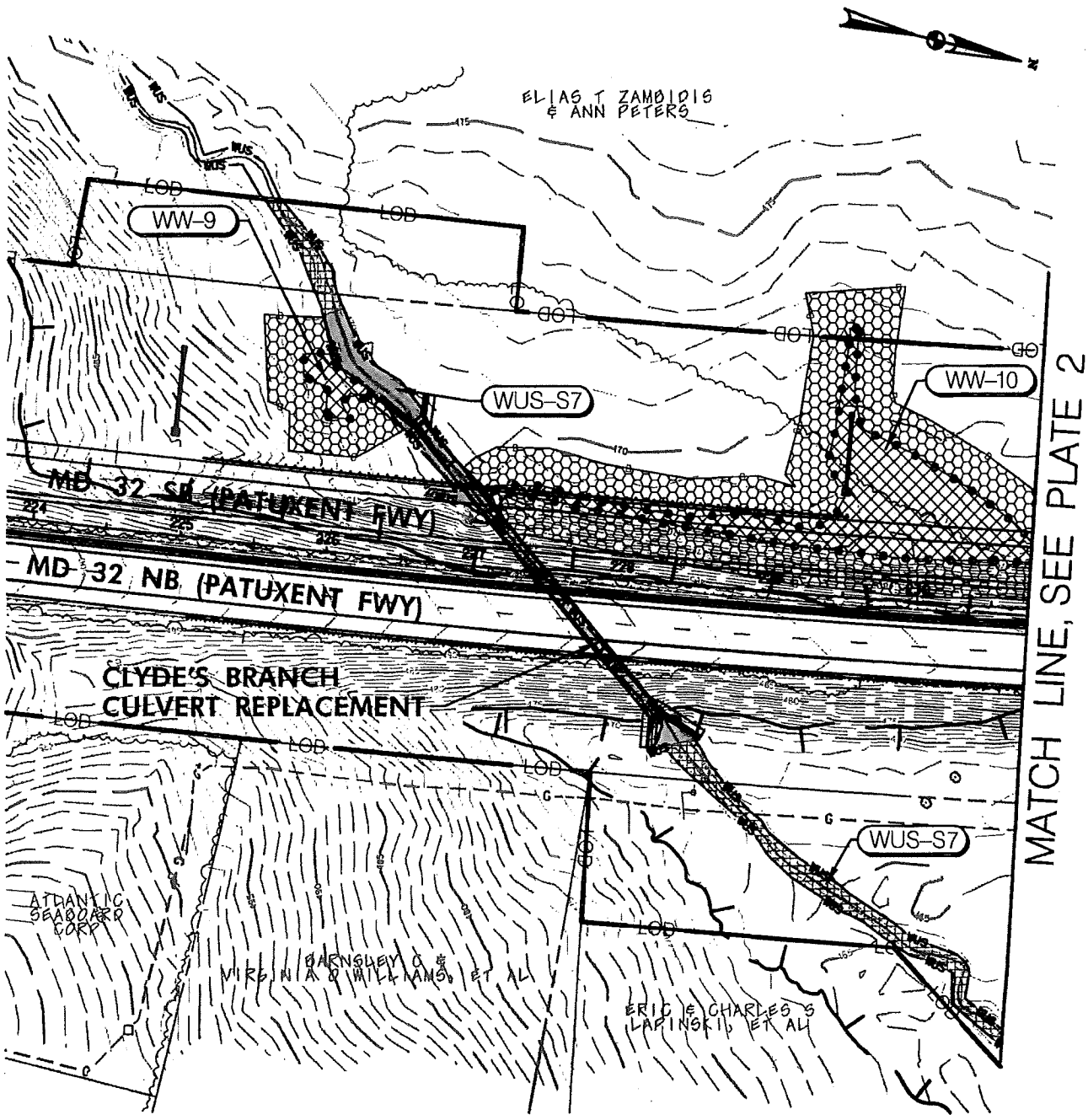

FLOODPLAIN IMPACTS = 171,595 SF (NO HATCH FOR GRAPHICAL CLARITY)

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	LOD	WATERS OF THE US	WUS
WETLAND		WETLAND BUFFER	B
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	0 S.F.	19,687 S.F.
WETLANDS	0 S.F.	11,321 S.F.
WATERS OF THE US	391 LF/4,654 S.F.	374 LF/4,031 S.F.

MDOT MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

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MD 32
FROM LINDEN CHURCH TO I-70
DESIGN BUILD
WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 1 OF 42

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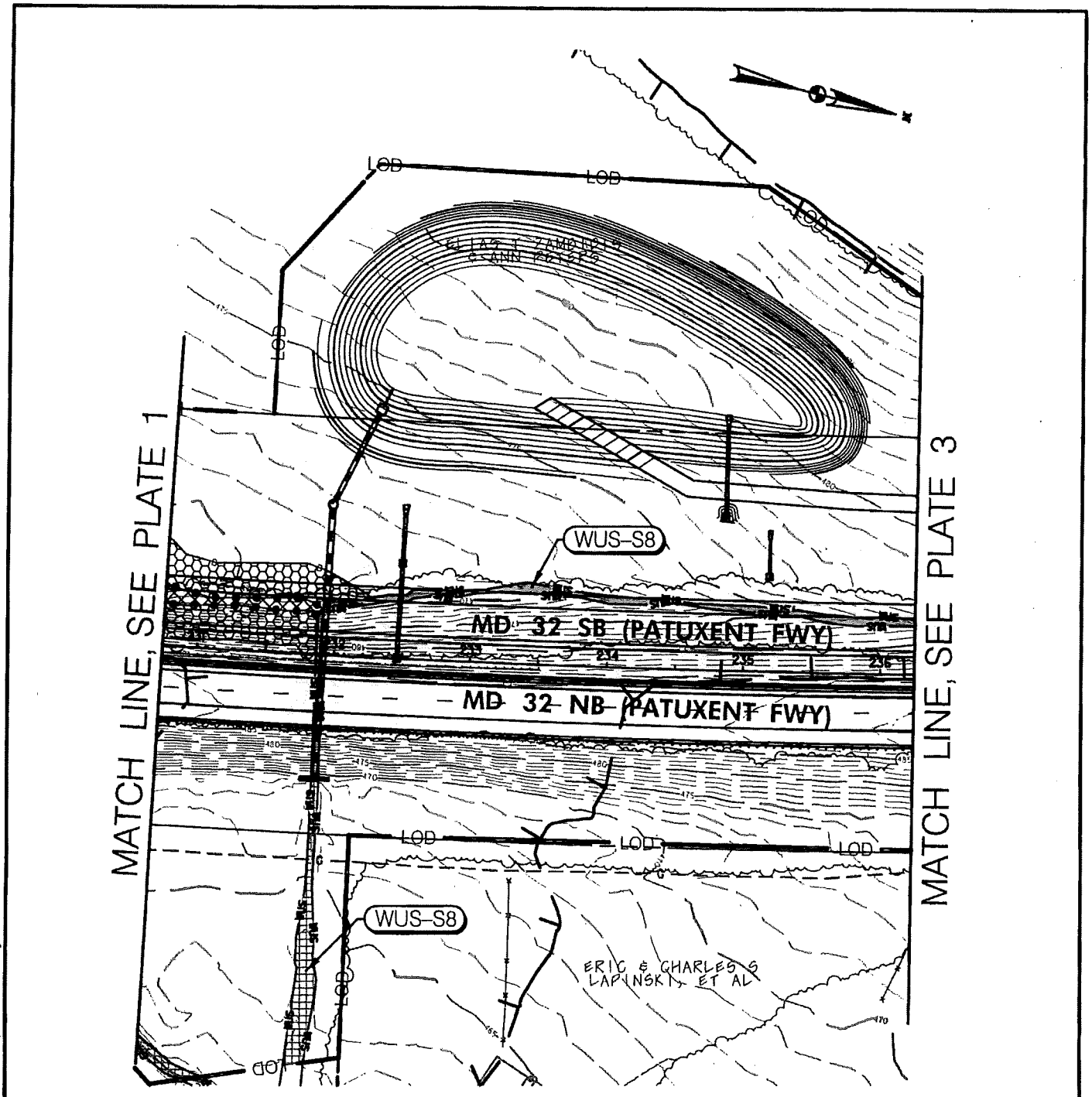

FLOODPLAIN IMPACTS = 239,670 SF (NO HATCH FOR GRAPHICAL CLARITY)

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	LOD	WATERS OF THE US	WUS
WETLAND		WETLAND BUFFER	B
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	0 S.F.	6,327 S.F.
WETLANDS	0 S.F.	885 S.F.
WATERS OF THE US	253 LF/2,466 S.F.	562 LF/2,651 S.F.

MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

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MD 32
FROM LINDEN CHURCH TO I-70
DESIGN BUILD
WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 2 OF 42

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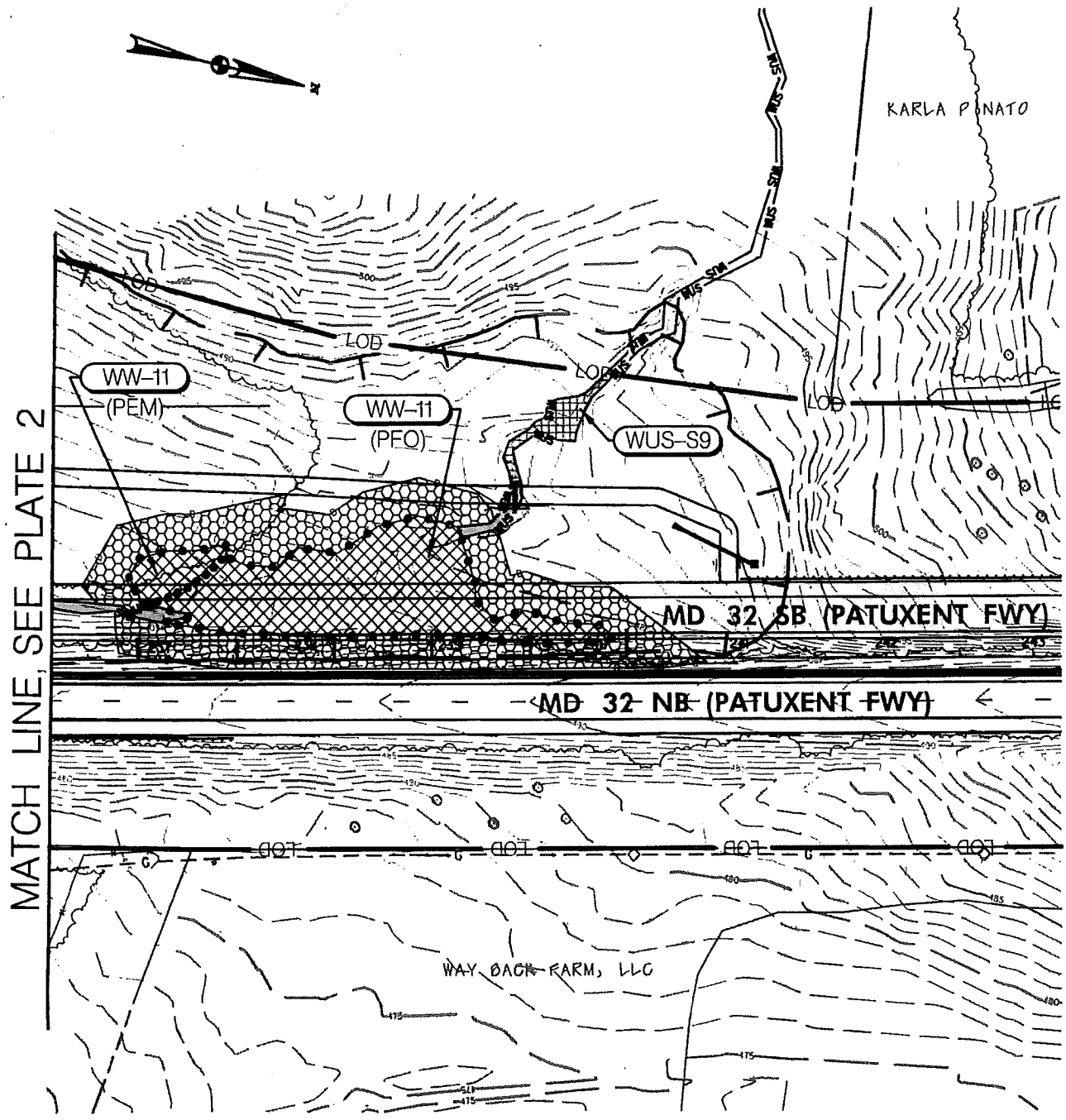

FLOODPLAIN IMPACTS = 103,078 SF (NO HATCH FOR GRAPHICAL CLARITY)

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	LOD	WATERS OF THE US	WUS
WETLAND		WETLAND BUFFER	B
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	0 S.F.	21,038 S.F.
WETLANDS	0 S.F.	15,070 S.F.
WATERS OF THE US	112 LF/1,145 S.F.	154 LF/1,038 S.F.

MDOT MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

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MD 32
FROM LINDEN CHURCH TO I-70
DESIGN BUILD
WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 3 OF 42

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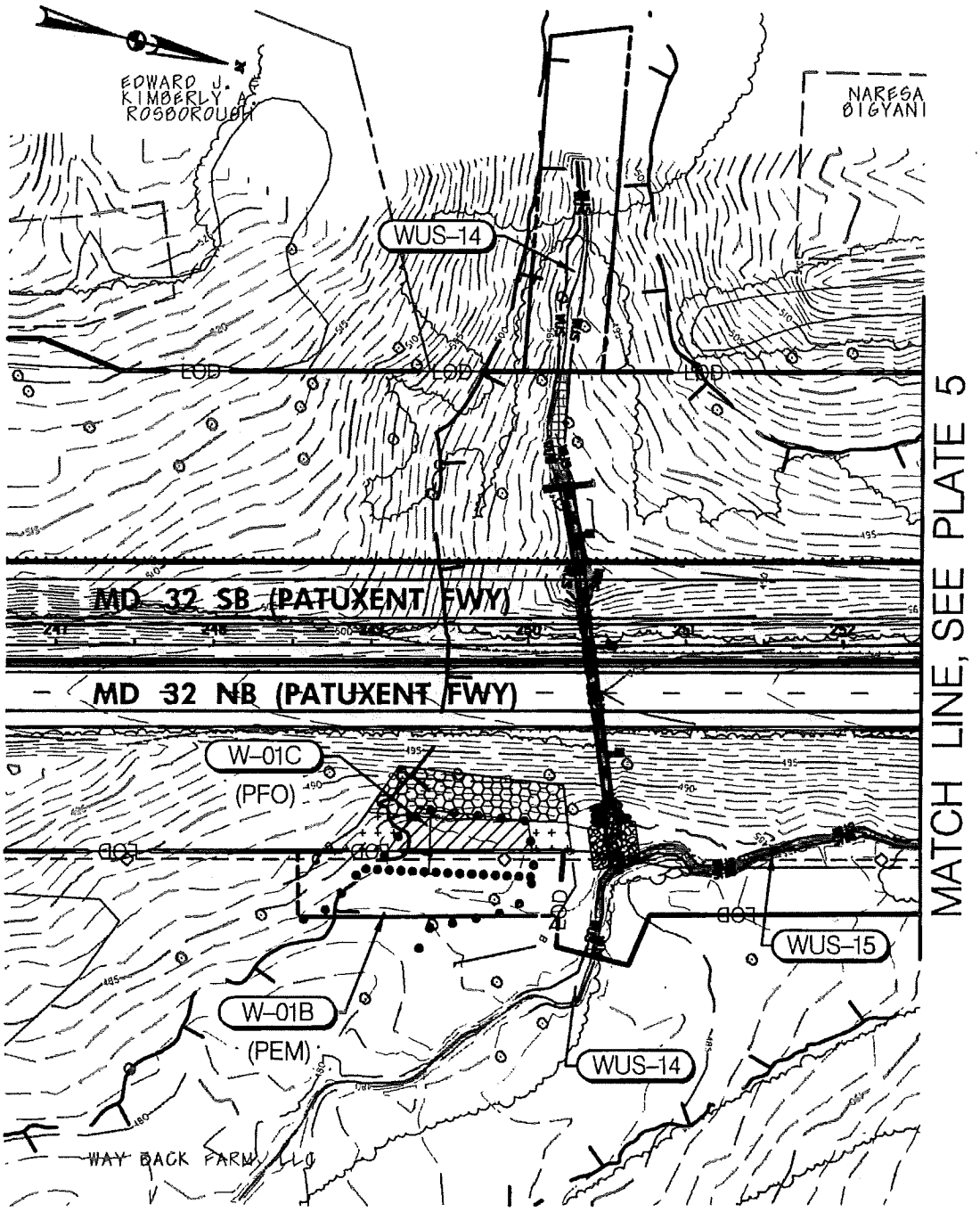

FLOODPLAIN IMPACTS = 97,412 SF (NO HATCH FOR GRAPHICAL CLARITY)

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	LOD	WATERS OF THE US	WUS
WETLAND		WETLAND BUFFER	B
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	1,281 S.F.	3,005 S.F.
WETLANDS	1,698 S.F.	192 S.F.
WATERS OF THE US	317 LF/1,825 S.F.	262 LF/1,753 S.F.

MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

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MD 32
FROM LINDEN CHURCH TO I-70
DESIGN BUILD
WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 4 OF 42

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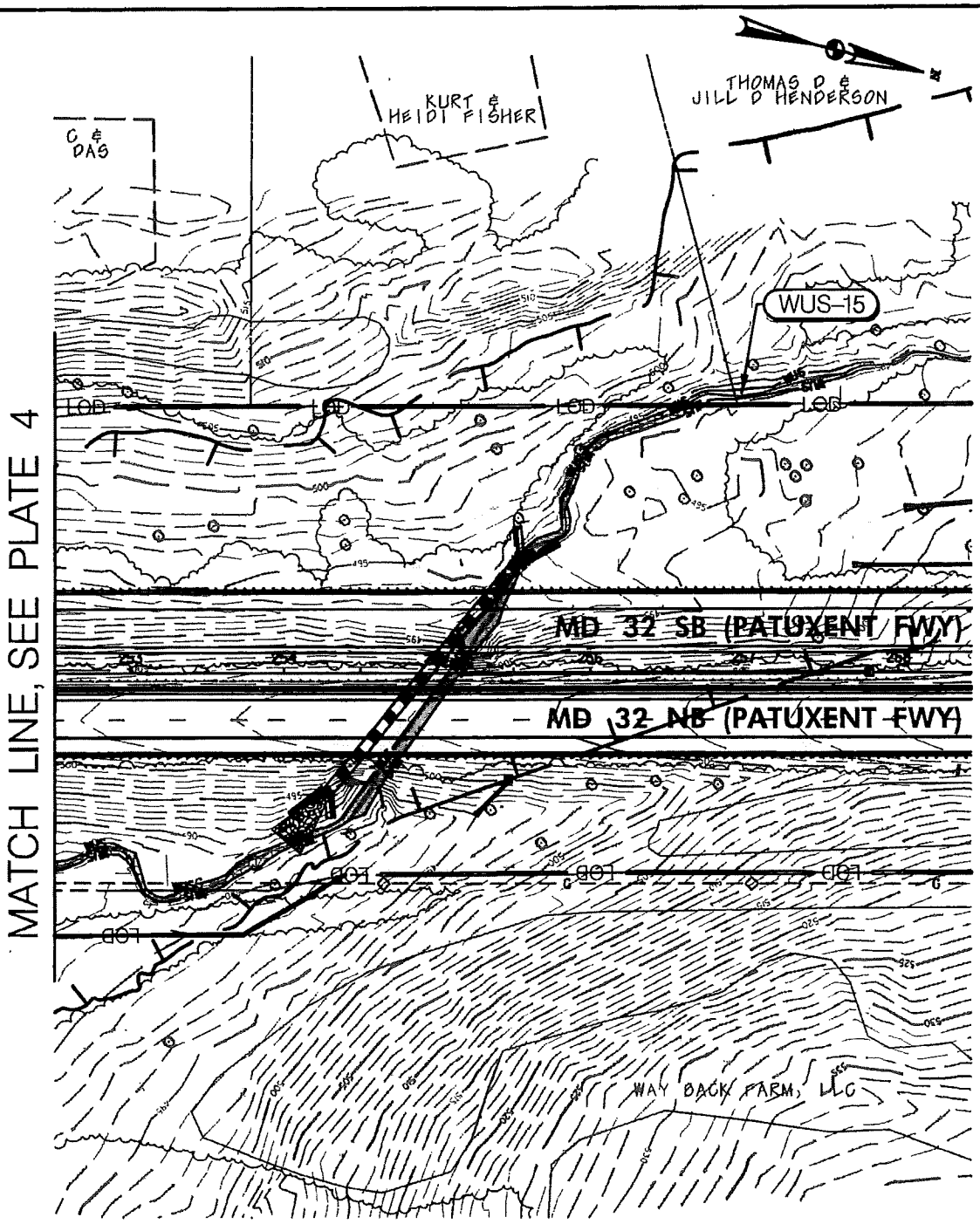

FLOODPLAIN IMPACTS = 162,992 SF (NO HATCH FOR GRAPHICAL CLARITY)

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	LOD	WATERS OF THE US	WUS
WETLAND		WETLAND BUFFER	B
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	0 S.F.	0 S.F.
WETLANDS	0 S.F.	0 S.F.
WATERS OF THE US	312 LF/1,693 S.F.	277 LF/2,103 S.F.

MDOT MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

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MD 32
FROM LINDEN CHURCH TO I-70
DESIGN BUILD
WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 5 OF 42

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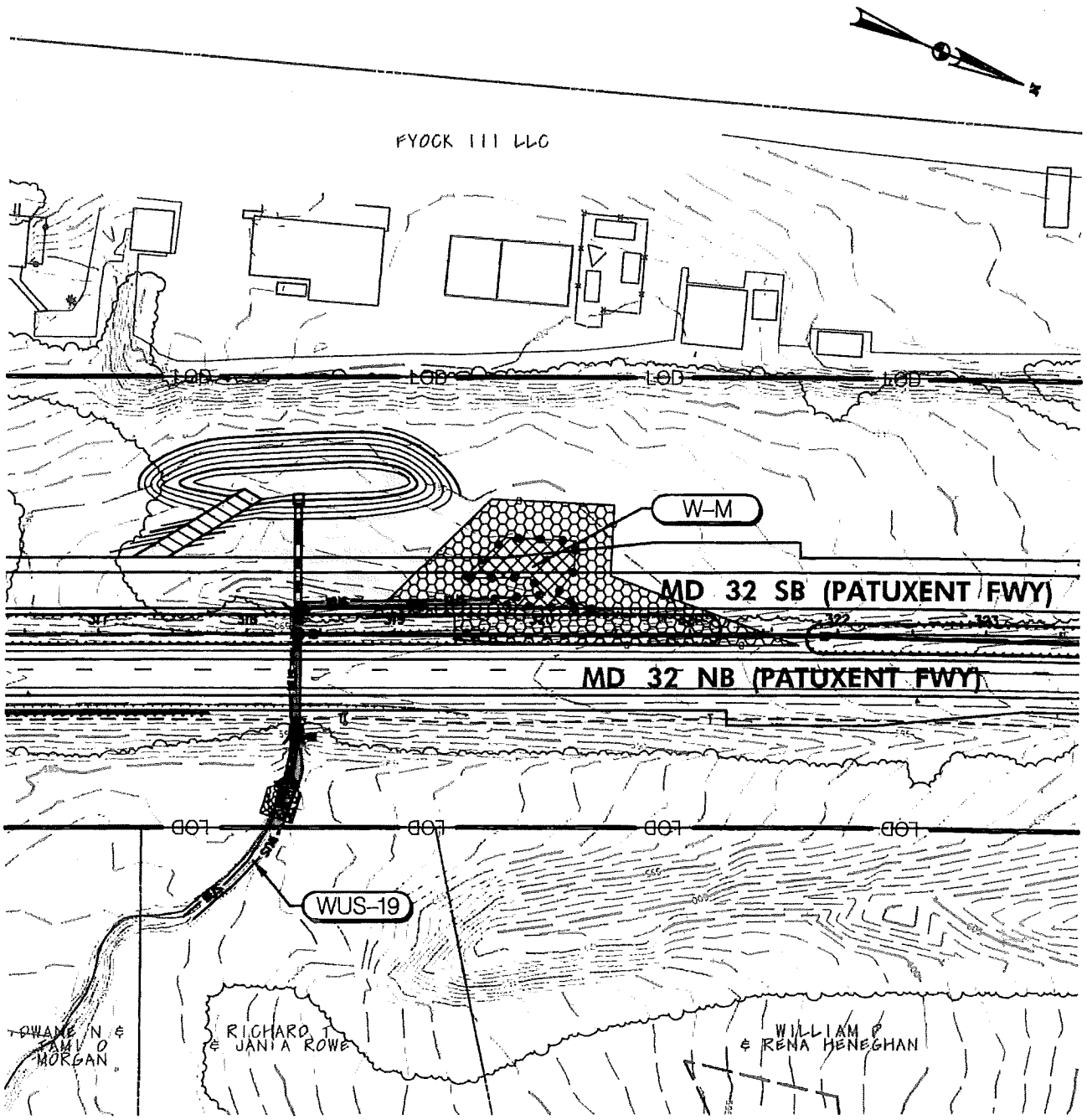

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	LOD	WATERS OF THE US	WUS
WETLAND		WETLAND BUFFER	B
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	0 S.F.	11,859 S.F.
WETLANDS	0 S.F.	2,125 S.F.
WATERS OF THE US	0 LF/0 S.F.	281 LF/1,416 S.F.

MDOT MARYLAND DEPARTMENT OF TRANSPORTATION
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MD 32
FROM LINDEN CHURCH TO I-70
DESIGN BUILD
WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 10 OF 42

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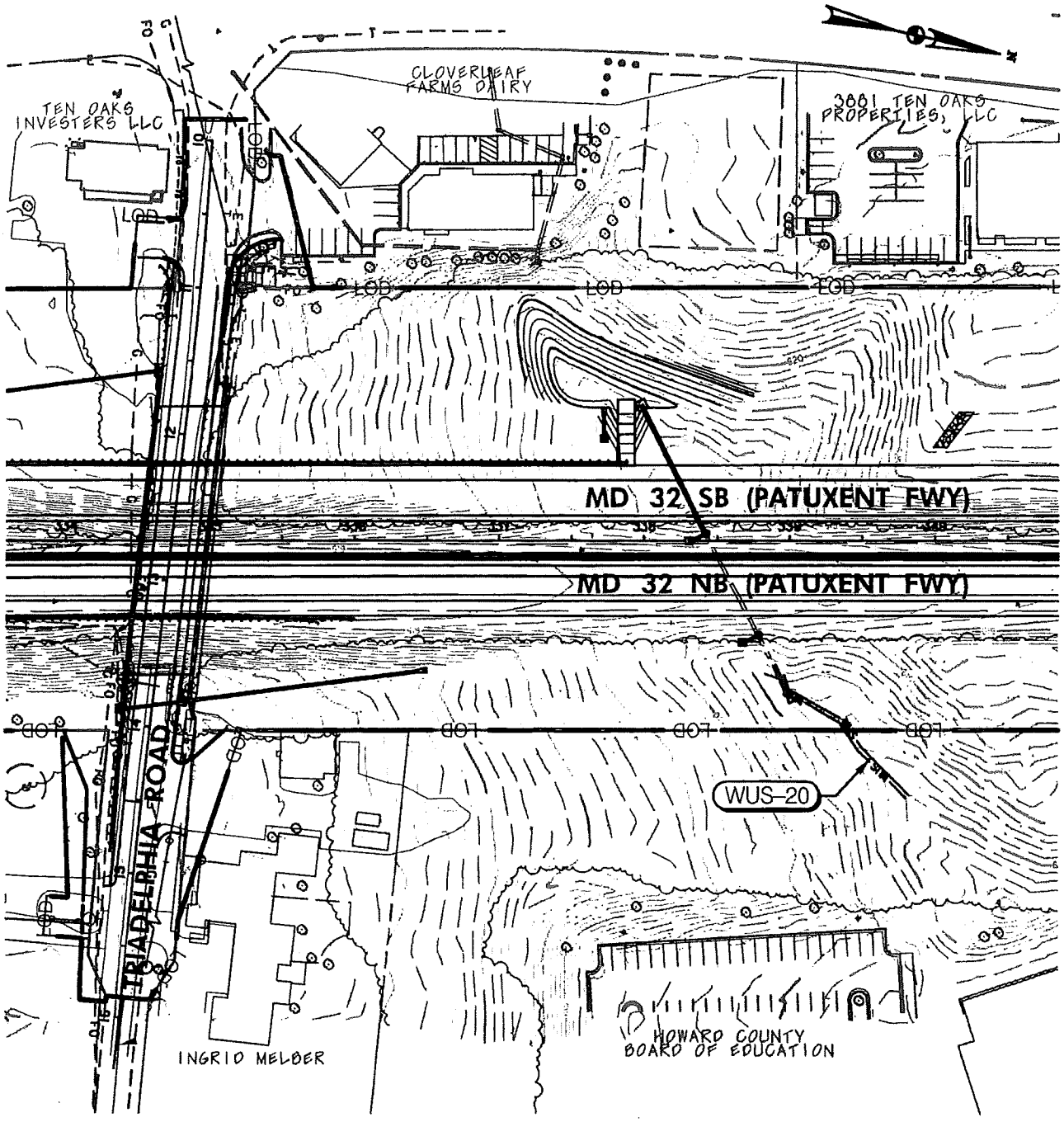

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	—LOD—	WATERS OF THE US	—WUS—
WETLAND		WETLAND BUFFER	—B—
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	0 S.F.	0 S.F.
WETLANDS	0 S.F.	0 S.F.
WATERS OF THE US	38 LF/105 S.F.	22 LF/54 S.F.

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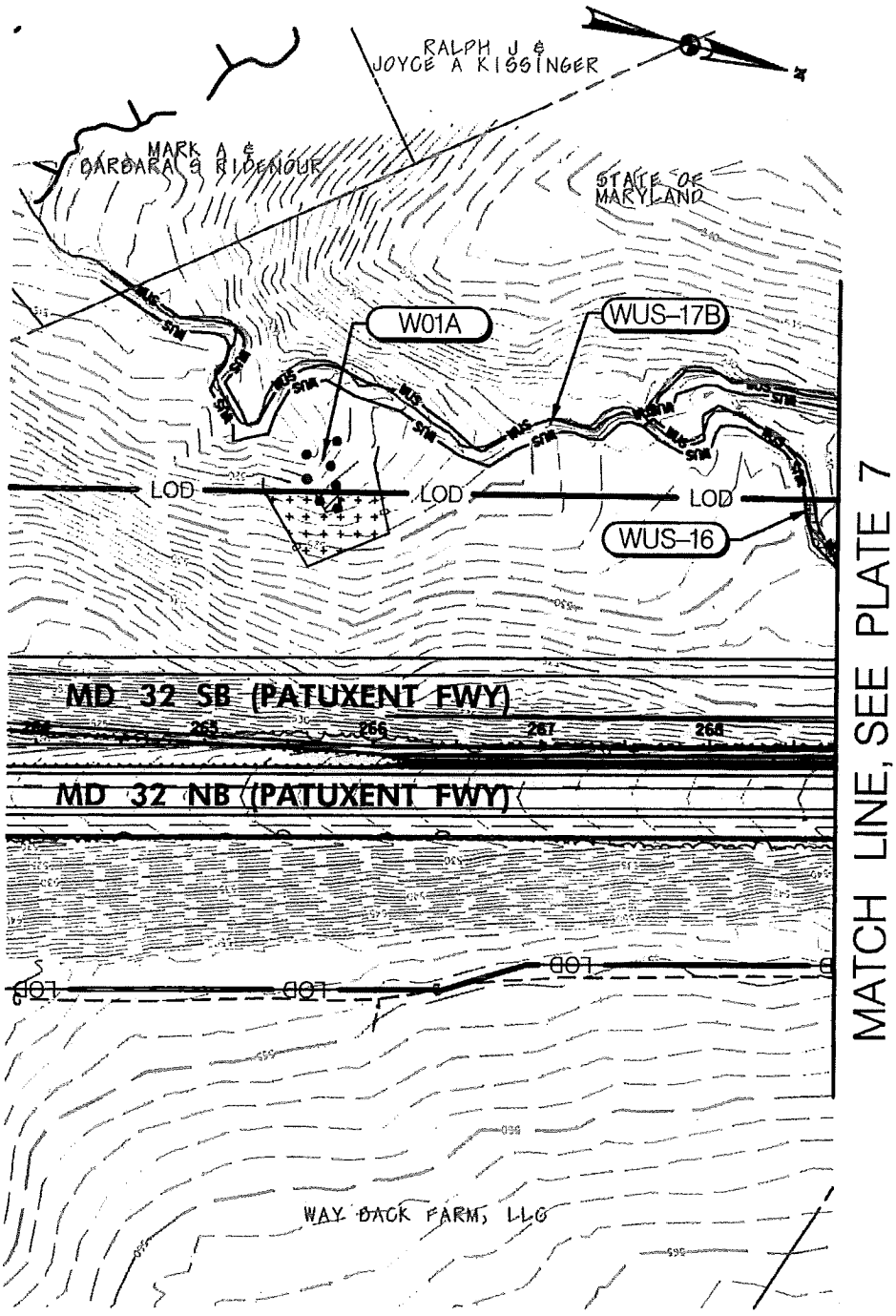
MD 32
FROM LINDEN CHURCH TO I-70
DESIGN BUILD
WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 11 OF 42

\\balserv06\v2016\2016\16005.bcs\219c\Task 2_MD 32\NatRes\CADD\Plans\pWT-011_MD32.dgn
Thursday, February 22, 2018 AT 07:41 AM



Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	LOD	WATERS OF THE US	WUS
WETLAND		WETLAND BUFFER	B
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	1,990 S.F.	0 S.F.
WETLANDS	124 S.F.	0 S.F.
WATERS OF THE US	42 LF/248 S.F.	0 LF/0 S.F.

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DESIGN BUILD
WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 6 OF 42

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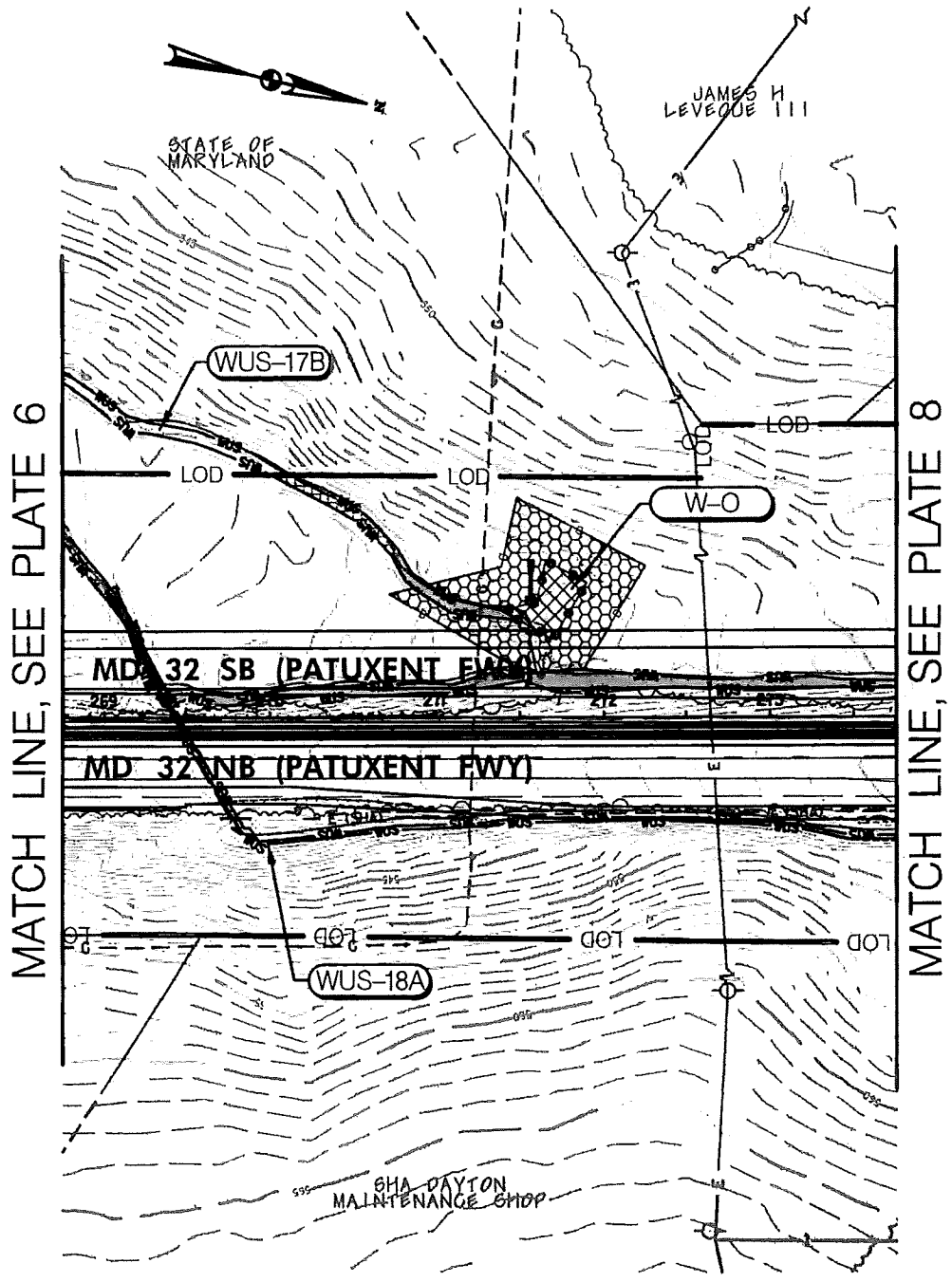

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	—LOD—	WATERS OF THE US	—WUS—
WETLAND		WETLAND BUFFER	—B—
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	0 S.F.	6,317 S.F.
WETLANDS	0 S.F.	952 S.F.
WATERS OF THE US	122 LF/682 S.F.	1,084 LF/5,065 S.F.

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DESIGN BUILD
WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 7 OF 42

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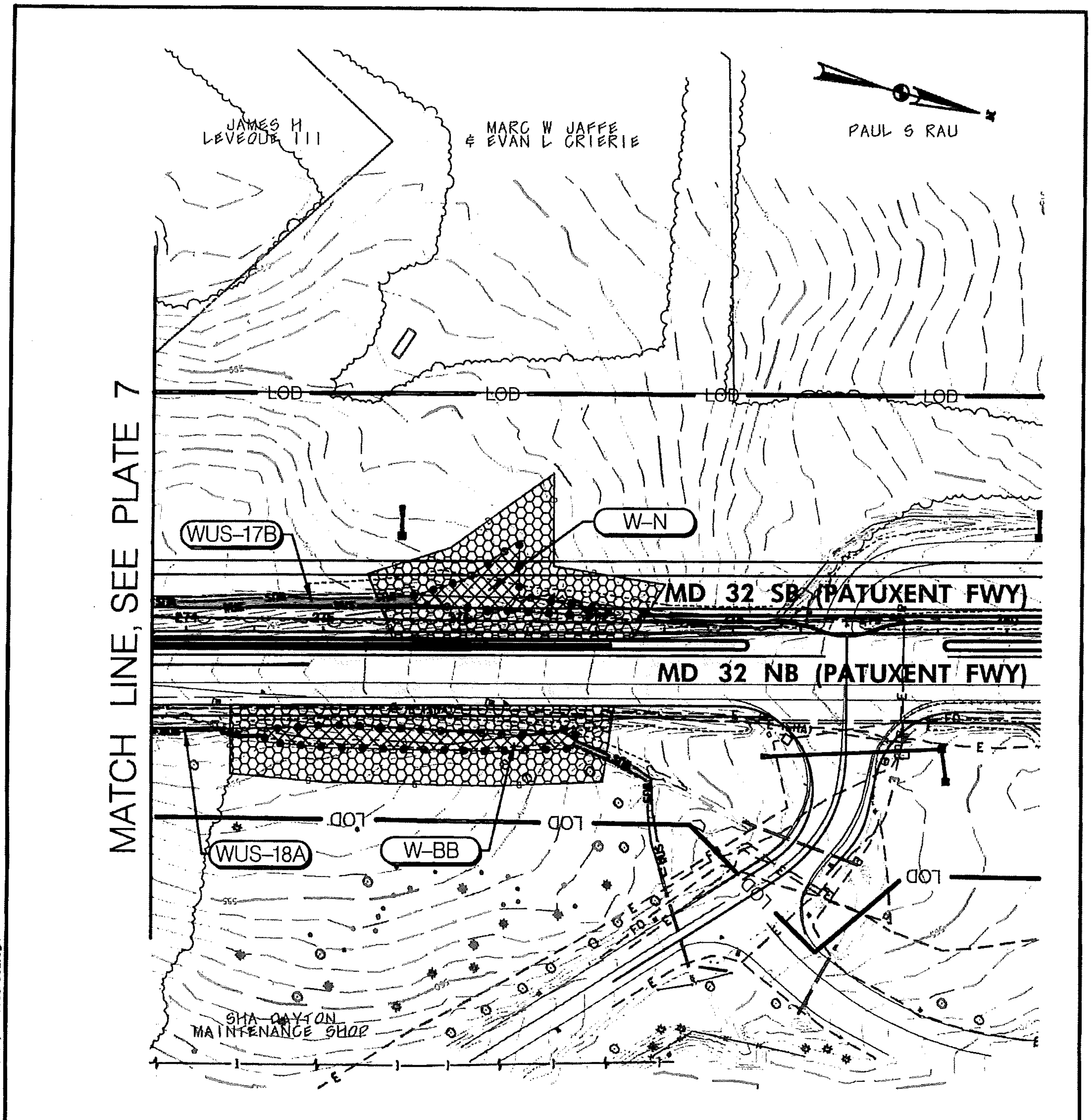

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	—LOD—	WATERS OF THE US	—WUS—
WETLAND	(dots)	WETLAND BUFFER	—B—
100-YR FLOODPLAIN	(line)	PROPOSED RIP-RAP	(pattern)
PROPOSED R-O-W	(line)	PROP SW PIPE	(line)

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	0 S.F.	23,037 S.F.
WETLANDS	0 S.F.	5,536 S.F.
WATERS OF THE US	31 LF/104 S.F.	338 LF/1,422 S.F.

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DESIGN BUILD
WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 8 OF 42

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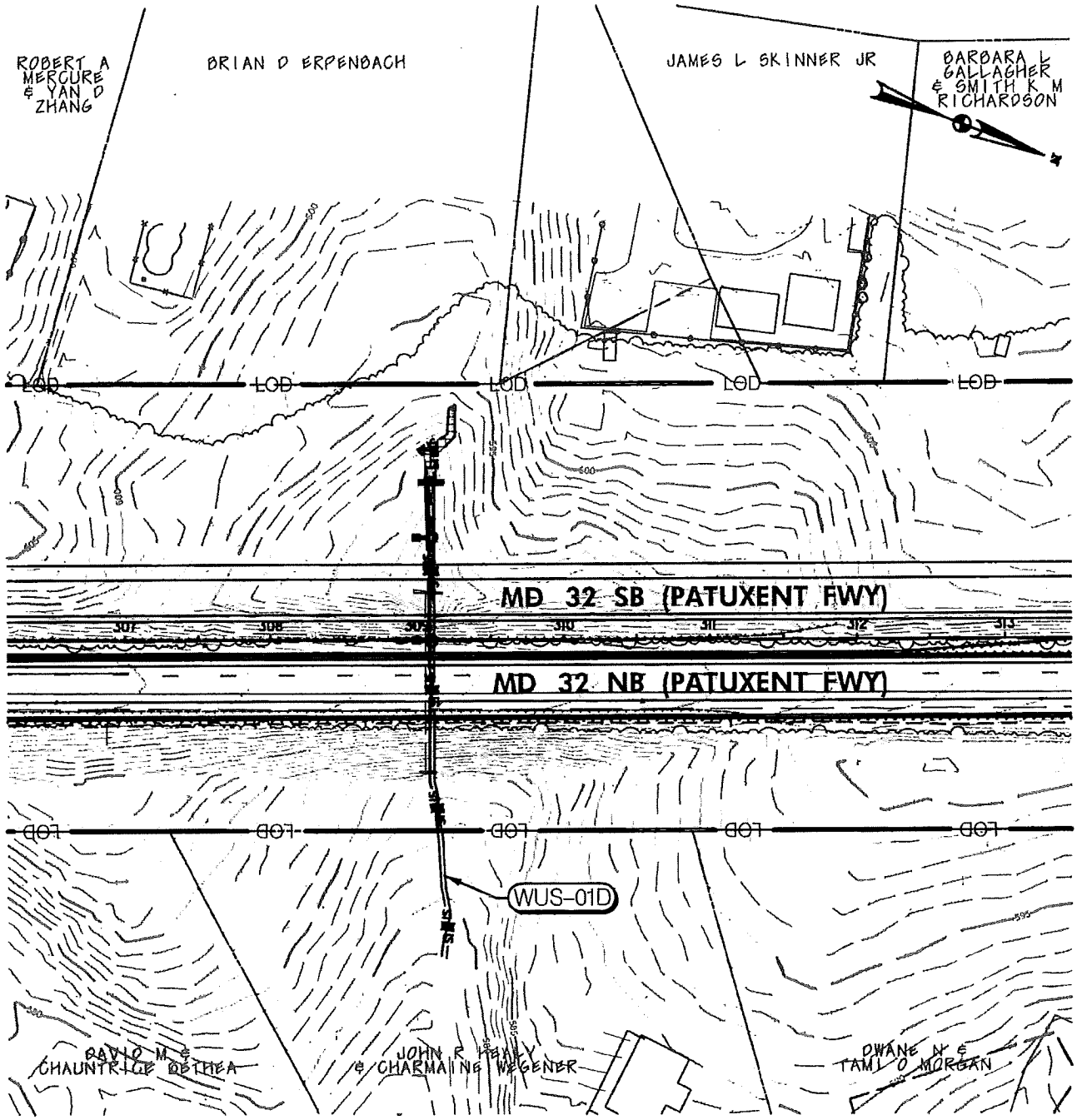

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	LOD	WATERS OF THE US	WUS
WETLAND		WETLAND BUFFER	B
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	0 S.F.	0 S.F.
WETLANDS	0 S.F.	0 S.F.
WATERS OF THE US	67 LF/340 S.F.	225 LF/930 S.F.

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WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 9 OF 42

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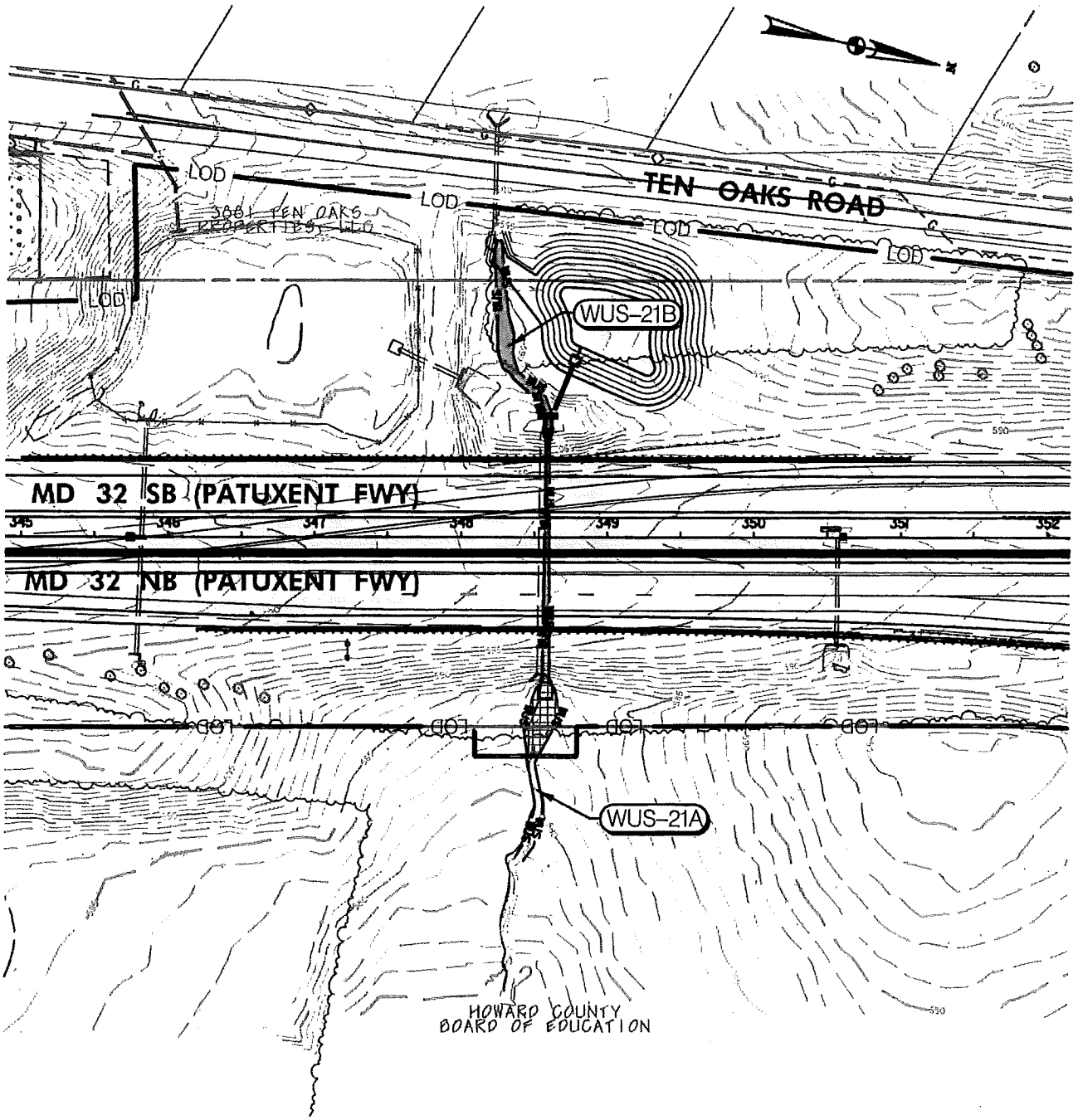

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	—LOD—	WATERS OF THE US	—WUS—
WETLAND		WETLAND BUFFER	—B—
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	0 S.F.	0 S.F.
WETLANDS	0 S.F.	0 S.F.
WATERS OF THE US	81 LF/975 S.F.	279 LF/1,566 S.F.

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WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 12 OF 42

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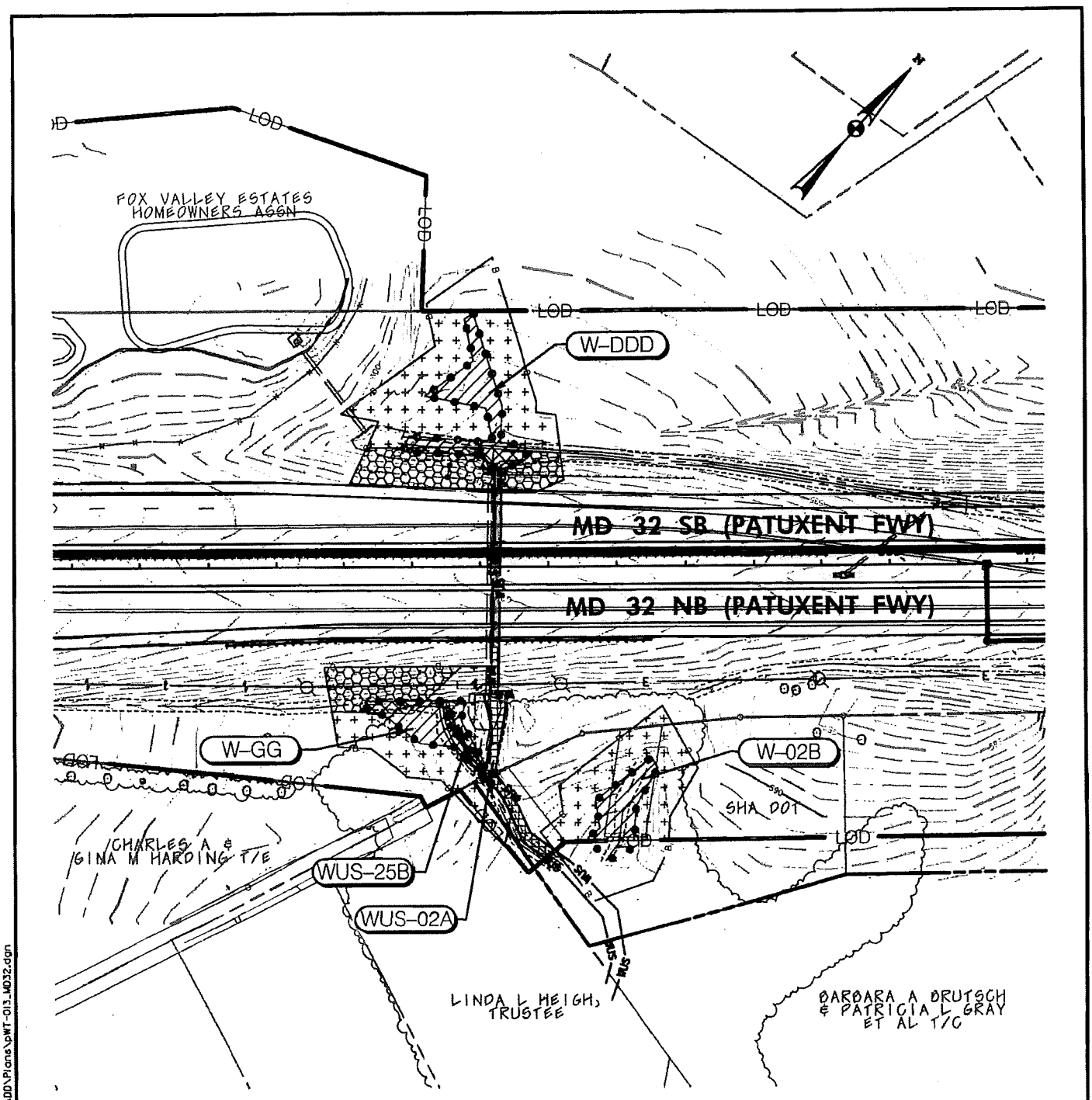

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	LOD	WATERS OF THE US	WUS
WETLAND		WETLAND BUFFER	B
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	18,196 S.F.	5,938 S.F.
WETLANDS	5,006 S.F.	925 S.F.
WATERS OF THE US	223 LF/1,451 S.F.	128 LF/666 S.F.

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COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 13 OF 42

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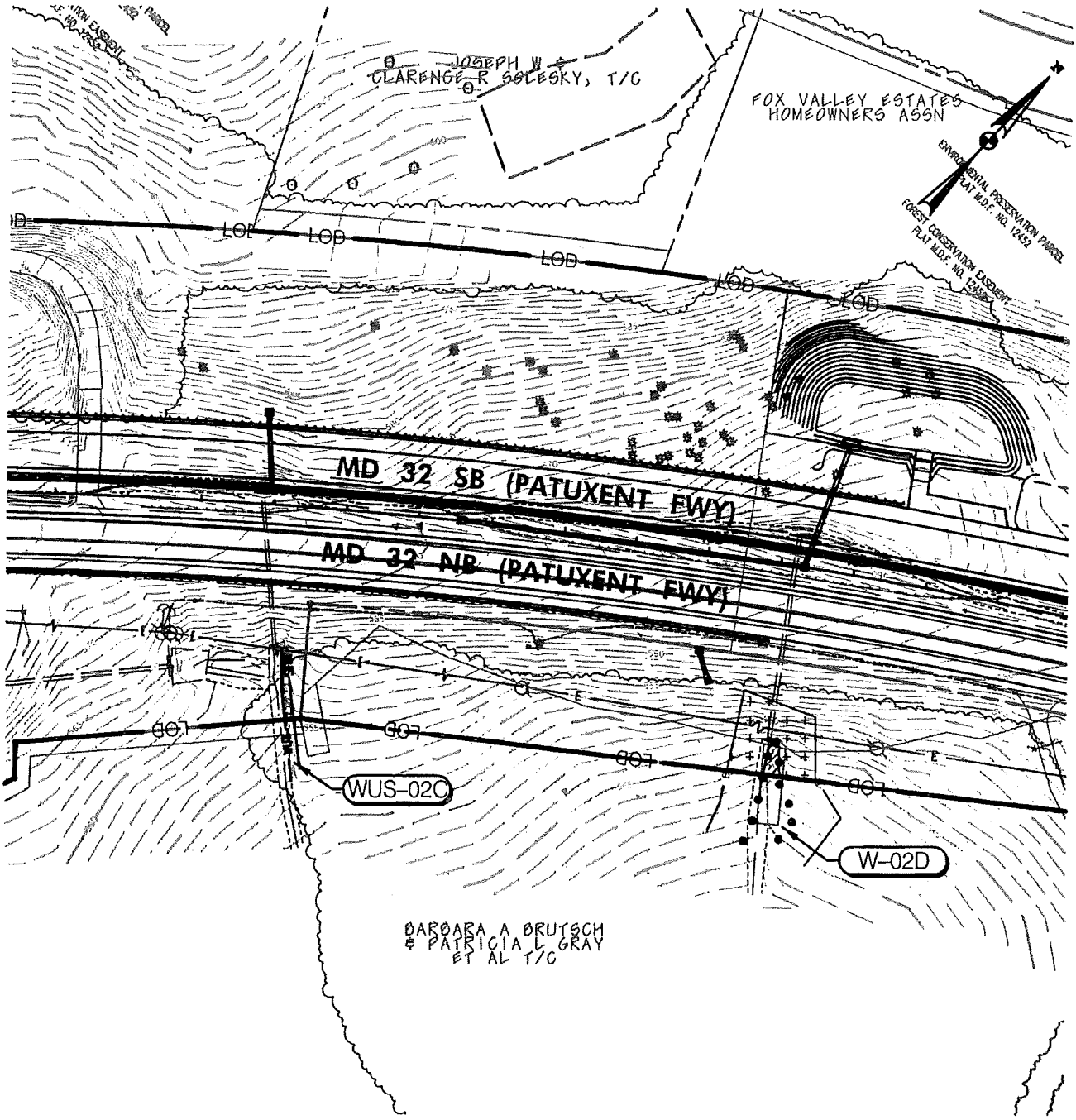

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	—LOD—	WATERS OF THE US	—WUS—
WETLAND		WETLAND BUFFER	—B—
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	2,552 S.F.	0 S.F.
WETLANDS	197 S.F.	0 S.F.
WATERS OF THE US	48 LF/261 S.F.	0 LF/0 S.F.

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COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 14 OF 42

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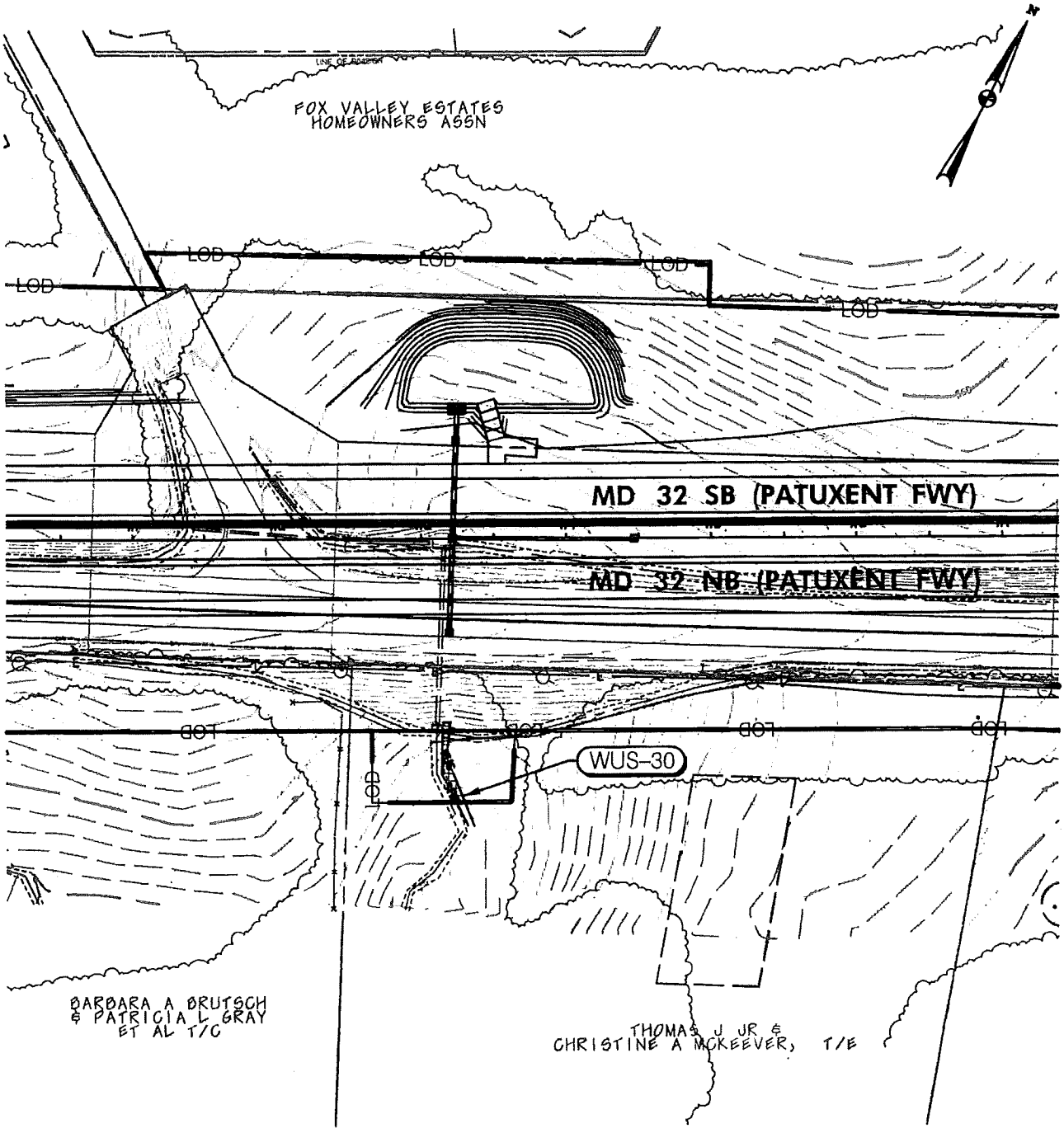

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	LOD	WATERS OF THE US	WUS
WETLAND		WETLAND BUFFER	B
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	0 S.F.	0 S.F.
WETLANDS	0 S.F.	0 S.F.
WATERS OF THE US	57 LF/298 S.F.	0 LF/0 S.F.

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COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 15 OF 42

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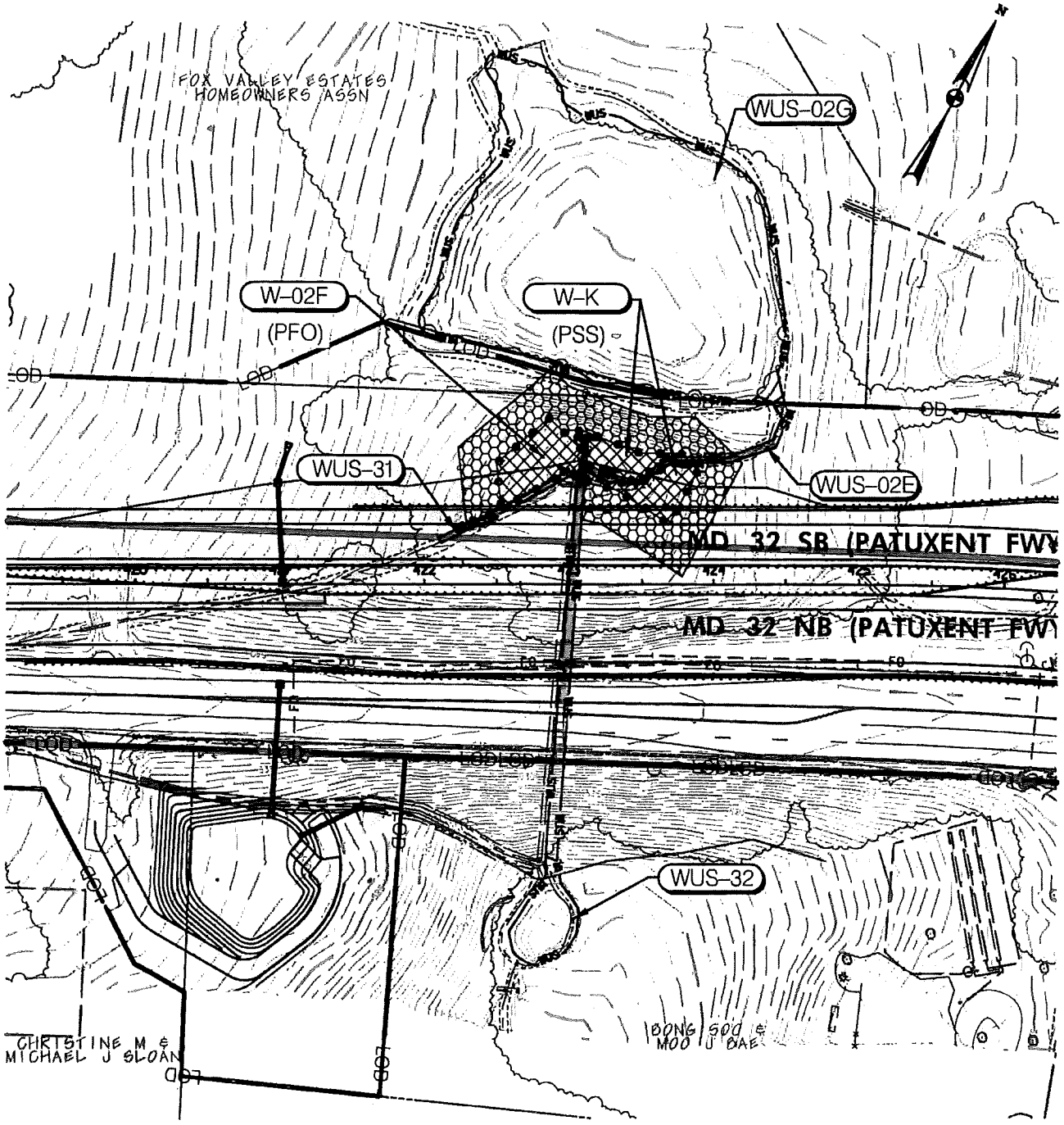

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	LOD	WATERS OF THE US	WUS
WETLAND		WETLAND BUFFER	B
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	0 S.F.	9,445 S.F.
WETLANDS	0 S.F.	4,319 S.F.
WATERS OF THE US	77 LF/472 S.F.	399 LF/1,894 S.F.

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DESIGN BUILD
WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 16 OF 42

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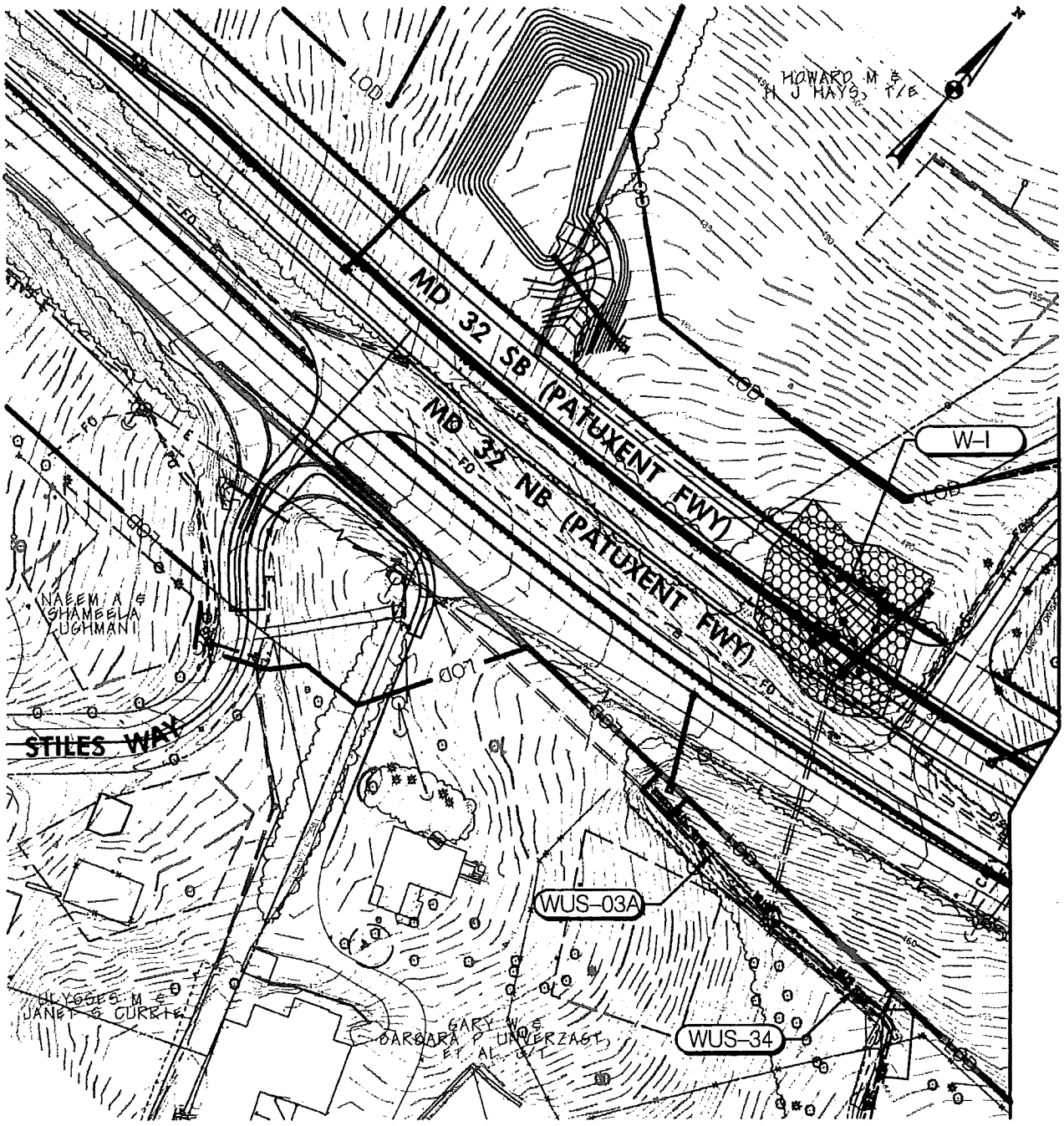

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	—LOD—	WATERS OF THE US	—WUS—
WETLAND		WETLAND BUFFER	—B—
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	0 S.F.	8,920 S.F.
WETLANDS	0 S.F.	2,011 S.F.
WATERS OF THE US	20 LF/61 S.F.	0 LF/0 S.F.

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DESIGN BUILD
WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 17 OF 42

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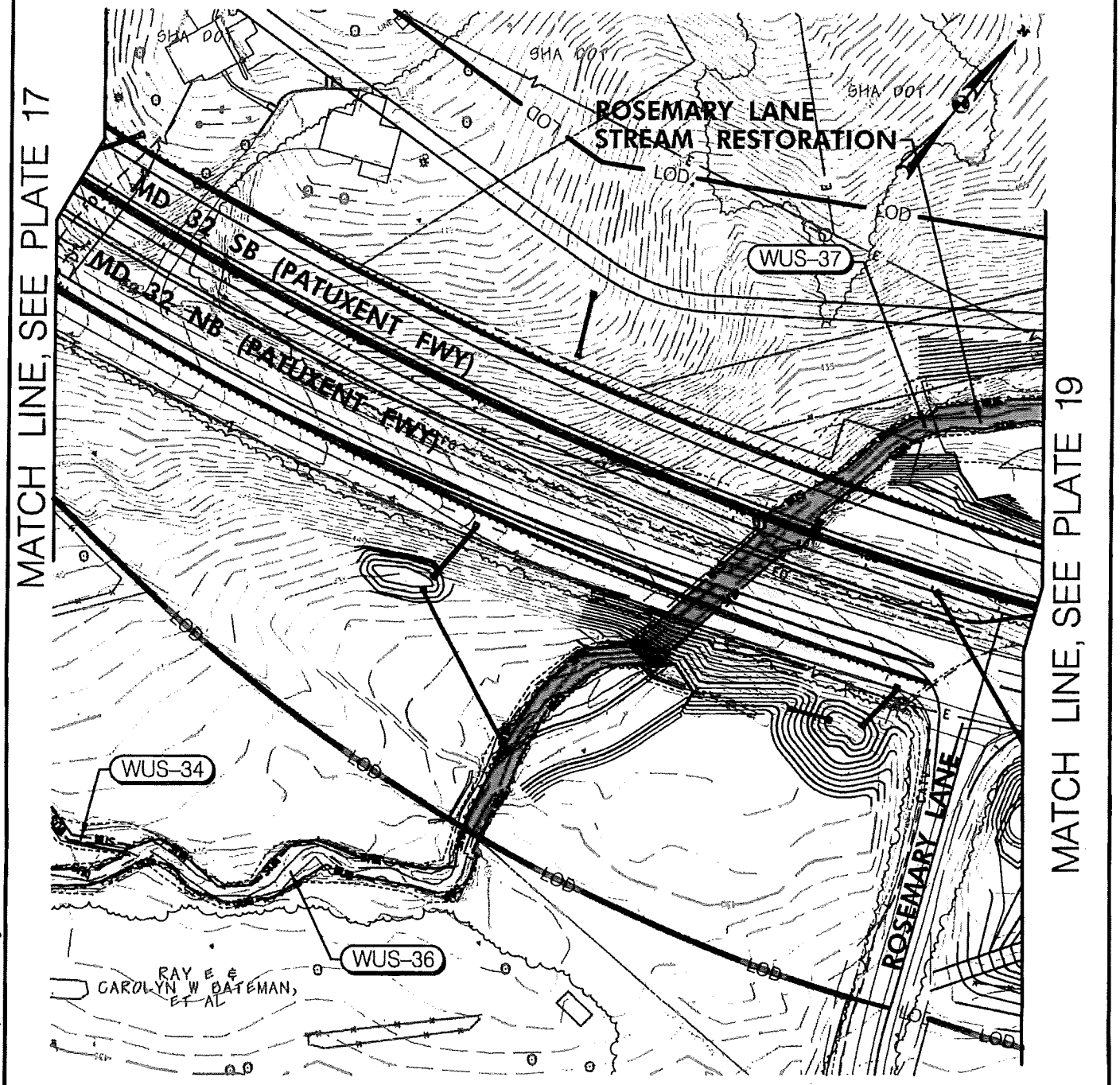

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	—LOD—	WATERS OF THE US	—WUS—
WETLAND		WETLAND BUFFER	—B—
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	0 S.F.	0 S.F.
WETLANDS	0 S.F.	0 S.F.
WATERS OF THE US	0 LF/0 S.F.	530 LF/9,412 S.F.

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WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 18 OF 42

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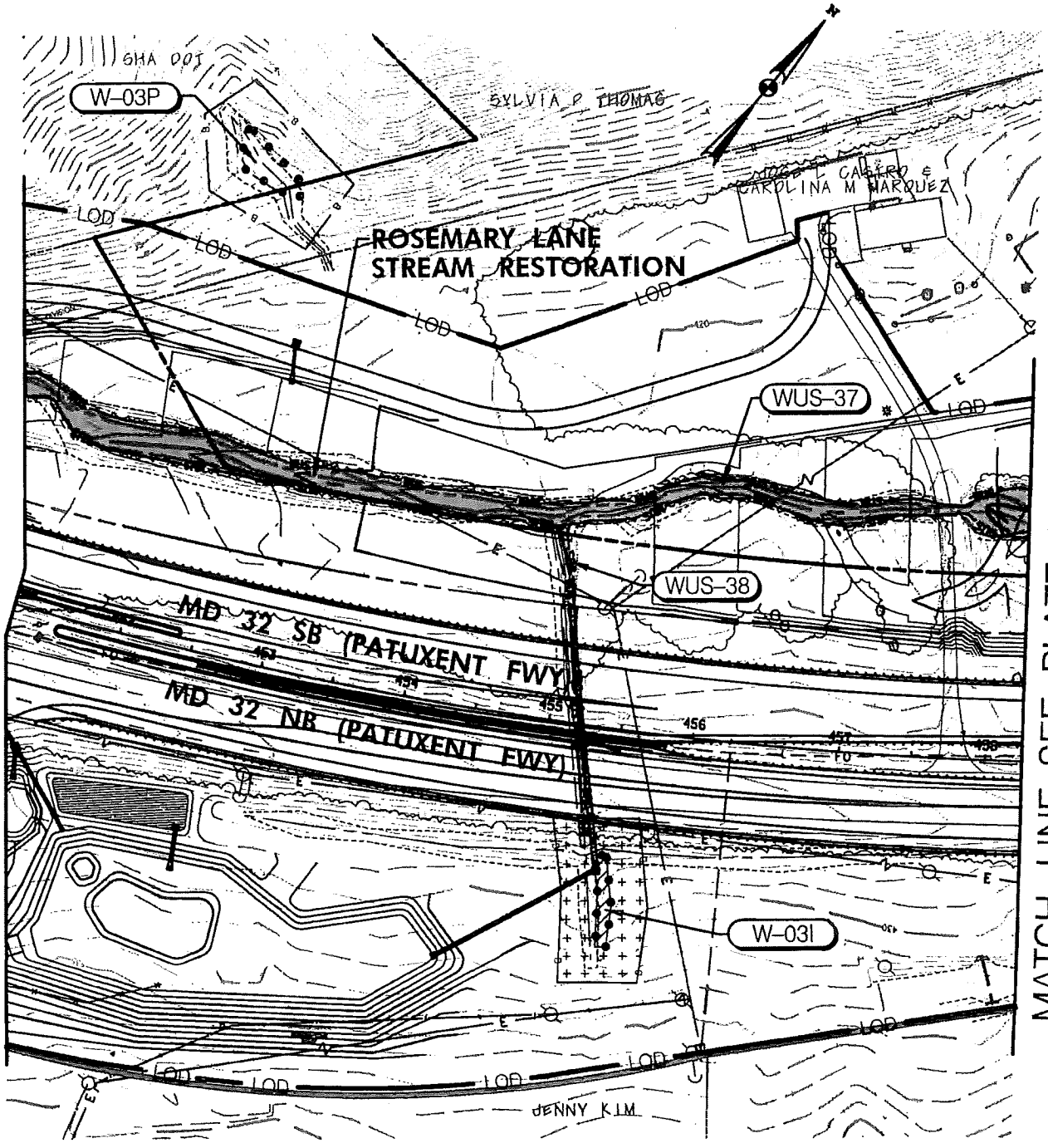

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	LOD	WATERS OF THE US	WUS
WETLAND		WETLAND BUFFER	B
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	5,920 S.F.	0 S.F.
WETLANDS	530 S.F.	0 S.F.
WATERS OF THE US	0 LF/0 S.F.	922 LF/12,099 S.F.

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WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 19 OF 42

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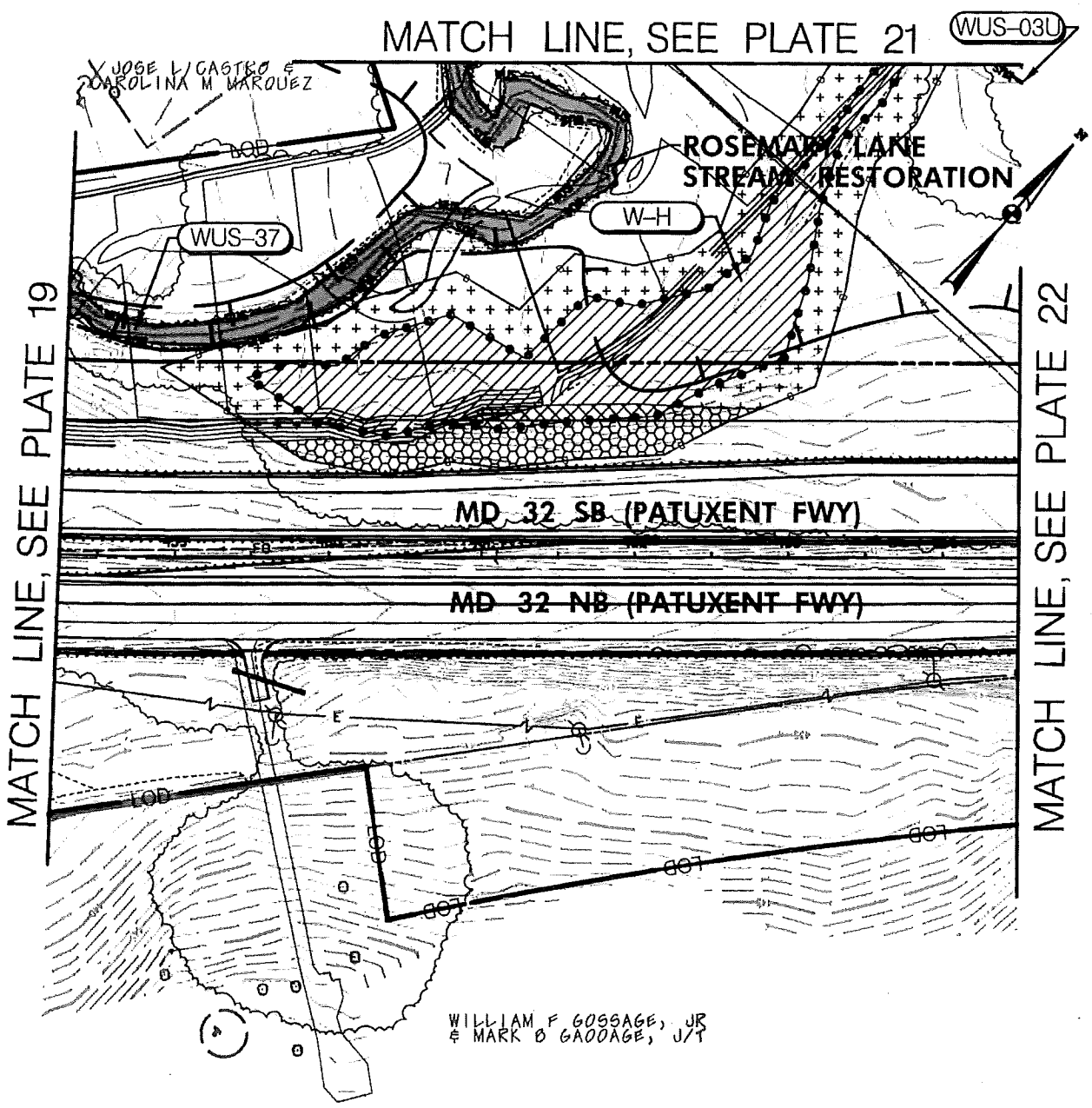

FLOODPLAIN IMPACTS = 72,359 SF (NO HATCH FOR GRAPHICAL CLARITY)

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	LOD	WATERS OF THE US	WUS
WETLAND		WETLAND BUFFER	B
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	22,408 S.F.	6,377 S.F.
WETLANDS	22,582 S.F.	1,394 S.F.
WATERS OF THE US	19 LF/23 S.F.	580 LF/8,590 S.F.

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WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 20 OF 42

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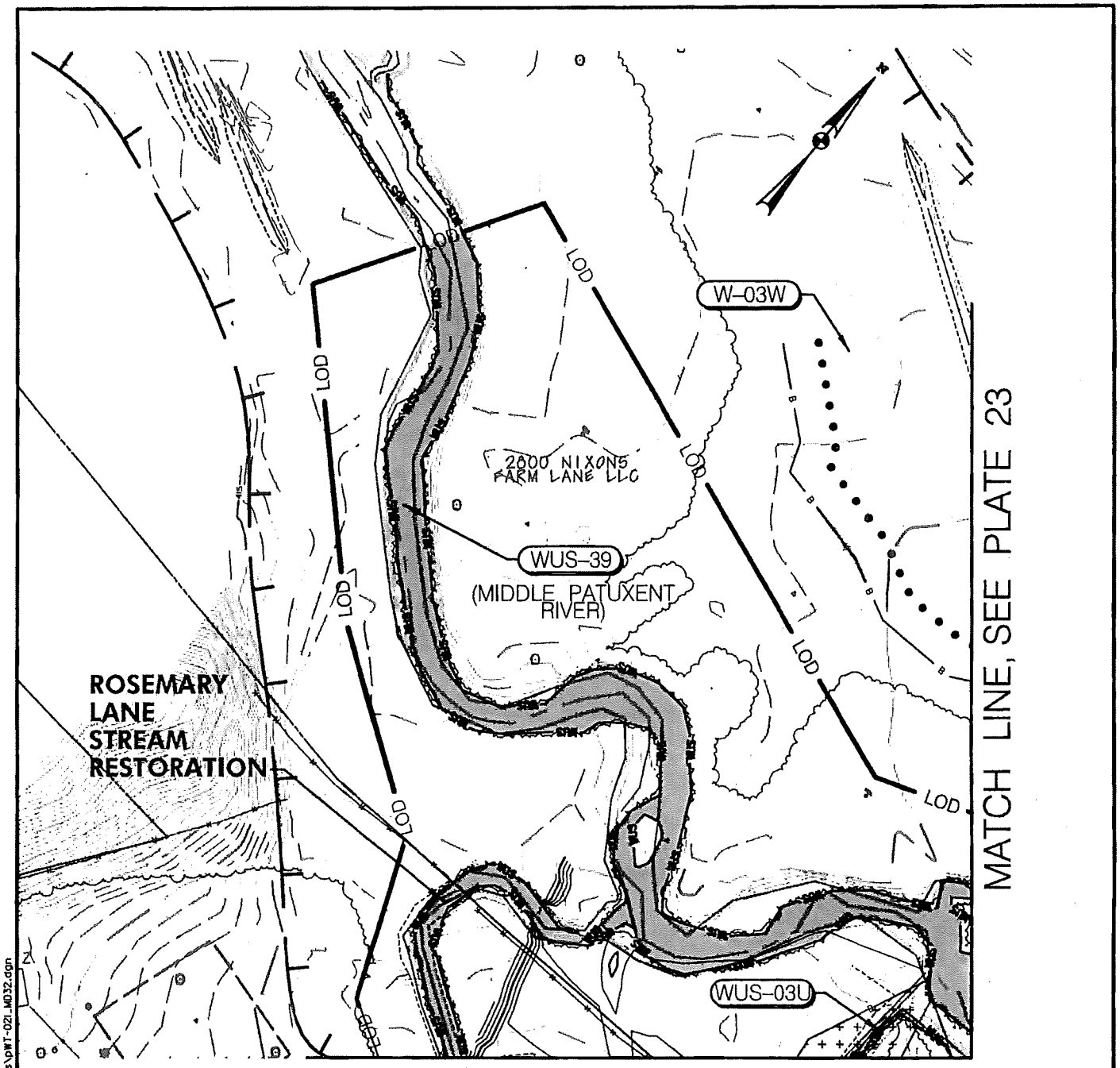

FLOODPLAIN IMPACTS = 186,617 SF (NO HATCH FOR GRAPHICAL CLARITY)

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	LOD	WATERS OF THE US	WUS
WETLAND		WETLAND BUFFER	B
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	2,534 S.F.	0 S.F.
WETLANDS	0 S.F.	0 S.F.
WATERS OF THE US	87 LF/201 S.F.	1,343 LF/ 28,428 S.F.

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COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 21 OF 42

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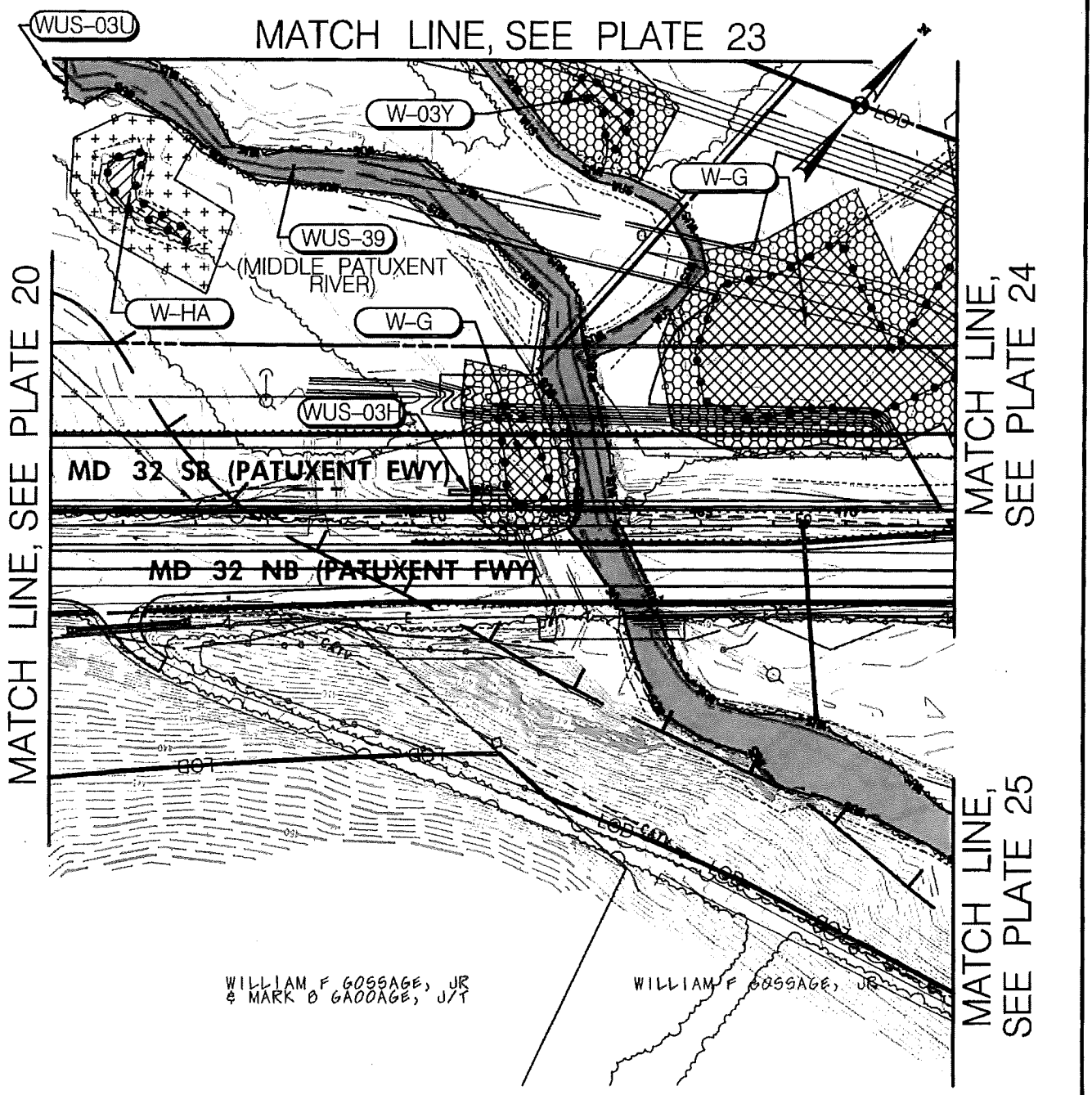

FLOODPLAIN IMPACTS = 241,326 SF (NO HATCH FOR GRAPHICAL CLARITY)

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	LOD	WATERS OF THE US	WUS
WETLAND		WETLAND BUFFER	B
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	8,020 S.F.	25,042 S.F.
WETLANDS	945 S.F.	16,851 S.F.
WATERS OF THE US	11 LF/13 S.F.	1,235 LF/ 26,954 S.F.

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WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 22 OF 42

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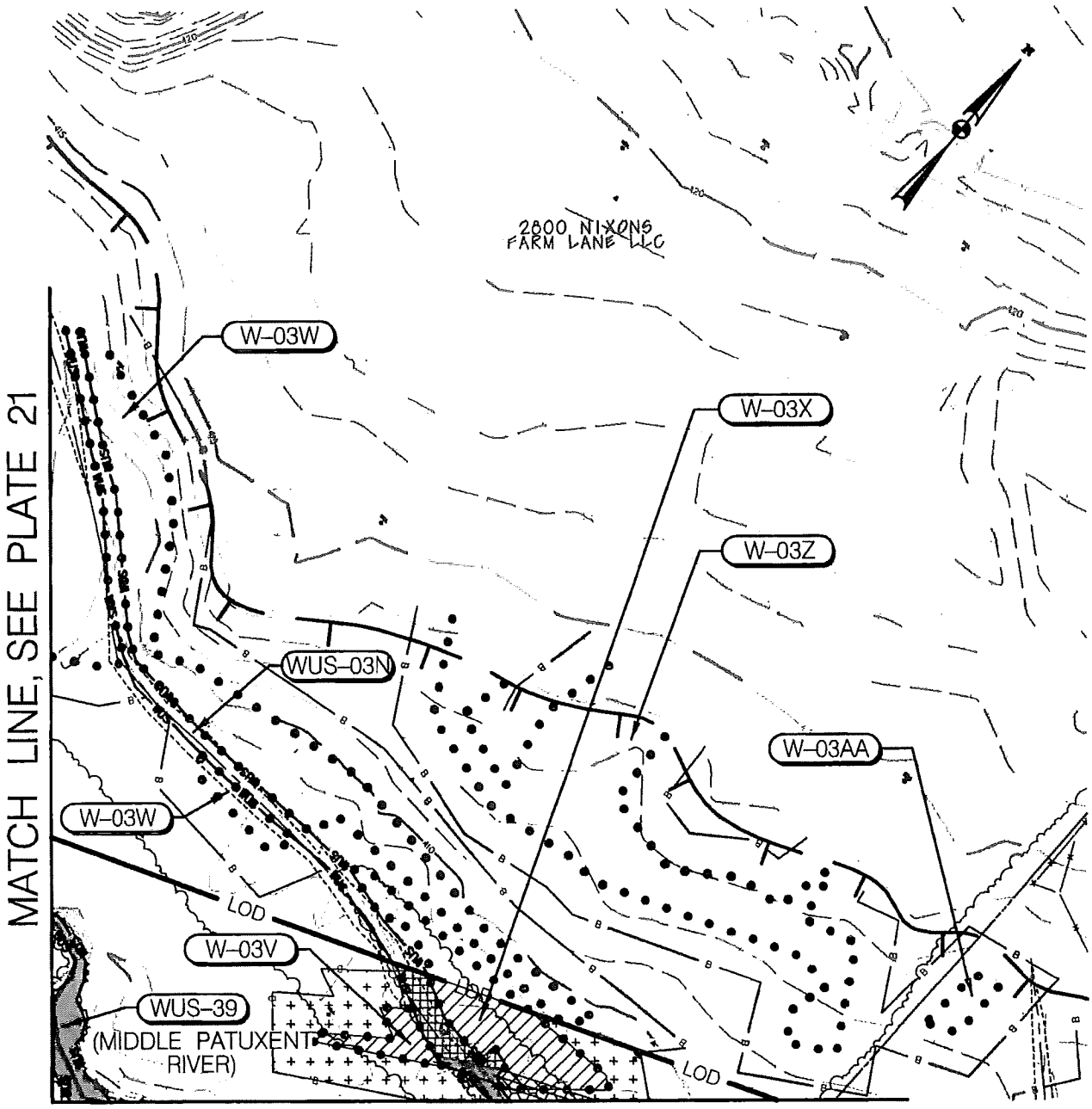

FLOODPLAIN IMPACTS = 41,936 SF (NO HATCH FOR GRAPHICAL CLARITY)

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	LOD	WATERS OF THE US	WUS
WETLAND		WETLAND BUFFER	B
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	8,011 S.F.	381 S.F.
WETLANDS	5,094 S.F.	278 S.F.
WATERS OF THE US	75 LF/1,460 S.F.	173 LF/2,478 S.F.

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MD 32
FROM LINDEN CHURCH TO I-70
DESIGN BUILD
WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 23 OF 42

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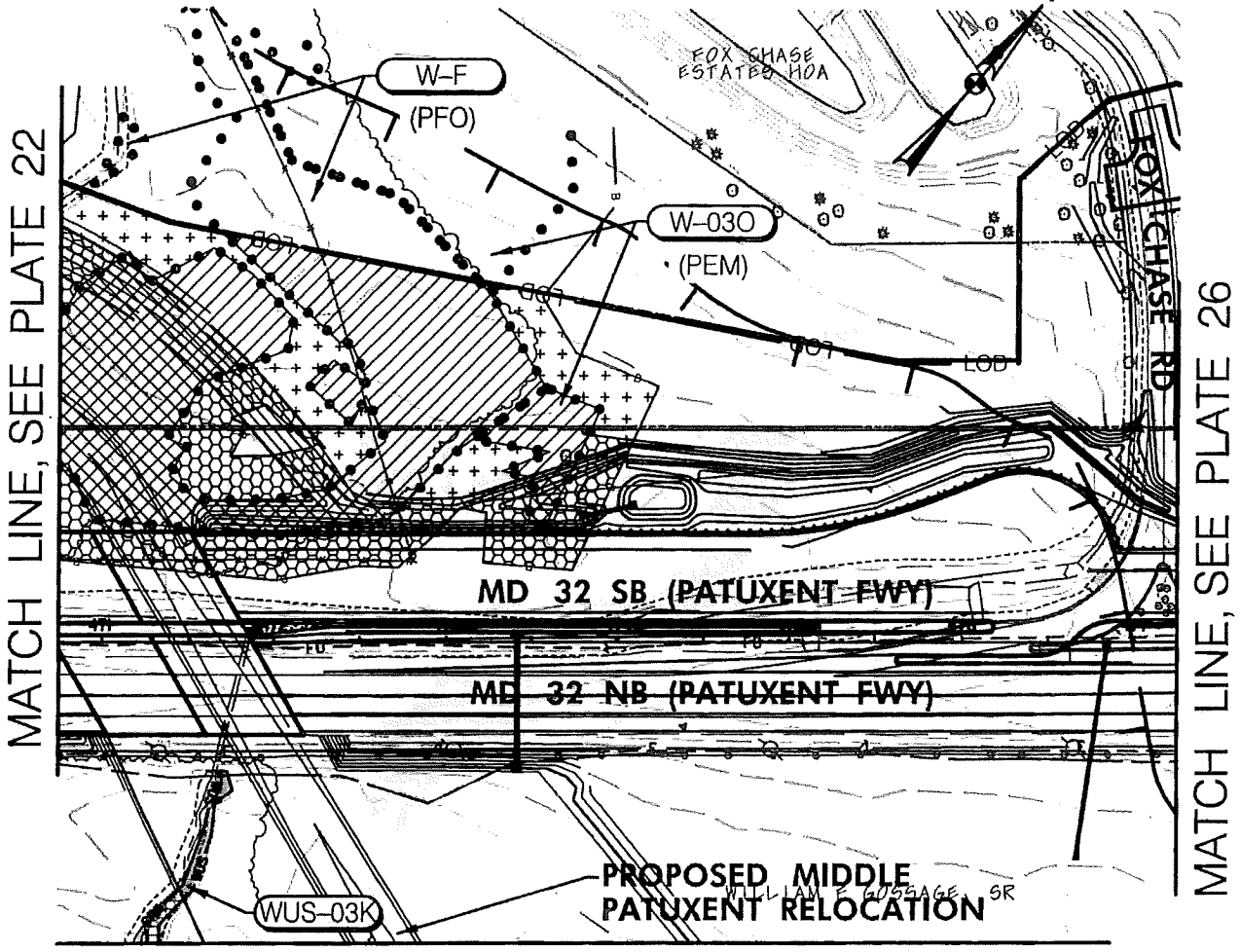

FLOODPLAIN IMPACTS = 227,774 SF (NO HATCH FOR GRAPHICAL CLARITY)

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	LOD	WATERS OF THE US	WUS
WETLAND		WETLAND BUFFER	B
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	14,414 S.F.	14,842 S.F.
WETLANDS	17,507 S.F.	13,199 S.F.
WATERS OF THE US	35 LF/233 S.F.	77 LF/441 S.F.

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DESIGN BUILD
WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 24 OF 42

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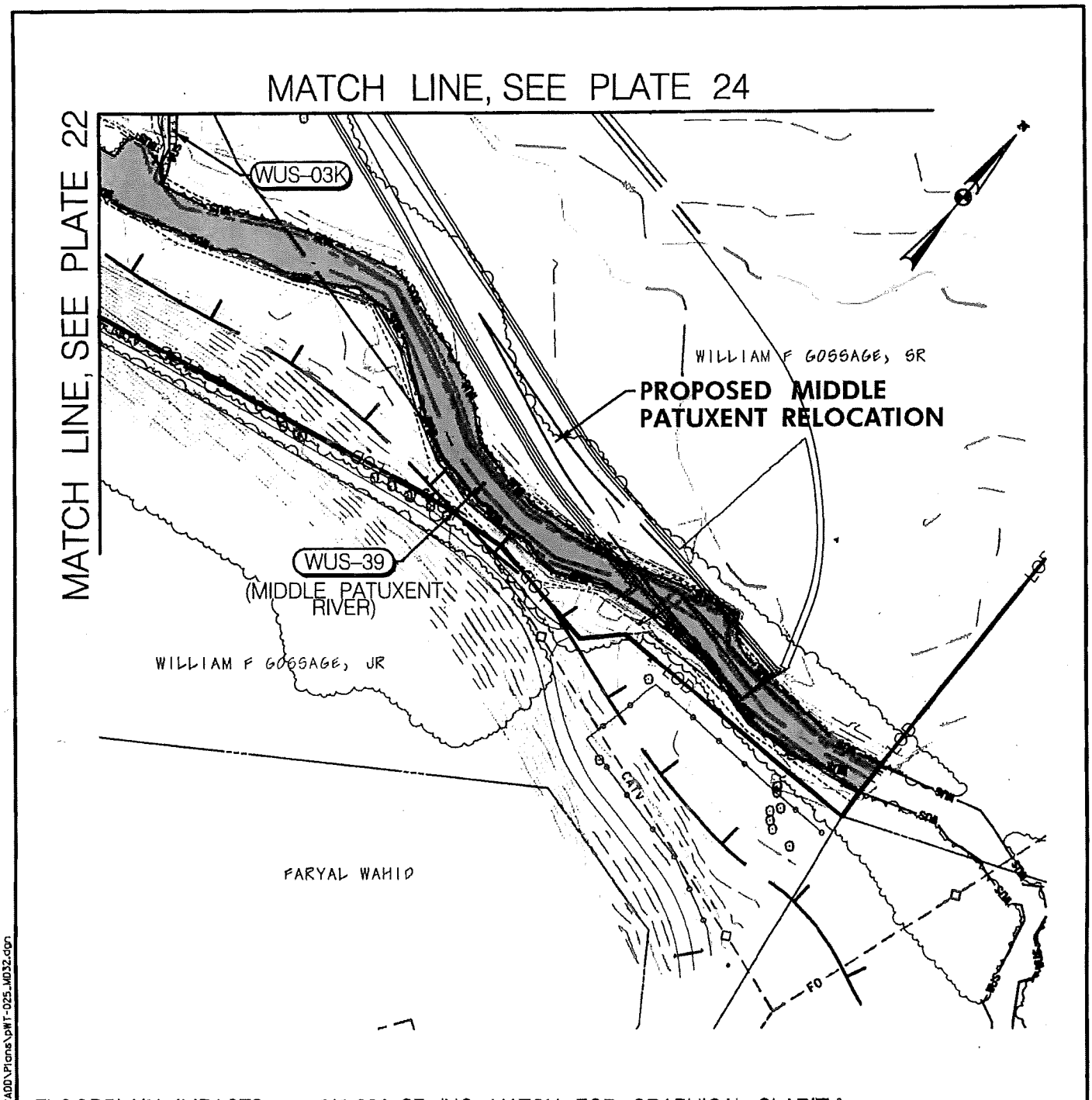

FLOODPLAIN IMPACTS = 210,806 SF (NO HATCH FOR GRAPHICAL CLARITY)

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	LOD	WATERS OF THE US	WUS
WETLAND		WETLAND BUFFER	B
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	0 S.F.	0 S.F.
WETLANDS	0 S.F.	0 S.F.
WATERS OF THE US	46 LF/276 S.F.	752 LF/21,526 S.F.

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DESIGN BUILD
WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 25 OF 42

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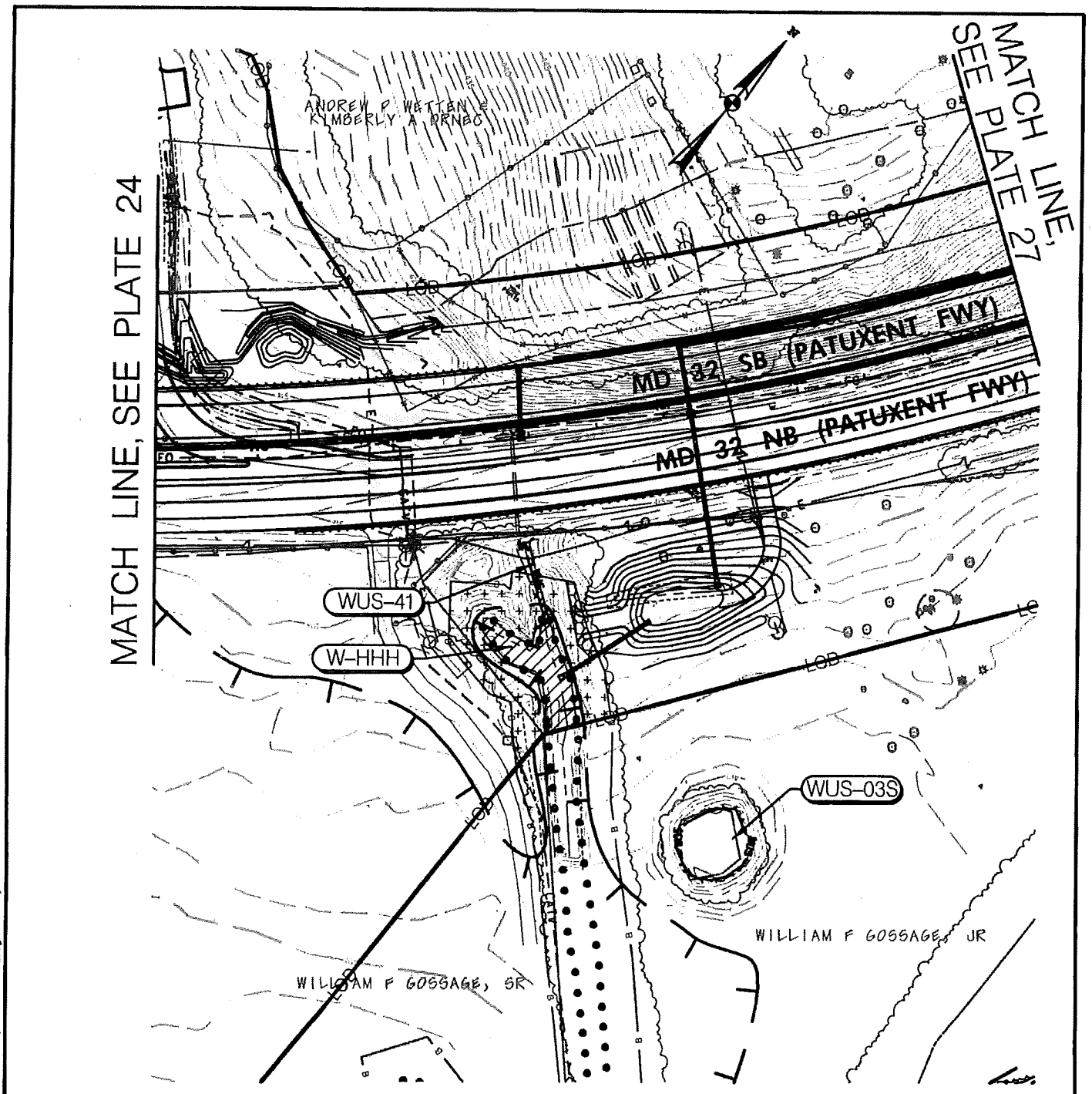

FLOODPLAIN IMPACTS = 58,138 SF (NO HATCH FOR GRAPHICAL CLARITY)

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	LOD	WATERS OF THE US	WUS
WETLAND		WETLAND BUFFER	B
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	7,382 S.F.	453 S.F.
WETLANDS	2,222 S.F.	0 S.F.
WATERS OF THE US	49 LF/170 S.F.	0 LF/0 S.F.

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DESIGN BUILD
WETLAND IMPACT PLATE

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DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 26 OF 42

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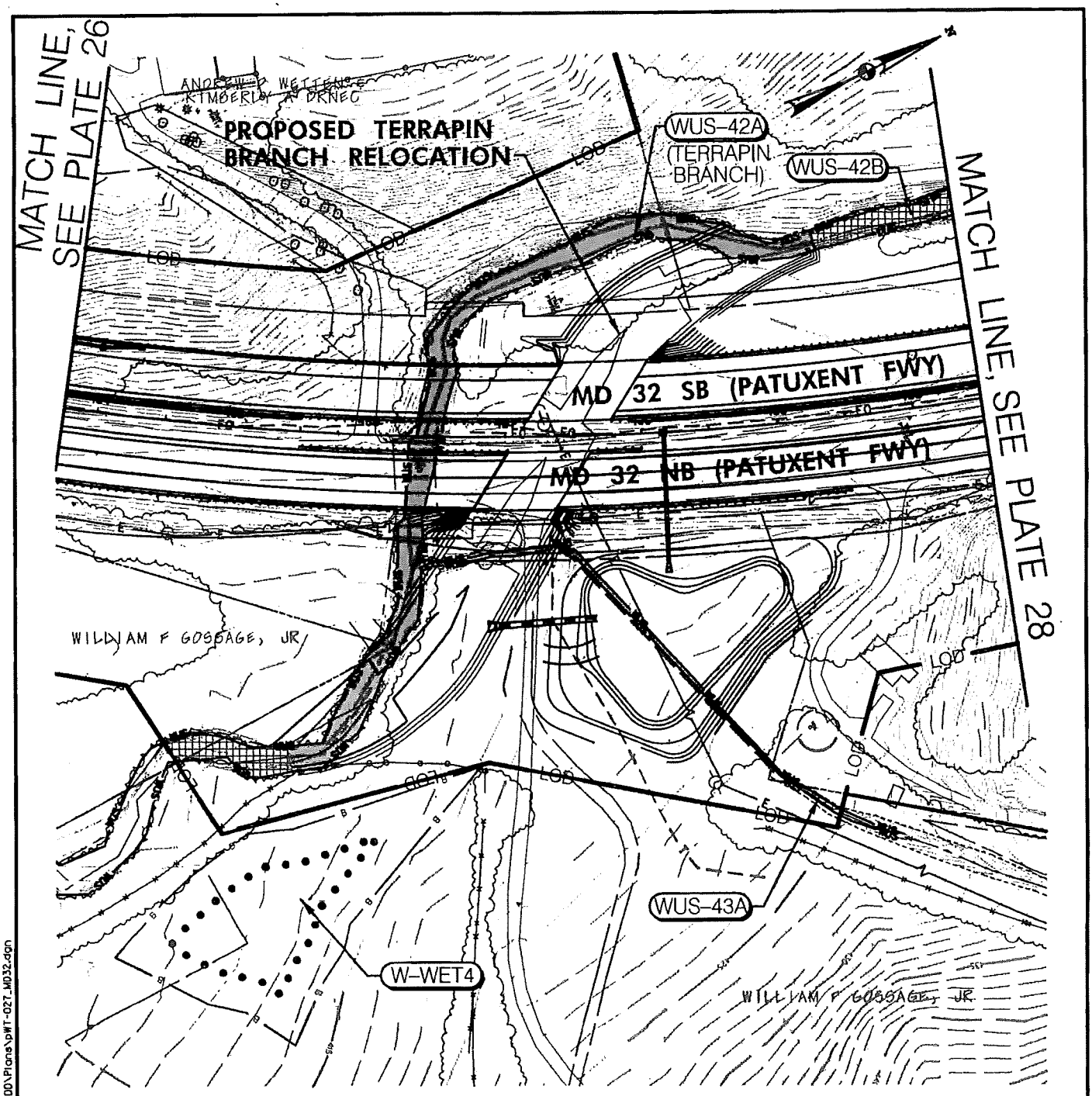

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	LOD	WATERS OF THE US	WUS
WETLAND		WETLAND BUFFER	B
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	0 S.F.	0 S.F.
WETLANDS	0 S.F.	0 S.F.
WATERS OF THE US	307 LF/3,663 S.F.	925 LF/ 11,946 S.F.

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DESIGN BUILD
WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
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SCALE: 1" = 100'	PLATE 27 OF 42

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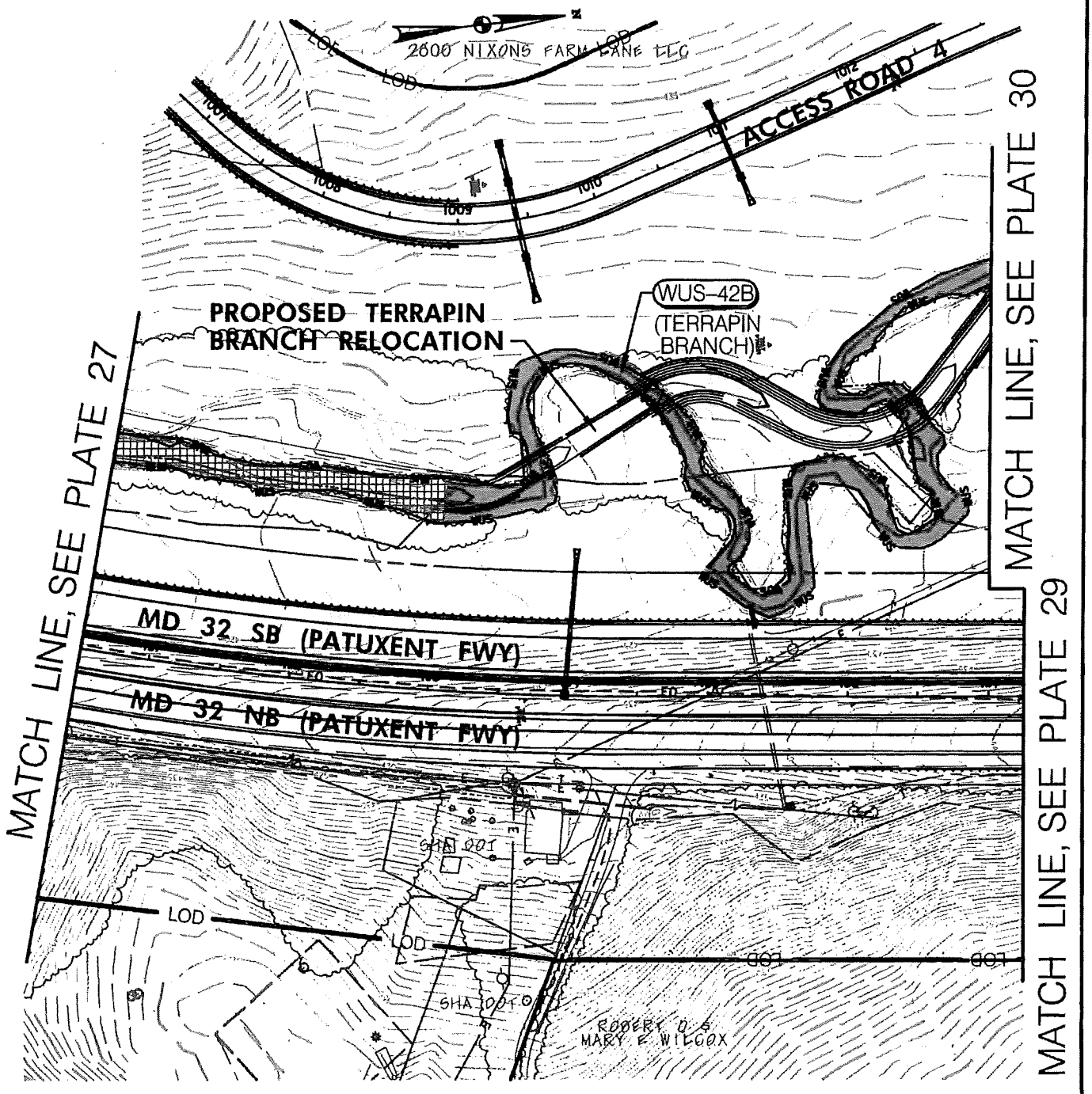

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	—LOD—	WATERS OF THE US	—WUS—
WETLAND		WETLAND BUFFER	—B—
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	0 S.F.	0 S.F.
WETLANDS	0 S.F.	0 S.F.
WATERS OF THE US	240 LF/ 4,661 S.F.	1,012 LF/ 14,855 S.F.

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WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 28 OF 42

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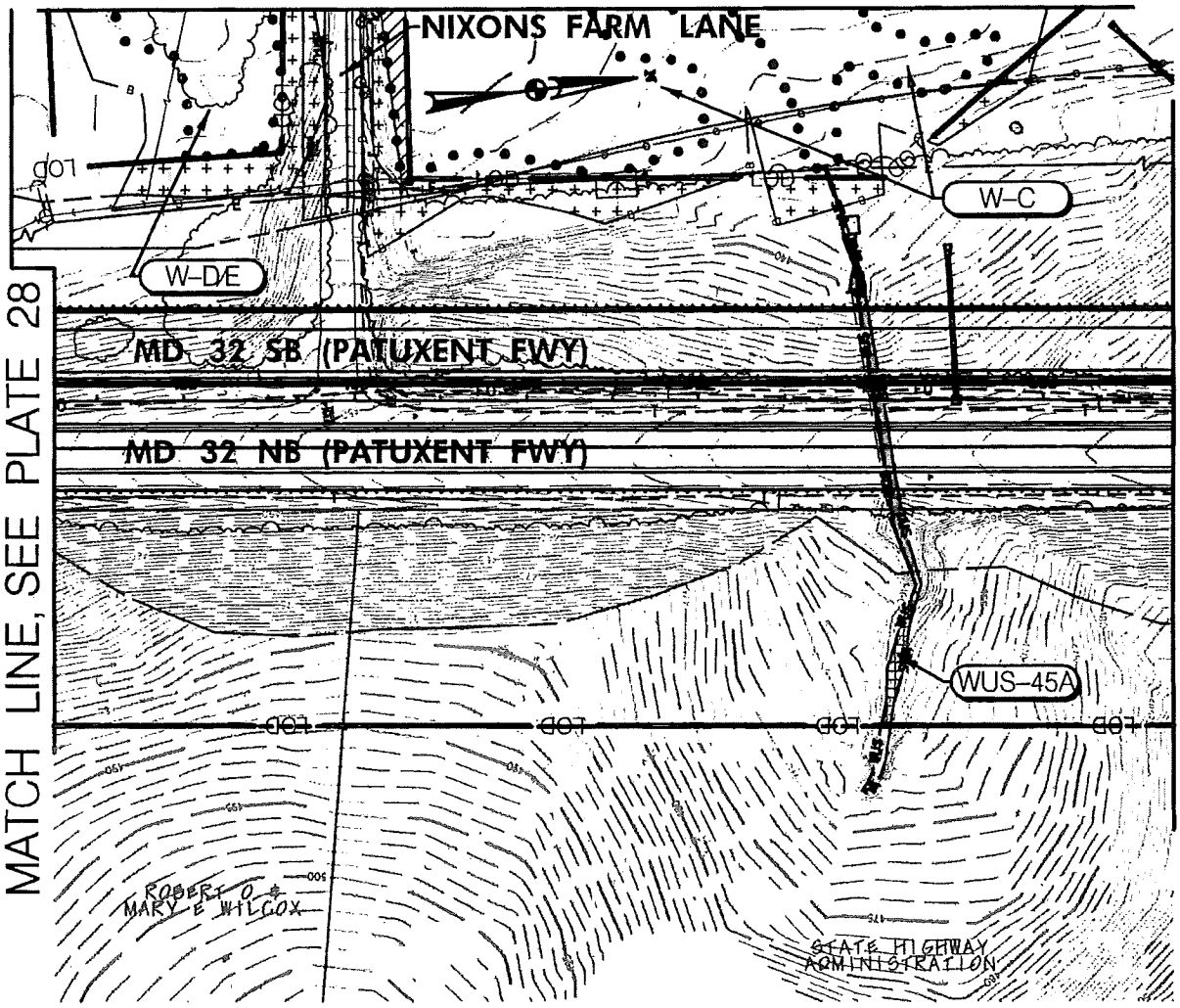
MATCH LINE, SEE PLATE 30



MATCH LINE, SEE PLATE 28

MATCH LINE, SEE PLATE 31

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	—LOD—	WATERS OF THE US	—WUS—
WETLAND		WETLAND BUFFER	—B—
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	11,815 S.F.	0 S.F.
WETLANDS	936 S.F.	0 S.F.
WATERS OF THE US	129 LF/589 S.F.	193 LF/1,068 S.F.

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WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
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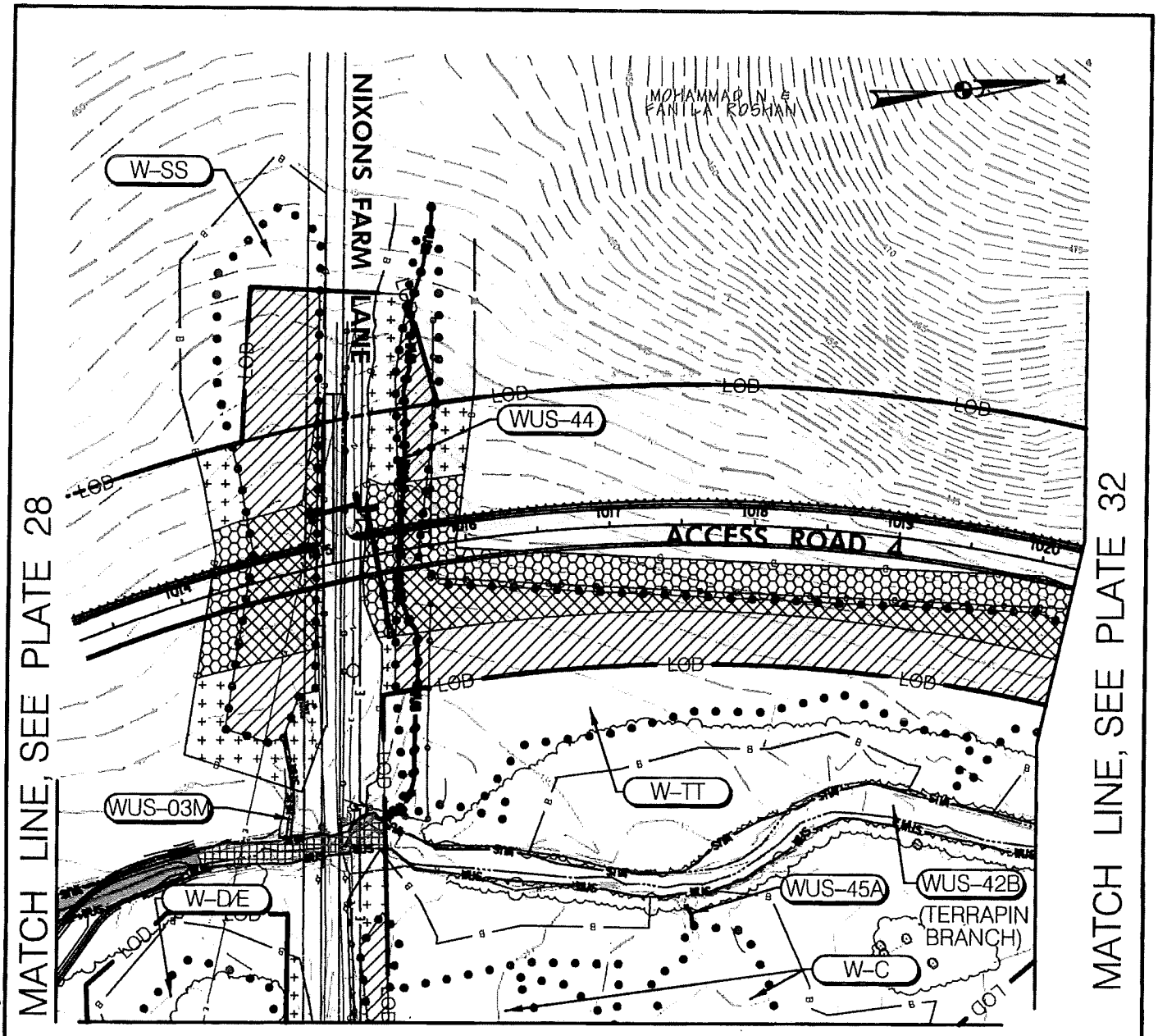

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	LOD	WATERS OF THE US	WUS
WETLAND		WETLAND BUFFER	B
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	12,671 S.F.	17,978 S.F.
WETLANDS	29,412 S.F.	14,520 S.F.
WATERS OF THE US	361 LF/2,443 S.F.	210 LF/1,946 S.F.

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WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
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SCALE: 1" = 100'	PLATE 30 OF 42

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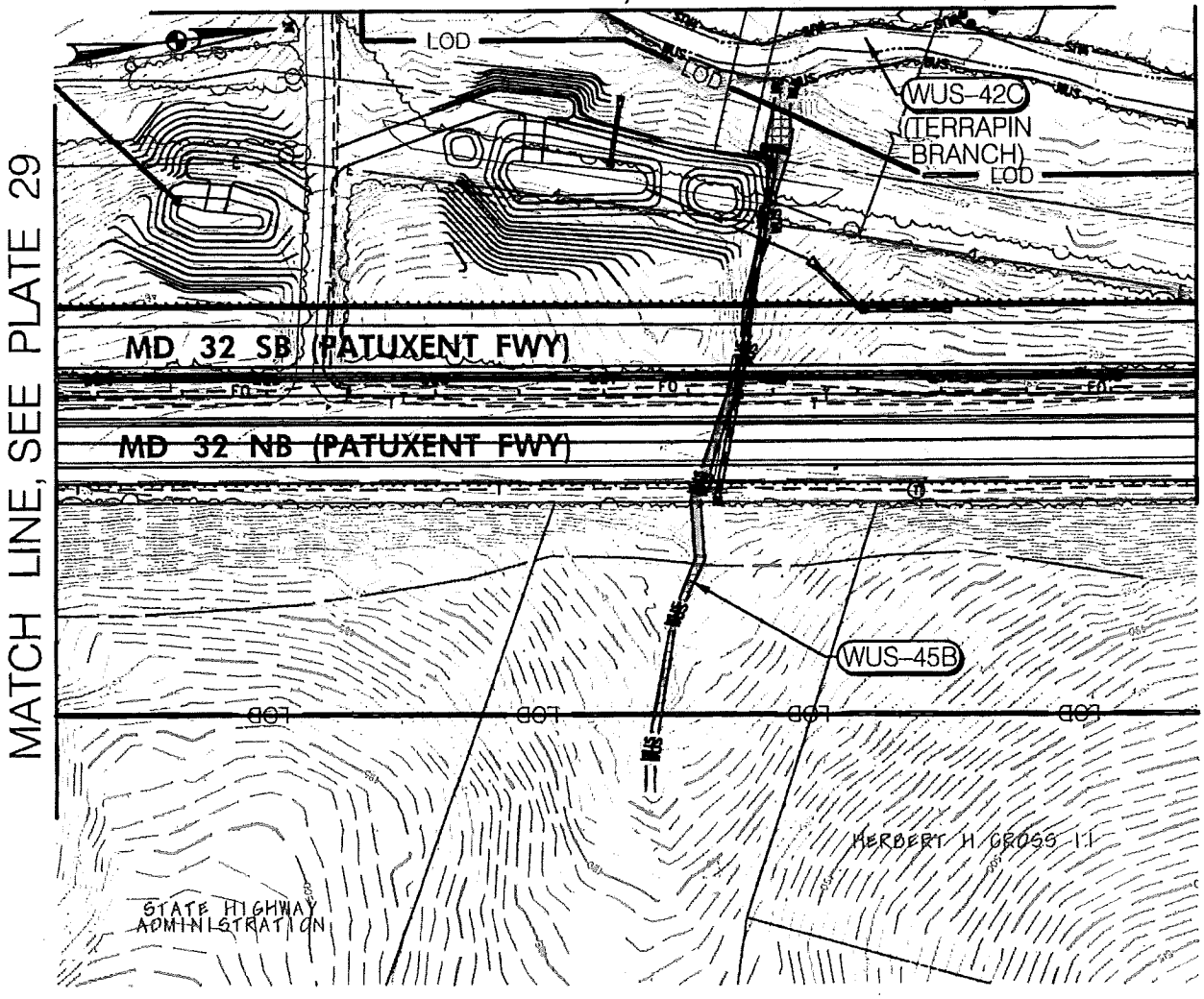

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	—LOD—	WATERS OF THE US	—WUS—
WETLAND		WETLAND BUFFER	—B—
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	0 S.F.	0 S.F.
WETLANDS	0 S.F.	0 S.F.
WATERS OF THE US	121 LF/694 S.F.	242 LF/1,388 S.F.

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COUNTY:	CONTRACT NO.:
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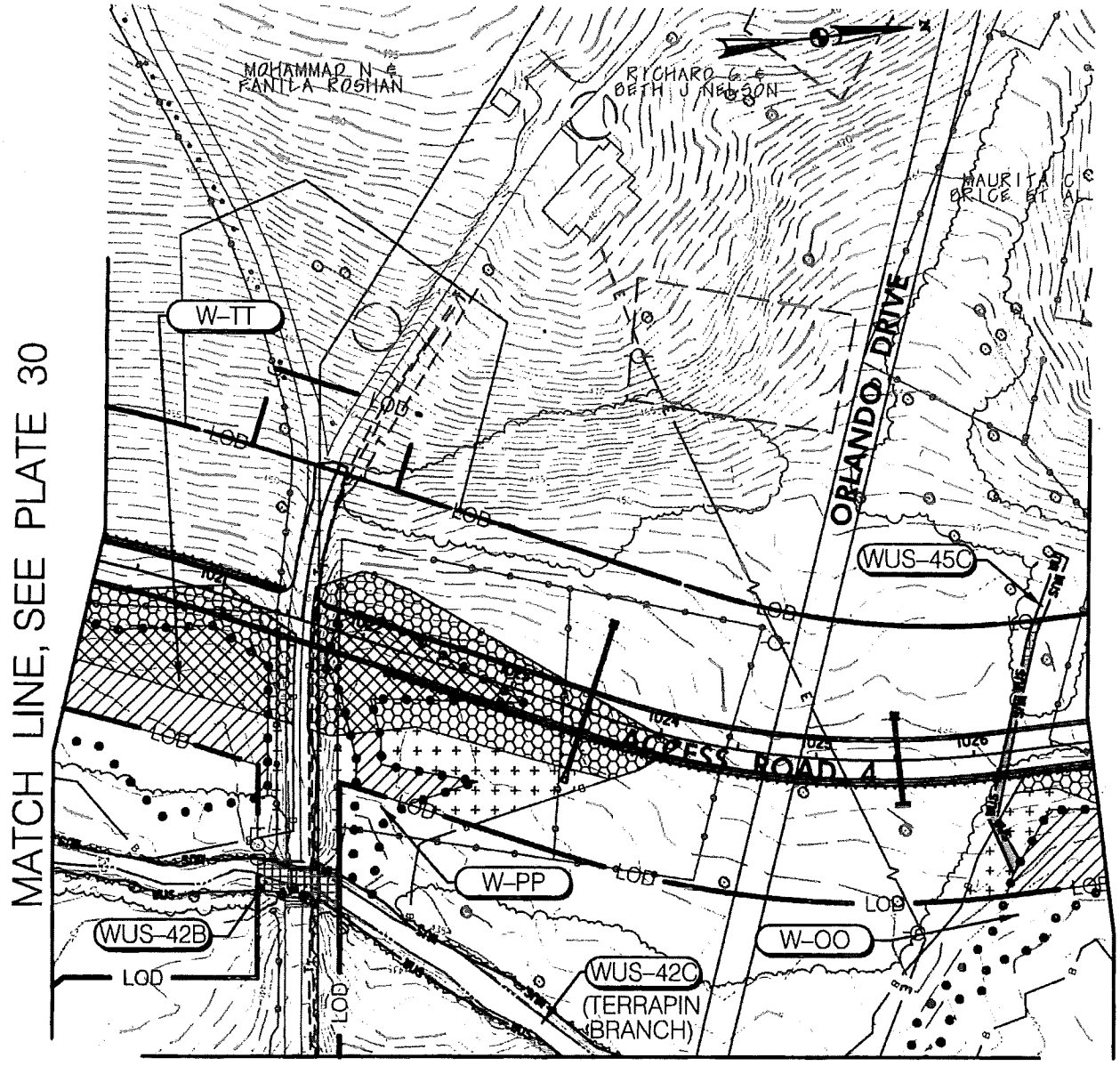

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	—LOD—	WATERS OF THE US	—WUS—
WETLAND		WETLAND BUFFER	—B—
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	9,220 S.F.	15,991 S.F.
WETLANDS	8,041 S.F.	8,492 S.F.
WATERS OF THE US	80 LF/1,104 S.F.	137 LF/697 S.F.

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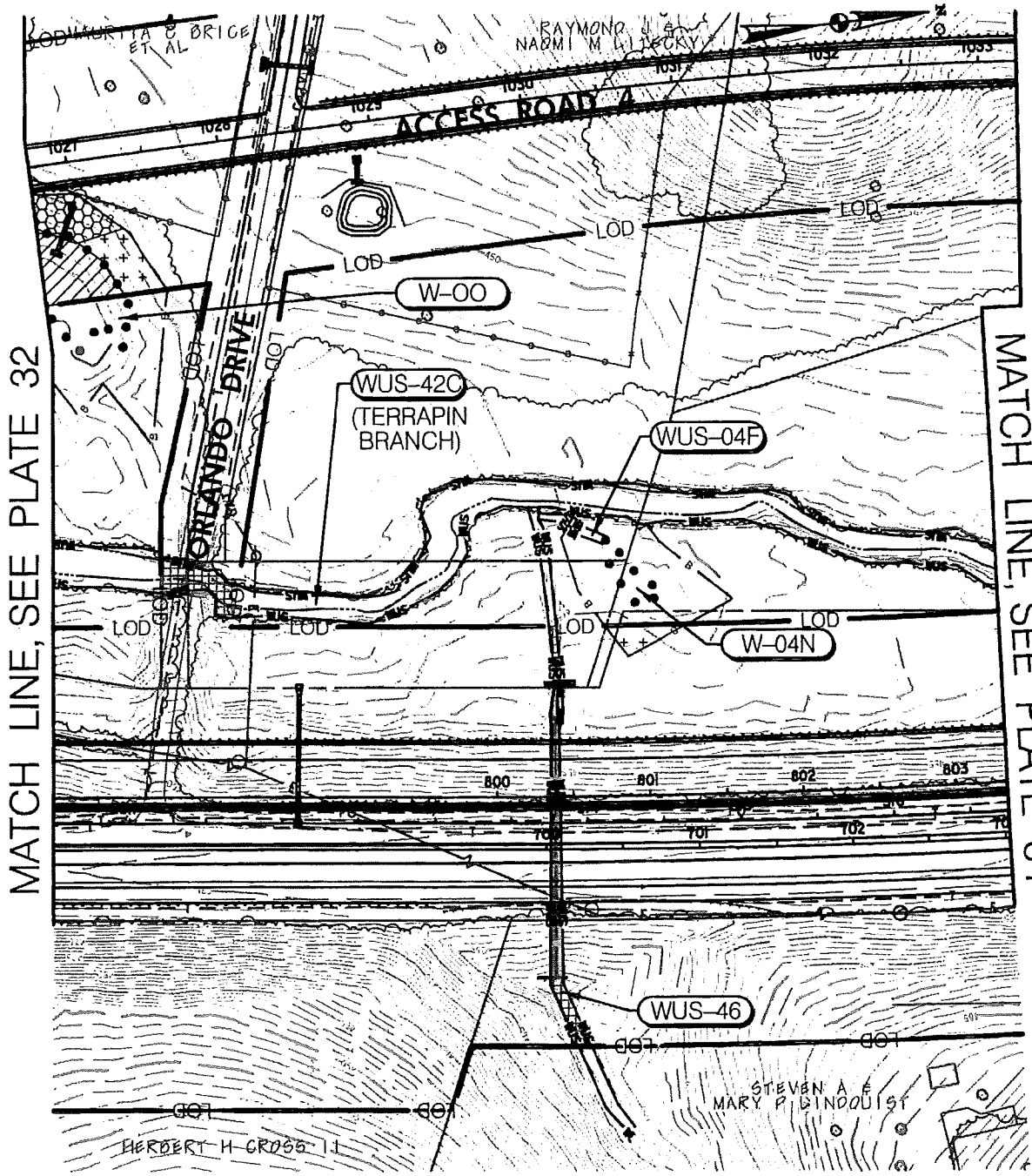

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	—LOD—	WATERS OF THE US	—WUS—
WETLAND		WETLAND BUFFER	—B—
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	1,739 S.F.	1,191 S.F.
WETLANDS	1,685 S.F.	39 S.F.
WATERS OF THE US	147 LF/1,504 S.F.	192 LF/1,287 S.F.

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WETLAND IMPACT PLATE

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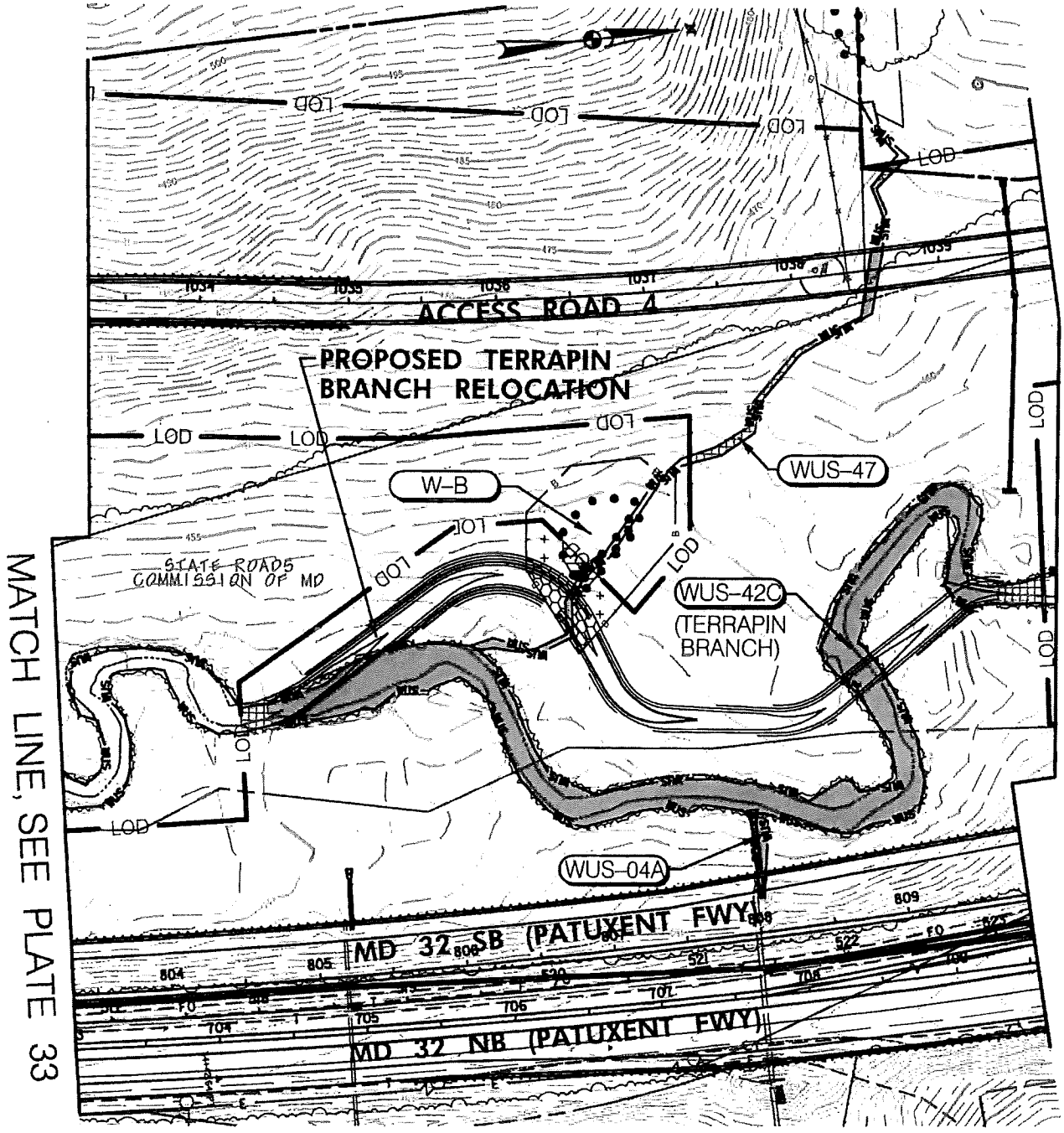

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	—LOD—	WATERS OF THE US	—WUS—
WETLAND		WETLAND BUFFER	—B—
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	1,233 S.F.	1,158 S.F.
WETLANDS	273 S.F.	0 S.F.
WATERS OF THE US	199 LF/ 1,436 S.F.	1,132 LF/ 18,219 S.F.

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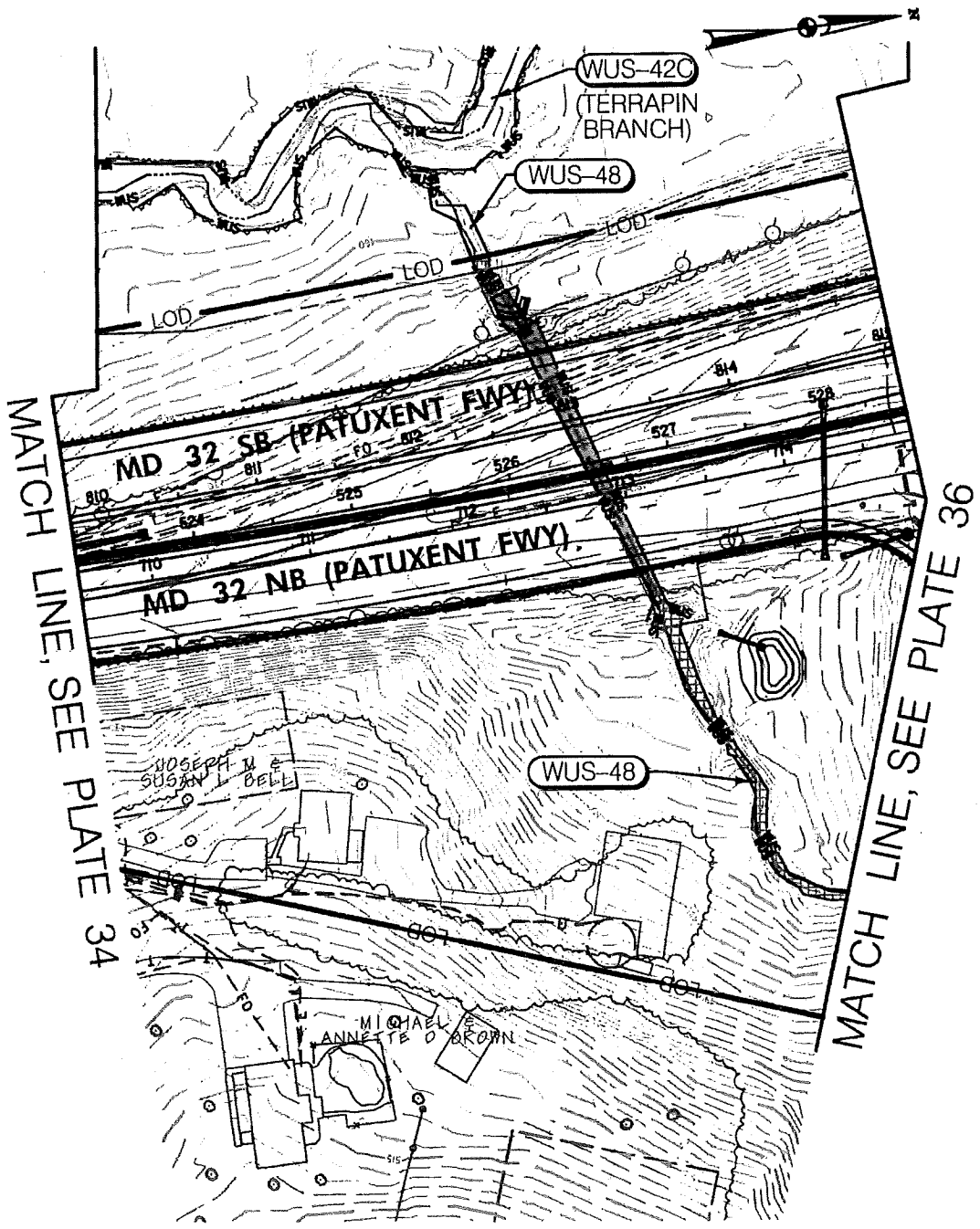
Addendum No. 5
09-06-2018



Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	—LOD—	WATERS OF THE US	—WUS—
WETLAND		WETLAND BUFFER	—B—
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	0 S.F.	0 S.F.
WETLANDS	0 S.F.	0 S.F.
WATERS OF THE US	262 LF/1,887 S.F.	211 LF/2,182 S.F.

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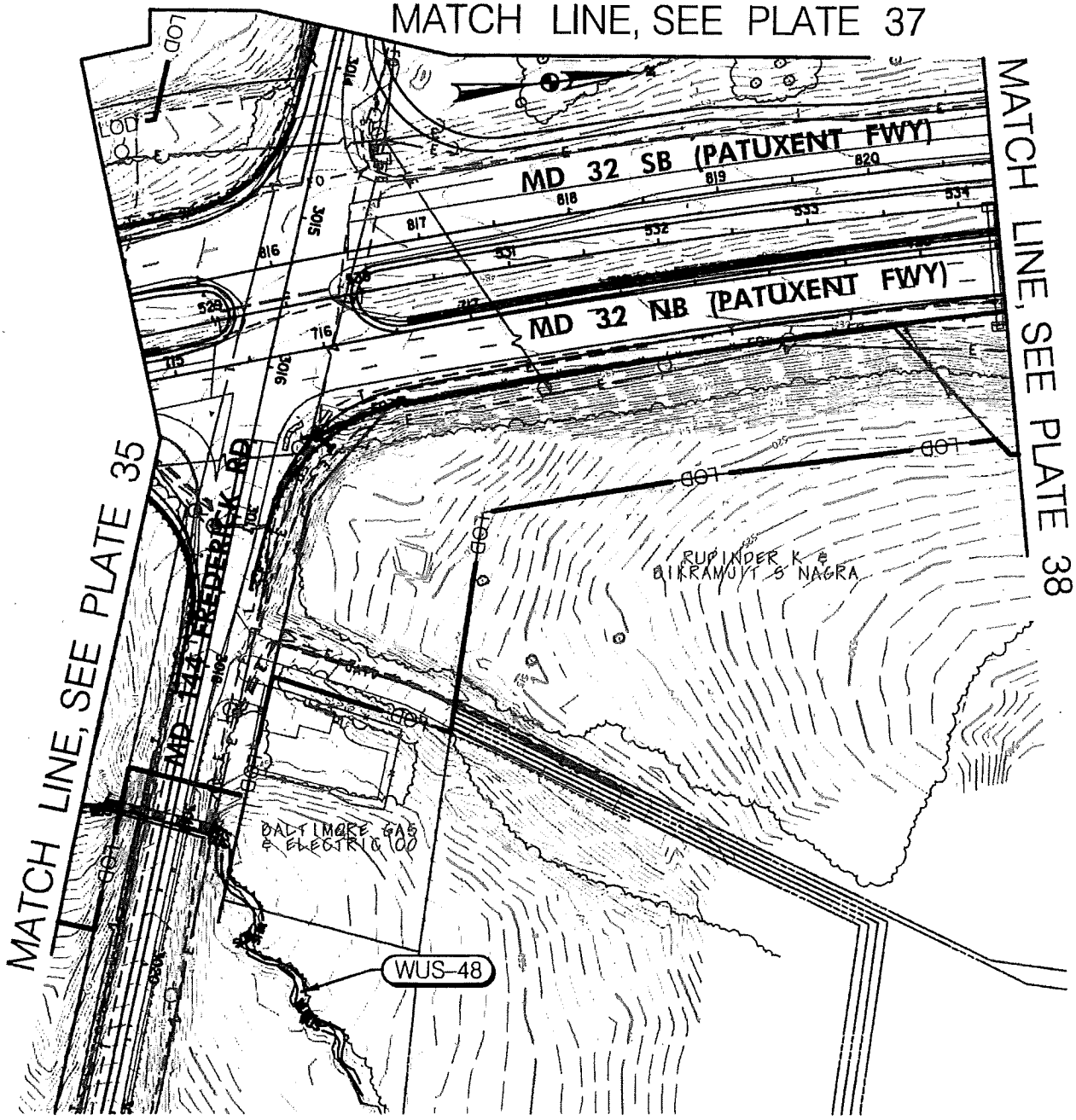

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	LOD	WATERS OF THE US	WUS
WETLAND		WETLAND BUFFER	B
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	0 S.F.	0 S.F.
WETLANDS	0 S.F.	0 S.F.
WATERS OF THE US	25 LF/84 S.F.	0 LF/0 S.F.

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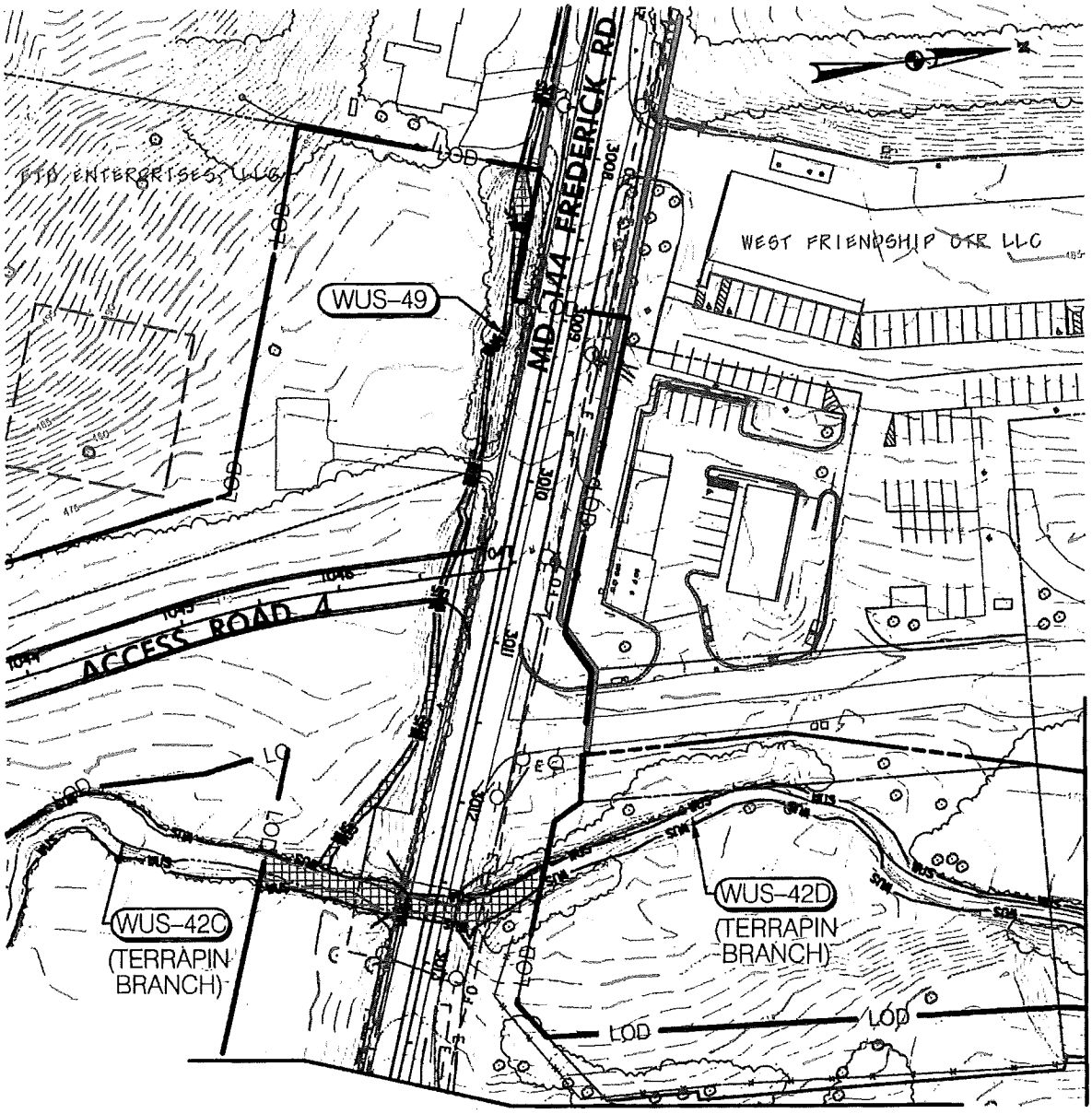

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	—LOD—	WATERS OF THE US	—WUS—
WETLAND		WETLAND BUFFER	—B—
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	0 S.F.	0 S.F.
WETLANDS	0 S.F.	0 S.F.
WATERS OF THE US	542 LF/4,644 S.F.	98 LF/405 S.F.

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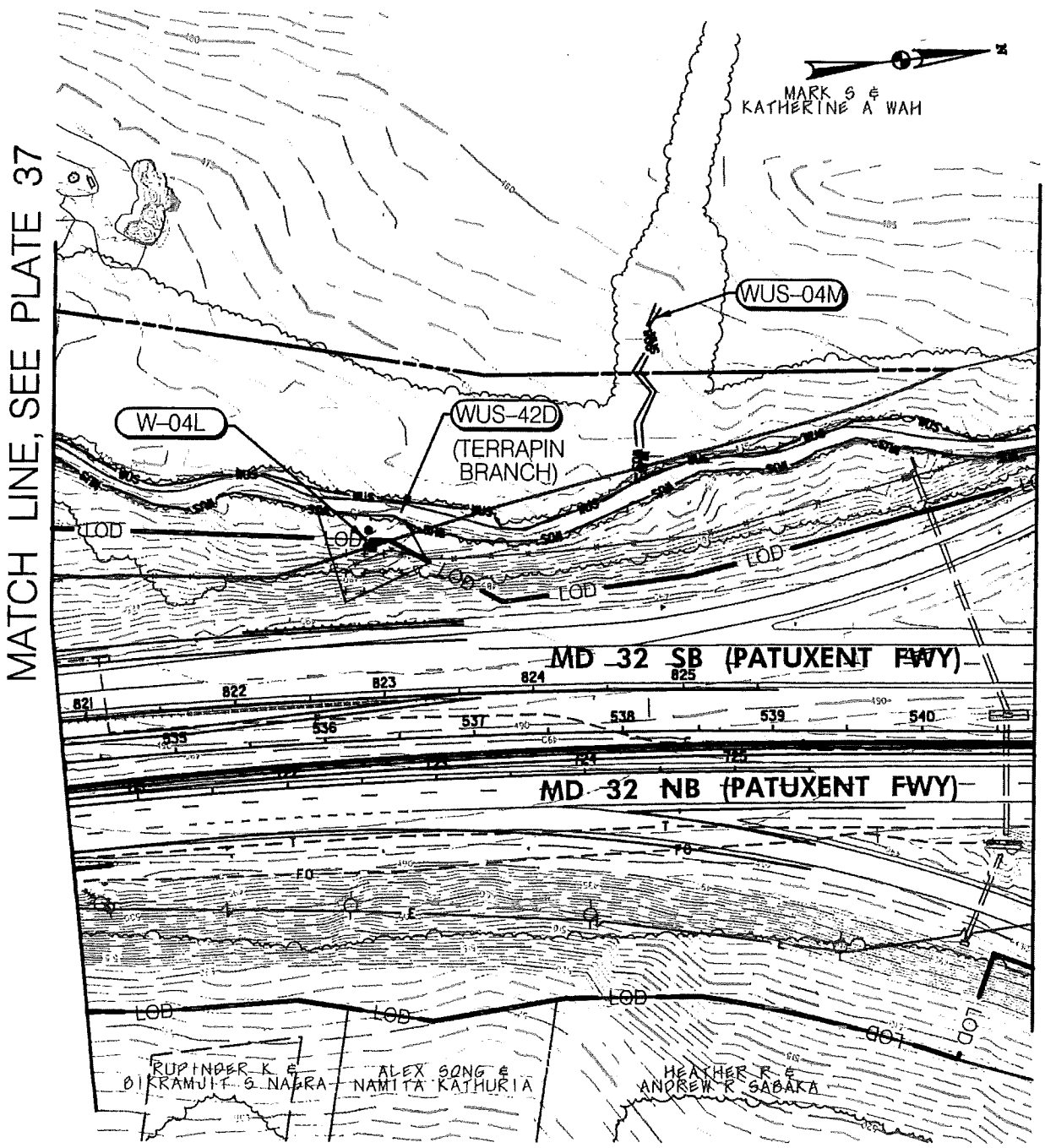

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	—LOD—	WATERS OF THE US	—WUS—
WETLAND		WETLAND BUFFER	—B—
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	1,636 S.F.	0 S.F.
WETLANDS	33 S.F.	0 S.F.
WATERS OF THE US	0 LF/0 S.F.	0 LF/0 S.F.

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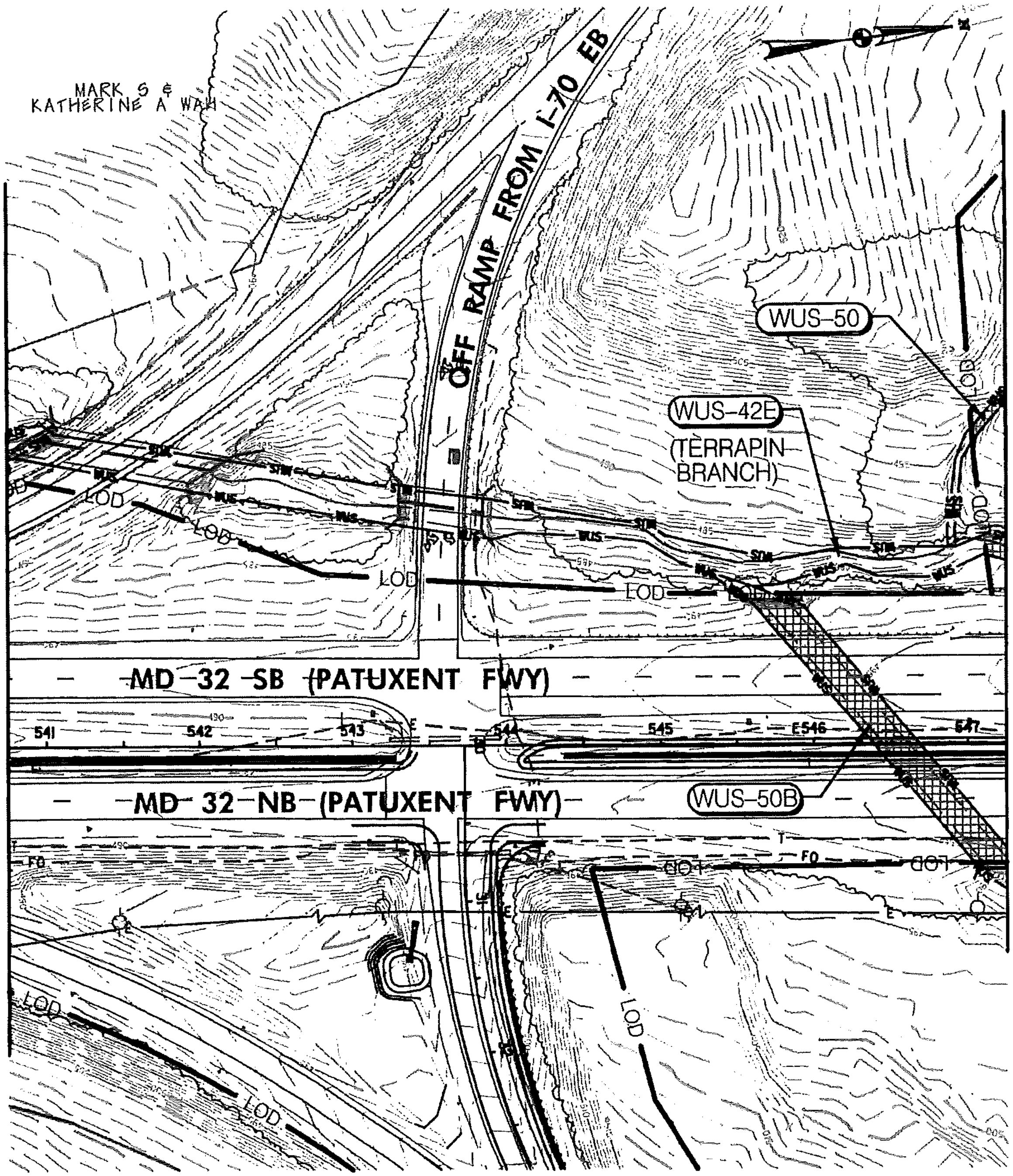

Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	LOD	WATERS OF THE US	WUS
WETLAND		WETLAND BUFFER	B
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	0 S.F.	0 S.F.
WETLANDS	0 S.F.	0 S.F.
WATERS OF THE US	277 LF/5,510 S.F.	0 LF/0 S.F.

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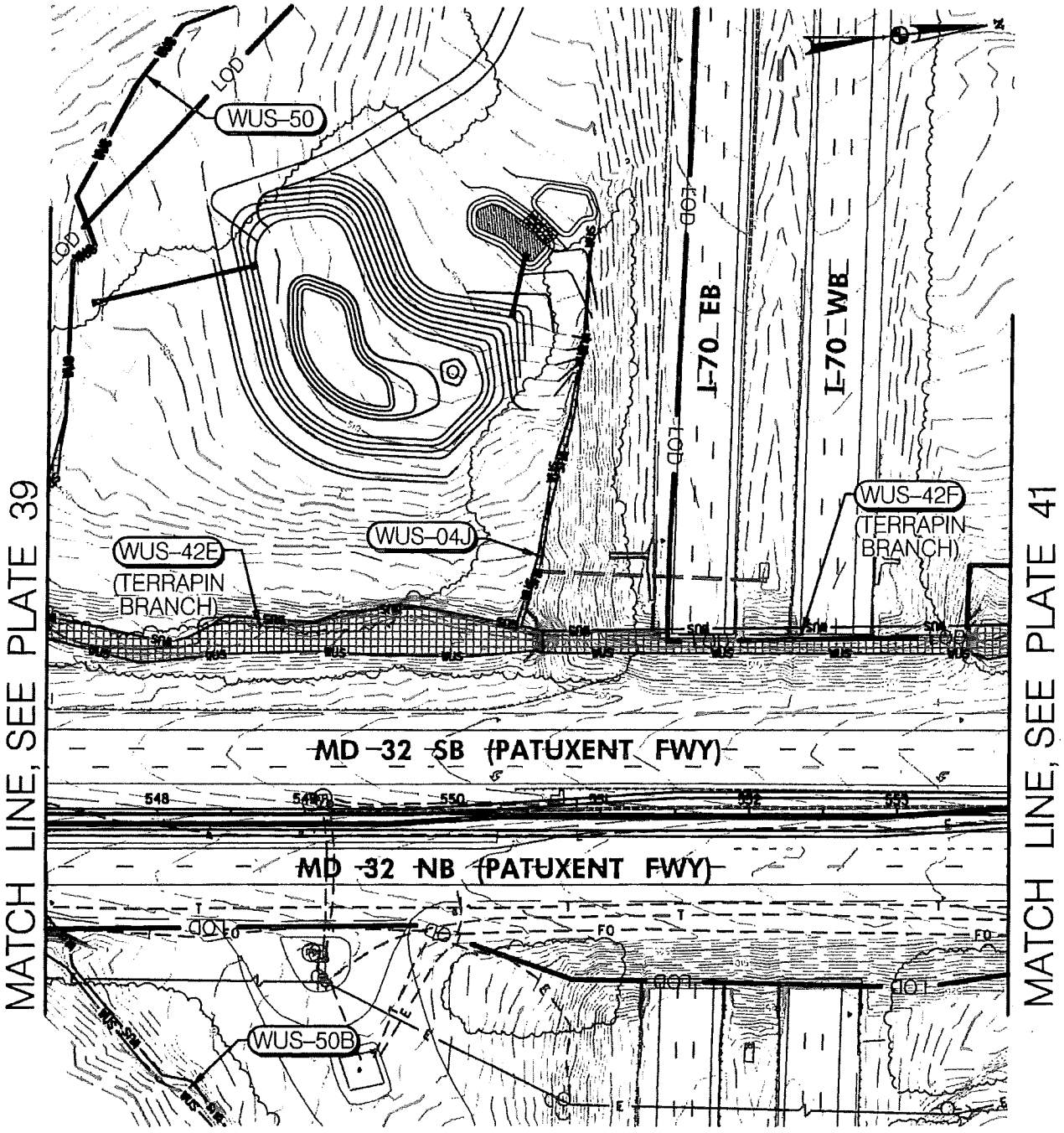
Thursday, February 22, 2018 AT 07:42 AM



Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	LOD	WATERS OF THE US	WUS
WETLAND		WETLAND BUFFER	B
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	0 S.F.	0 S.F.
WETLANDS	0 S.F.	0 S.F.
WATERS OF THE US	1,004 LF/ 12,095 S.F.	101 LF/117 S.F.

MDOT MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

RK&K
RESPONSIVE PEOPLE • CREATIVE SOLUTIONS
700 East Pratt Street Suite 500 Baltimore, Maryland 21202

MD 32
FROM LINDEN CHURCH TO I-70
DESIGN BUILD
WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 40 OF 42

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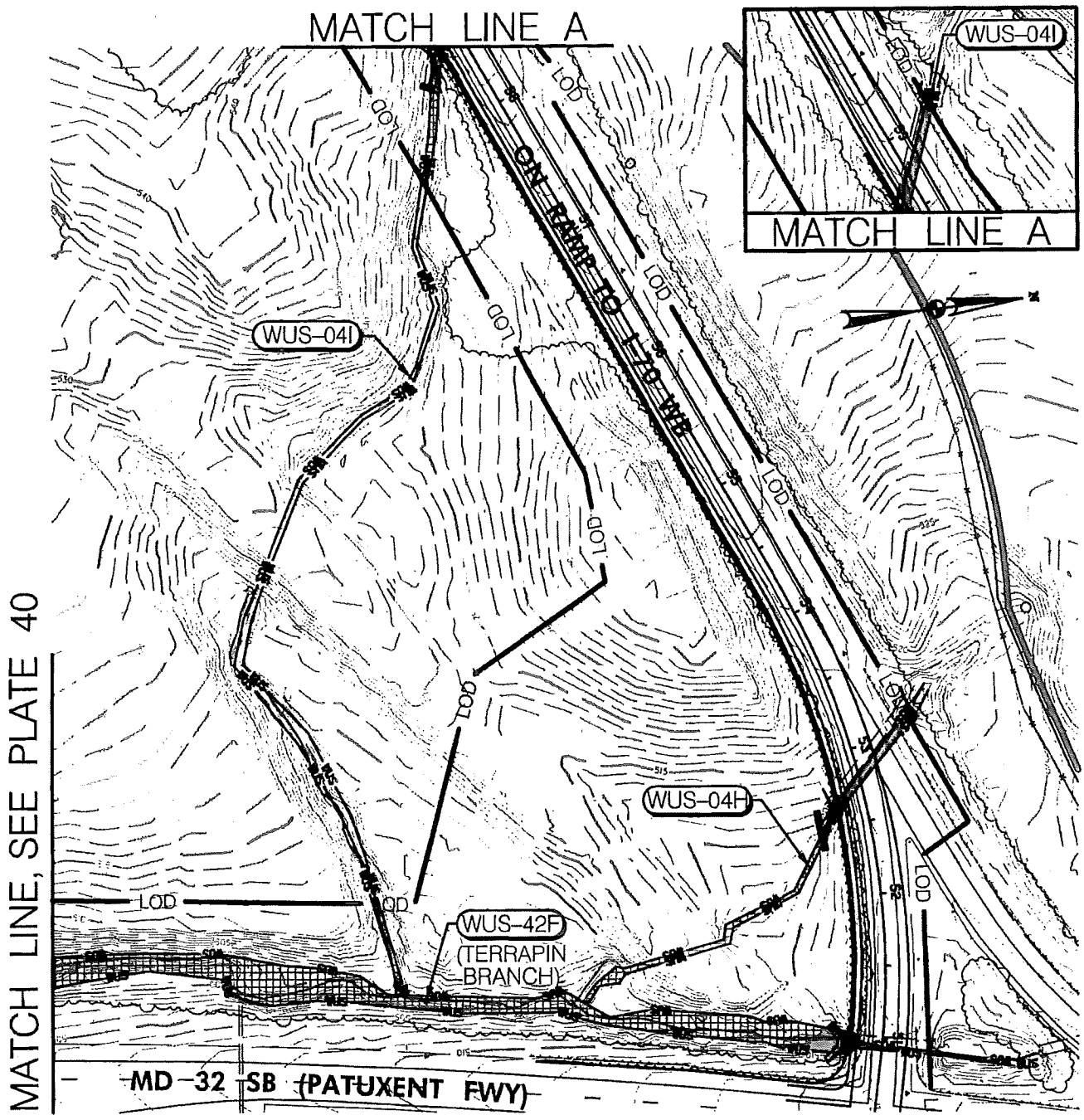
Thursday, February 22, 2018 AT 07:42 AM



Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	LOD	WATERS OF THE US	WUS
WETLAND		WETLAND BUFFER	B
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	0 S.F.	0 S.F.
WETLANDS	0 S.F.	0 S.F.
WATERS OF THE US	858 LF/9,524 S.F.	293 LF/1,946 S.F.

MDOT MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

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MD 32
FROM LINDEN CHURCH TO I-70
DESIGN BUILD
WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 41 OF 42

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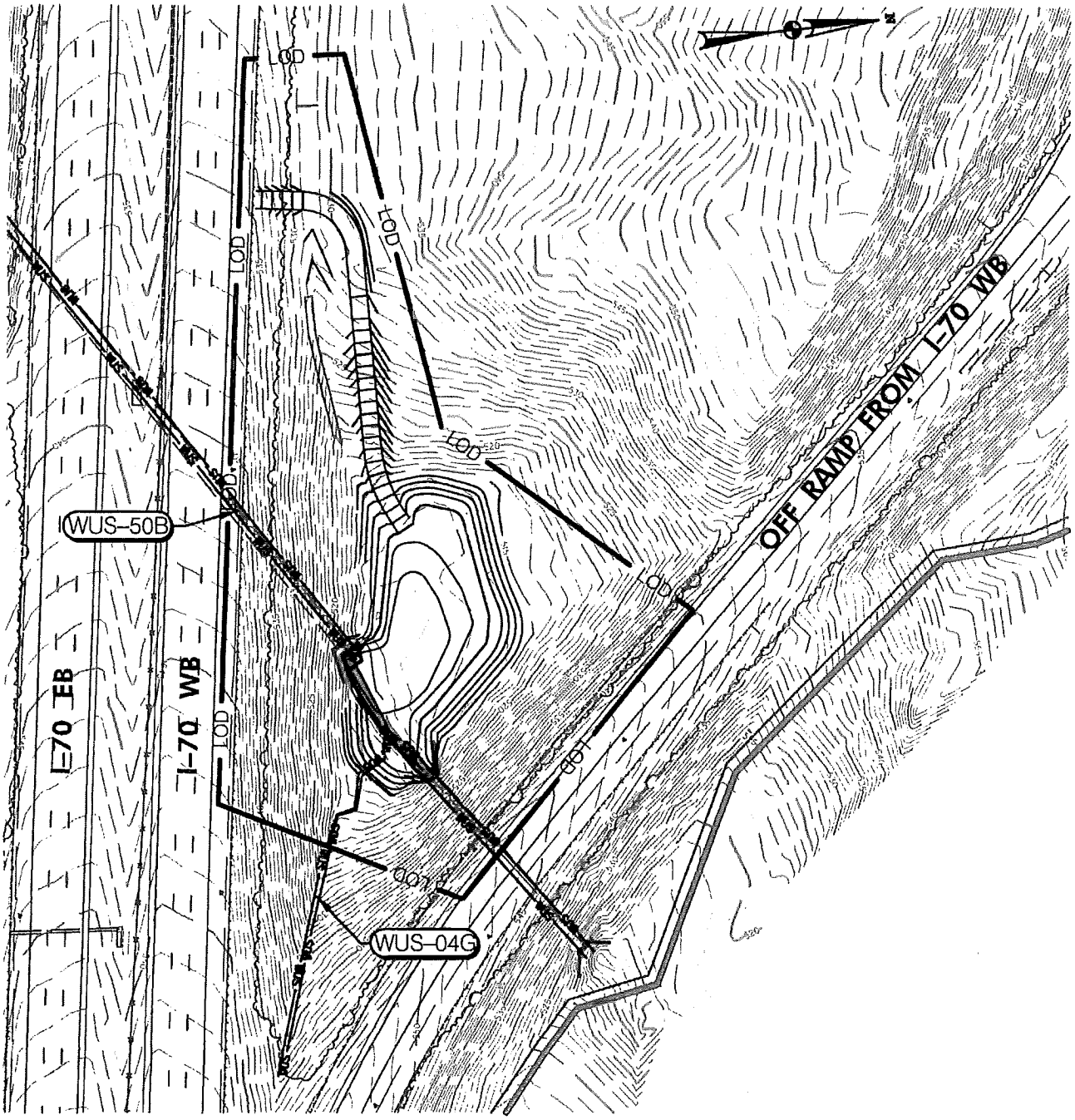
Thursday, February 22, 2018 AT 07:42 AM



Legend of Wetland and Waters Impacts

LIMITS OF DISTURBANCE	—LOD—	WATERS OF THE US	—WUS—
WETLAND		WETLAND BUFFER	—B—
100-YR FLOODPLAIN		PROPOSED RIP-RAP	
PROPOSED R-O-W		PROP SW PIPE	

IMPACTS:	TEMPORARY	PERMANENT
WETLAND BUFFER	0 S.F.	0 S.F.
WETLANDS	0 S.F.	0 S.F.
WATERS OF THE US	260 LF/1,249 S.F.	147 LF/730 S.F.

MDOT MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

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MD 32
FROM LINDEN CHURCH TO I-70
DESIGN BUILD
WETLAND IMPACT PLATE

COUNTY:	CONTRACT NO.:
DATE: FEB. 2018	REVISION DATE:
SCALE: 1" = 100'	PLATE 42 OF 42

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Thursday, February 22, 2018 AT 07:42 AM

MODIFICATION
WATER QUALITY CERTIFICATION
for
NONTIDAL WETLANDS AND WATERWAYS

CERTIFICATION NUMBER: 16-NT-3193/201661182

ISSUED TO: Maryland State Highway Administration
ATTN: Todd Nichols
707 North Calvert Street, Mailstop C-303
Baltimore, MD 21202

Description of Modified Certification:

To modify the Permit as follows: To authorize the following specific impacts attributable to Phase II (Linden Church Road to I-70 Interchange) of the previously authorized Maryland 32 corridor dualization project, including restoration of a length of the Middle Patuxent River. Phase II will permanently impact 44,718 square feet of forested nontidal wetland, 2,325 square feet of scrub/shrub nontidal wetland, 49,980 square feet of emergent nontidal wetland, 198,986 square feet of 25-foot nontidal wetland buffer, 1,813,703 square feet of 100-year floodplain, 11,599 linear feet (177,531 square feet) of perennial stream and 1,762 linear feet (8,340 square feet) of intermittent channel. Phase II will temporarily impact 19,576 square feet of forested nontidal wetland, 76,365 square feet of emergent nontidal wetland, 1,430 square feet of scrub/shrub nontidal wetland, 131,022 square feet of 25-foot nontidal wetland buffer, 5,177 linear feet (59,571 square feet) of perennial stream and 1,386 linear feet (7,732 square feet) of intermittent channel.
As a result of refined plans and further efforts at avoidance and minimization, total permanent nontidal wetland impacts for the entire MD 32 (including Phase I and Phase II) dualization project will be 50,263 square feet less than what was previously authorized. There will be an increase of 80,923 square foot of temporary nontidal wetland impacts related to the restoration of a reach of the Middle Patuxent River.

Special Conditions:

1. Additional wetland mitigation shall be accomplished for the MD 32 corridor wetland impacts, beyond the wetland mitigation already constructed, based on the final revised wetland mitigation credit at the original wetland mitigation site and the revised total mitigation requirement. A Phase II Mitigation Plan shall be submitted to the Section no later than 90 days after the issuance of this Permit, unless an extension has been granted in writing by the Section. The Phase II Mitigation Plan must be approved by the Section, through the Phase II Mitigation Plan Approval Letter and its associated exhibits ("Approval Letter"), prior to commencing the impacts authorized in this Permit. The Permittee shall successfully construct the mitigation site and meet project standards and other requirements, as specified in the Approval Letter and COMAR 26.23.04, in advance or concurrently with the activities authorized in this Permit. In the event of discrepancy with the mitigation requirements found in this Condition, the standards and requirements set forth in Approval Letter shall govern. The Permittee is required to notify the Section upon the start of grading and the completion of planting of the mitigation project. The Permittee shall submit monitoring reports for the mitigation project to the Section as specified in the Approval Letter. If the Permittee as stated in the Permit, changes, the Permittee must notify the Section. If the mitigation obligation is to be transferred to another party, the Permittee must notify the Section.

2. Permittee shall finalize access agreements with property owners on which regulated activities will be conducted. At least 30 days prior to the start of construction, the Permittee shall provide to the Department's Nontidal Wetlands Division confirmation that the Permittee has the property owners' permission to undertake the wetland and waterway activities authorized by the Permit.

THIS MODIFICTION IS ISSUED UNDER AUTHORITY OF SECTION 401 OF THE FEDERAL WATER POLLUTION CONTROL ACT AND ITS AMENDMENTS AND THE ENVIRONMENT ARTICLE, SECTIONS 9-313 - 9-323, INCLUSIVE, ANNOTATE CODE OF MARYLAND. A COPY OF THIS MODIFICATION HAS BEEN SENT TO THE CORPS OF ENGINEERS.

THIS MODIFICATION SHALL BE CONSIDERED AS PART OF NONTIDAL WETLANDS & WATERWAYS CERTIFICATION NUMBER 16-NT-3193/201661182. ALL OTHER CONDITIONS AND ELEMENTS OF THE CERTIFICATION REMAIN IN EFFECT.

MODIFICATION OFCERTIFICATION APPROVED

Denise M. Keehner, Program Manager
Wetlands and Waterways Program

December 8, 2021
Expiration Date

cc: Compliance w/ file

Maryland
Department of
the Environment

Larry Hogan, Governor
Boyd K. Rutherford, Lt. Governor

Ben Grumbles, Secretary
Horacio Tablada, Deputy Secretary

August 23, 2018

Maryland State Highway Administration
Attn: Mr.Todd Nichols
707 North Calvert Street
Mailstop C-303
Baltimore, MD 21202

Re: Nontidal Wetlands and Waterways Tracking No.: 16-NT-3193
Parent Tracking No.: 201661182
Project: MD SHA/MD 32
County: Howard

Dear Mr. Nichols:

The Nontidal Wetlands and Waterways Division, Mitigation and Technical Assistance Section, has extended the deadline for submittal of the Mitigation Plans for the above referenced project. The deadline for the submittal of the Phase II Wetland Mitigation Plan for the Gossage property is now October 30, 2019.

The previously approved and constructed wetland mitigation at the Nixon Farm mitigation site meets the mitigation requirement for the amount of mitigation required for new impacts, up to the point where all surplus successful mitigation credits at Nixon Farm are used up. Stated another way, commencing impacts attributable to Phase II (Linden Church Road to I-70) of the MD 32 dualization project would not be a potential violation of the condition requiring approval of the Phase II Mitigation Plan before commencing impacts until after the cumulative amount of mitigation required reaches the total amount of successful mitigation credit at Nixon Farm. The Phase II Mitigation Plan for that amount of impact has already been approved.

If you have any questions regarding the wetland mitigation requirements, please call me at (410) 537-3831.

Sincerely,

David Walbeck

David Walbeck
Nontidal Wetlands and Waterways Division

TC SECTION 7
PAYMENT

TC-7.09 PRICE ADJUSTMENT FOR DIESEL FUEL

(a) General. A Price Adjustment (PA) will be made to provide additional compensation to the Contractor or a credit to the Administration for the fluctuation in the cost of diesel fuel.

The monthly index price used for calculating the PA will be the On-Highway Diesel Fuel Price for the Central Atlantic Region published by the U.S. Department of Energy, Energy Information Administration, at www.eia.doe.gov. The monthly index price will be the average of the weekly prices posted for the month.

The prevailing base index price will be the price specified for Diesel Fuel currently posted at www.roads.maryland.gov (Business Center /Contracts, Bids, and Proposals) prior to bid opening. A historical database will be maintained by the Administration.

The adjustment factors for specific categories of the work are included in Table TC-7.09. Category A,C, D will apply to this Contract.

The PA will be calculated when the index for the current month increases or decreases more than 5 percent of the base index. The total dollar amount of fuel adjustment will be limited to 5 percent of the Contract Total Amount as bid. If an increase or decrease in costs exceeds 5 percent of the Contract Total Amount as bid, no further adjustment will be made.

Computations for adjustment will be as follows:

$$\text{Percent Change} = [(E - B)/B] \times 100$$

$$PA = [E - (B \times D)] \times F \times Q$$

Where:

PA = Amount of the price adjustment
E = Current monthly index price
B = Prevailing base index price
D = 1.05 when increase is over 5%; 0.95 when decrease is over 5%
F = Applicable fuel adjustment factor from Table TC-7.09
Q = Quantity of individual units of work

NOTICE TO CONTRACTOR

EARLY SUBMISSIONS. The last sentence of the first paragraph of TC-5.02, "No work shall be started before receipt of the Notice to Proceed" shall not apply to the following:

After notification to the Contractor from the Administration that the Contractor is the apparent low bidder, the Contractor will be permitted to provide a written request to the Engineer to submit documentation for materials sources and working drawings for any items of work that have a long lead time and could jeopardize the project schedule. Upon written approval from the Engineer the Contractor may submit the applicable documentation to the Engineer.

Should the Contract not be awarded to the apparent low bidder who meets the requirements of the Contract, GP-8.10 will apply for all costs accrued for the preparation and approval of the working drawings and any resultant material purchase approved by the District Engineer and steel fabricated in conformance with the approved working drawings between the date the Contractor received notice of apparent low bidder and the date of notice that the apparent low bidder will not be awarded this Contract.

Should this Contract not be awarded to the apparent low bidder due to failure of the Contractor to comply with all award and execution requirements, all costs accrued for the preparation of the specific items and any resultant material purchased and steel fabrication shall be borne by the Contractor.

Failure of the Contractor to submit the early submissions will not be basis for delaying issuance of the Notice to Proceed or be considered a reason for a time extension.

GENERAL PROVISIONS

GP SECTION 2
BIDDING REQUIREMENTS AND CONDITIONS FOR DESIGN-BUILD – COMPETETIVE SEALED PROPOSALS

16 **DELETE: GP-2.19 (a) General.** in its entirety.

INSERT: The following:

GP-2.19 (a) General. The Contract is to be awarded as outlined in the Instructions to Proposers of the Request for Proposals.

DELETE: GP-2.19 (b) Determination of Lowest Bidder.

INSERT: The following:

GP-2.19 (b) Determination of Successful Proposer.

DELETE: The first sentence in GP-2.19 (b) "Bids shall be…Invitation for Bids."

INSERT: The following:

Proposals shall be evaluated as outlined in Instructions to Proposers of the Request for Proposals.

17 **DELETE: GP-2.19 (c) Award.** in its entirety.

INSERT: The following:

GP-2.19 (c) Award. Award of the Contract will be based on the criteria as outlined in Instructions to Proposers of the Request for Proposals.

GENERAL PROVISIONS

GP SECTION 7
LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC

DELETE: GP-7.22 NONHIRING OF EMPLOYEES in its entirety.

INSERT: The following.

GP-7.22 NONHIRING OF EMPLOYEES

No official or employee of the State of Maryland, as defined under General Provisions Article, §5-101, Annotated Code of Maryland, whose duties as such official or employee include matters relating to or affecting the subject matter of this contract, shall during the pendency and term of this contract and while serving as an official or employee of the State become or be an employee of the contractor or any entity that is a subcontractor on this contract.

GENERAL PROVISIONS

GP SECTION 7
LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC

DELETE: GP-7.34 CONFLICT OF INTEREST LAW in its entirety.

INSERT: The following.

GP-7.34 CONFLICT OF INTEREST LAW

It is unlawful for any State officer, employee, or agent to participate personally in his official capacity through decision, approval, disapproval, recommendation, advice, or investigation in any Contract or other matter in which he, his spouse, parent, minor child, brother, or sister has a financial interest or to which any firm, corporation, association, or other organization in which he has a financial interest or in which he is serving as an officer, director, trustee, partner, or employee is a party, or to which any person or organization with whom he is negotiating or has any arrangement concerning prospective employment, is a party, unless such officer, employee, or agent has previously complied with the provisions of General Provisions Article, Title 5 of the Annotated Code of Maryland.

The Contractor shall comply with the provisions of State Finance and Procurement Article, §13-212.1, Annotated Code of Maryland and COMAR 21.05.08.08.

GENERAL PROVISIONS

GP-SECTION 8
PROSECUTION AND PROGRESS

59 **DELETE:** GP-8.07 SUSPENSION OF WORK in its entirety.

INSERT: The following.

GP-8.07 SUSPENSION OF WORK

On Administration Contracts, in addition to GP 8.07 Suspension of Work, TC 4.04 Suspension of Work shall apply.

(a) The procurement officer unilaterally may order the Contractor in writing to suspend, delay, or interrupt all or any part of the work for a period of time as he may determine to be appropriate for the convenience of the State.

(b) If the performance of all or any part of the work is for an unreasonable period of time, suspended, delayed, or interrupted by an act of the procurement officer in the administration of this contract, or by his failure to act within the time specified in this contract (or if no time is specified, within a reasonable time), an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) necessarily caused by an unreasonable suspension, delay, or interruption and the contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent (1) that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor or (2) for which an equitable adjustment is provided for excluded under any provision of this contract.

(c) No claim under this clause shall be allowed:

(1) For any costs incurred more than 20 days before the Contractor shall have notified the procurement officer in writing of the act or failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension order), and

(2) Unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of a suspension, delay, or interruption, but not later than the date of final payment under the contract.

TERMS AND CONDITIONS

TC SECTION 2
BIDDING REQUIREMENTS AND CONDITIONS FOR COMPETITIVE SEALED PROPOSALS (DESIGN-BUILD)

TC-2.03 VALUE ENGINEERING CHANGE PROPOSALS

DELETE: This entire section.

INSERT: The following:

Value Engineering proposals will not be entertained on this project.

TC-2.06 PARTNERING

DELETE: This entire section.

INSERT: The following:

Partnering on this project will be mandatory. The partnership will be structured to draw on the strengths of each organization through open communication, teamwork and cooperative action to identify and achieve mutual goals. The objective is to create an atmosphere of trust and honest dialogue among all stakeholders. This partnership will not change the legal relationship of the parties to the Contract nor relieve any party from any of the terms of the Contract.

The Administration's Assistant District Engineer of Construction, the Project Design Engineer and the Design-Builder's management representative will organize a partnering project team. Persons recommended being on the team and guidelines for partnering are included in the Partnering Field Guide at www.mdqi.org.

The kick-off workshop meeting will be held soon after execution of the Contract. All stakeholders will attend the kick-off workshop to develop and commit to the Partnering Charter and Issue Resolution process. Follow-up meetings will be held monthly by the Design-Builder and the Administration, with other stakeholders attending as needed.

Measuring the partnering on the project is a key element to its success. All stakeholders will participate in the process. The Partnering Project Rating form will be completed monthly and then entered into the Administration's Partnering Data Base. Summaries of the ratings will then be shared with the team. The Administration's and Design-Builder's management team will review the partnering ratings and intervene if necessary on a monthly basis.

All cost of partnering meetings shall be shared equally between the Design-Builder and the Administration.

TERMS AND CONDITIONS

TC SECTION 2
BIDDING REQUIREMENTS AND CONDITIONS

DELETE: TC-2.12 — DEBARMENT / SUSPENSION in its entirety.

INSERT: The following.

TC-2.12 DEBARMENT / SUSPENSION

Pursuant to the emergency regulations which were approved by the Administrative and Executive Legislative Review (AELR) Committee of the Maryland General Assembly on July 27, 1982, and which went into effect on July 28, 1982, the Maryland Department of Transportation, State Highway Administration has pursuant to applicable laws and regulation established a list of Debarred or Suspended Contractors.

The current list of Debarred or Suspended Contractors or Suppliers is available as follows:

1. Visit http://bpw.maryland.gov/Pages/debarments.aspx for contractors barred from doing business with Maryland Government.

2. Visit http://www.sam.gov/ and click on 'Search Records' for exclusions.

TERMS AND CONDITIONS

TC SECTION 3
GOVERNING ORDER OF CONTRACT DOCUMENTS FOR DESIGN-BUILD

TC 3.01 GOVERNING ORDER OF CONTRACT DOCUMENTS

DELETE: This entire section.

INSERT: The following:

The Contract Documents, including but not limited to the Standard Specifications, the Special Provision Inserts, Special Provisions and all supplementary documents are essential parts of the Contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work. In the event of any discrepancy between the various Contract Documents, the governing order from highest to lowest shall be the Instructions to Proposers, Performance Requirements, Special Provisions, Special Provisions Inserts, and Standard Specifications. Materials noted by the Administration as Conceptual in Instructions to Proposers are not considered part of the Contract Documents and thus are not included in the governing order.

General Provisions will govern over all Contract Documents unless expressly provided for in the Contract.

TERMS AND CONDITIONS

TC SECTION 4
CONTROL OF WORK FOR DESIGN-BUILD

TC-4.01 WORKING DRAWINGS.

(a) General.

DELETE: Paragraph 3 in its entirety.

INSERT: The following:

The Design-Build Team shall prepare working drawings as described in the Standard Specifications, with the exception that the drawings shall not be submitted to the State Highway Administration, but shall be submitted to the Design-Build Team's Lead Design Firm and Independent Design Quality Management (IDQM) Firm for review and approval. Following approval by the Lead Design Firm and the IDQM Firm, two copies of the approved drawings shall be forwarded to the Administration. The Administration shall review the drawings to determine that they meet minimum job performance specifications only. Acceptance of the drawings shall not relieve the Design-Builder of any responsibility in connection therewith and the Administration assumes no responsibility for the accuracy of the drawings. A two-week period will be permitted for SHA review of the working drawings. The approved working drawings shall be stamped and signed by the Design-Build Team's Lead Design Firm and IDQM Firm and forwarded to:

Maryland State Highway Administration
Director
Office of Highway Development
707 North Calvert Street
Baltimore, Maryland 21202

(b) Working Drawings for Falsework Systems.

In the first paragraph, substitute Design-Build Team's Engineer for Engineer.

In the third paragraph, substitute Design-Build Team's Engineer for Engineer.

TERMS AND CONDITIONS

TC SECTION 6
RESTRICTIONS AND PERMITS

115 **DELETE:** TC-6.14 STORING MATERIALS AND EQUIPMENT ON/AGAINST STRUCTURES RESTRICTIONS in its entirety.

INSERT: The following.

TC-6.14 RESTRICTIONS FOR PLACING AND USING EQUIPMENT ON STRUCTURES, OR STORING MATERIALS ON/OR AGAINST STRUCTURES

Materials, and waste shall not be stored on or against any structure or structure element and equipment shall not be placed or used on any structure during the construction phase or finished or final configuration unless the written permission is obtained from the Administration's District Office and the Office of Structures for each type of material or equipment to be stored.

Loads, vehicle or other weight (materials etc.) that exceeds the bridge posted weight limit, if posted, or exceeds Maryland's legal vehicle loads on bridges, (with no posted bridge weight limits), are prohibited on the structure at any time, except as modified by the following. If the Contractor's intended operations will impose loads on the structure that exceed the weights listed above, the Contractor shall submit to the Engineer the type of material, its weight, the area that will be affected by the load, and its location on the structure. No stock pile of material regardless of unit weight shall be more than 4 ft high. If equipment is to be used, submit the maximum gross weight, axle spacing, load per axle, and proposed location on the structure. The maximum gross weight must include the vehicle weights in the most critical load position, i.e. front axle on crane with boom extended and element hanging. A special Hauling Permit is a requirement anytime equipment is moved over a structure that is over legal weight limit.

If any load requires evaluation, then a professional engineer registered in the State of Maryland and experienced in bridge design shall perform a load analysis to ensure that the load on the structure will not create an overstress condition on any bridge element. This analysis also includes effects of legal loads crossing the structure, if applicable. Analyses shall be submitted for review and loading cannot be imposed until written approval is received. Such submission does not guarantee acceptance by the Office of Structures, which reserves the sole right to accept or reject the proposed loading.

For structures under construction or rehabilitation, the Contractor shall also submit information pertaining to the phase of construction, such as which members have been modified or separated from the remainder of the structure, or have been newly constructed.

Any materials or equipment that would have a detrimental affect to the structure such as aluminum products placed against concrete surfaces shall be adequately protected to prohibit them from coming in contact with each other. Any discoloration or damage to the structure as a result of material or equipment being stored on/against the structure shall be removed or repaired.

TERMS AND CONDITIONS

TC SECTION 4
CONTROL OF WORK

TC-4.02 FAILURE TO MAINTAIN PROJECT

ADD: As a third paragraph.

Additionally, an appropriate deduction will be made from the Contractor's next progress estimate for each day or portion thereof that Maintenance of Traffic deficiencies exist, and will continue until the deficiencies are satisfactorily corrected and accepted by the Engineer. Any portion of a day will be assessed a full day deduction. The deduction will be equal to a prorata share of the lump sum price bid for Maintenance of Traffic or an amount prorated from the Engineer's estimate, whichever is more. The amount prorated will be the per diem amount established by using the working days (based upon calendar dates when required) divided into the total value of the bid item or the Engineer's estimate of that item, whichever is more.

The above noted deduction will be assessed on the next progress estimate if:

The Contractor does not take action to correct the deficiencies and properly assume the responsibilities of maintaining the project (as determined by the Engineer) within four hours of receiving a notice to comply with the required maintenance provisions.

The deduction will be equal to the daily prorated share of the lump sum price bid for Maintenance of Traffic or $1,000.00 per day, whichever is more for each day or portion thereof that the deficiencies exist, and will continue until the deficiencies and proper assumption of the required maintenance provisions are satisfactorily corrected and accepted by the Engineer. The amount of monies deducted will be a permanent deduction and are not recoverable. Upon satisfactory correction of the deficiencies, payment of the Maintenance of Traffic lump sum item will resume.

TERMS AND CONDITIONS

TC SECTION 5
LEGAL RELATIONS AND PROGRESS

TC-5.01 INSURANCE

100 **DELETE:** In its entirety.

INSERT: The following.

TC-5.01 INSURANCE FOR DESIGN-BUILD

In addition to the provisions of GP-7.14 (Liability Insurance), the following shall apply on Administration Contracts.

The Contractor shall maintain in full force and effect third party legal liability insurance necessary to cover claims arising from the Contractor's operations under this agreement that cause damage to the person or property of third parties. The insurance shall be under a standard commercial general liability (CGL) form endorsed as necessary to comply with the above requirements and the other requirements of this Section. The State of Maryland shall be listed as an additional insured on the policy. The limit of liability shall be no less than $1 000 000 per occurrence/$2 000 000 general aggregate. The insurance shall be kept in full force and effect until all work has been satisfactorily completed and accepted.

When specified in the Contract Documents or otherwise required by law, the Contractor shall carry the type and amounts of insurance in addition to any other forms of insurance or bonds required under the terms of the Contract and these Specifications.

All insurance policies required by this Section, elsewhere in the Contract Documents, or otherwise required by law, shall be kept in full force and effect until all work has been satisfactorily completed and accepted. The Contractor shall be responsible for the payment of all deductibles or self-insured retentions.

All insurance policies required by this Section, elsewhere in the Contract Documents, or otherwise required by law, (other than Workers' Compensation Policies) shall include endorsements:

(a) Stating that the State of Maryland and Garrett County are additional insured with respect to liability arising from the Contractor's operations under this agreement that cause damage to the person or property of third parties.

(b) Stating that such coverage as is provided by the policies for the benefit of the additional insureds is primary and any other coverage maintained by such additional insureds (including self-insurance pursuant to the Maryland Tort Claims Act) shall be non-contributing with the coverage provided under the policies.

(c) Containing waivers of subrogation with respect to all named insureds and additional insureds.

(d) Stating that the insurer has the duty to adjust claims and provide a defense with regard to such claims made against the additional insured.

All insurance policies required by this Section, elsewhere in the Contract Documents, or otherwise required by law, (including Workers' Compensation Policies) shall be endorsed to state that the insurer shall provide at least 7 days notice of cancellation or nonrenewal to:

Maryland State Highway Administration
Director, Office of Construction
7450 Traffic Drive
Hanover MD 21076

Evidence of insurance shall be provided to the Administration at the address listed above prior to the award of the Contract by means of a Certificate of Insurance with copies of all endorsements attached.

Any policy exclusions shall be shown on the face of the Certificate of Insurance or provided with the Certificate of Insurance.

Certificates of Insurance shall comply with all requirements of the Maryland Annotated Code, Insurance Article, § 19-116. Certificates of Insurance shall be on a form approved by the Maryland Insurance Commissioner (Commissioner). Standard Certificate of Insurance forms currently adopted for use by the Association for Cooperative Operations Research (ACORD) or the Insurance Services Office (ISO) are deemed approved by the Commissioner and are acceptable. Outdated ACORD or ISO forms (those with a revision date prior to the date of the form currently adopted for current use by ACORD or ISO) are not acceptable. The Contractor shall ensure that all required Certificates of Insurance satisfy all requirements of §19-116 of the Insurance Article, including the prohibition against the issuance of any certificate of insurance that contains false or misleading information or that purports to amend, alter, or extend the coverage provided by the policies referenced in the certificate.

The Certificate of Insurance shall be accompanied by a document (a copy of State License or letter from insurer) that indicates that the agent signing the certificate is an authorized agent of the insurer.

No acceptance and/or approval of any Certificate of Insurance or insurance by the Administration shall be construed as relieving or excusing the Contractor, or the Contractor's Surety from any liability or obligation imposed upon either or both of them by the provisions of this Contract or elsewhere in the Contract Documents.

The cost of the insurance will not be measured but the cost will be incidental to the Contract lump sum price.

Contractor and Railroad Public Liability and Property Damage Insurance shall be provided as specified in TC-6.05.

.01 Indemnification

The Design-Build Team shall indemnify, defend and hold the Administration and its officers, directors, employees, agents and consultants from and against all claims, actions, torts, costs, losses, and damages for bodily injury (including sickness, disease or death) and/or tangible property damage (other than to the Work itself) arising out of or resulting from the performance of the Work by the Design-Build Team, any subcontractor, subconsultant, engineer, supplier, any individual or entity directly or indirectly employed by any of them or anyone for whose acts any of them may be liable. Damages covered by the preceding sentence include, but are not limited to, all fees and charges of engineers, attorneys and all other professionals and all mediation, arbitration, court or other dispute resolution costs.

The indemnity obligation set forth in the preceding paragraph shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the Design-Build Team or any subcontractor, subconsultant, engineer, supplier, or other individual or entity under Workers' Compensation acts, disability benefit acts, or other employee benefit acts.

.02 Additional Insurance Requirements

.02.1 Professional Liability Insurance

Professional Liability Insurance Policy, which covers the Indemnification Clause of this contract (paragraph .02 above), as it relates to errors, omissions, negligent acts or negligent performance in the work performance under this contract by the Designer, its subcontractors, employees and agents. The limitation of the Courts and Judical Proceedings Article states Annotated Code of Maryland Section 5-108(b) shall apply.

.02.2 Workers' Compensation Insurance

Workers' compensation, as required by the laws of the State of Maryland, including Employer's Liability Coverage and coverage for the benefits set forth under the U.S. Longshoremen and Harbor Workers' Compensation Act, the Jones Act, and other federal laws where applicable.

.02.3 Comprehensive Automobile Liability Insurance

Comprehensive Business Automobile Liability covering use of any motor vehicle to be used in conjunction with this contract, including hired automobiles and non-owned automobiles. Loading and unloading of any motor vehicle must be covered by endorsement to the automobile liability policy or policies.

.02.4 Administrative & General Provisions

a. Each policy, with the exception of Workers' Compensation and Professional Liability Insurance, shall name the State Highway Administration.

b. Defense of Claims

Each insurance policy shall include a provision requiring the carrier to investigate and defend all named insured against any and all claims for death, bodily injury or property damage, even if groundless.

c. Compliance

The Design-Build Team shall be in compliance with this Section provided it procures either one policy or insurance covering all work under the contract or separate insurance policies for all segments constituting the entire project. In either case, a certificate of insurance must be filed for each policy with the Administration indicating that all required insurance has been obtained.

The Design-Build Team is responsible for assuring that insurance policies required by this Contract comply with all the requirements. The Design-Build Team is also responsible to determine that all subconsultants, subcontractors, suppliers, and all other individuals or entities performing Work for the Project carry all applicable insurance coverages set forth in this section, including, in all cases, Workers' Compensation, Automobile, and Commercial General Liability Insurance. The Design-Build Team shall indemnify and hold harmless the Administration from any claims arising from the failure to fulfill said responsibilities.

d. Reporting Provisions

Any failure to comply with reporting provisions of the policies shall not affect coverage provided to the Administration, its officers, agents and employees.

e. Separate Application

The insurance provided by the Design-Build Team shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

.02.5 Notice of Cancellation or Modification

All policies of insurance provided in this Section shall be endorsed to provide that the insurance company shall notify the Administration, the Design-Build Team, and each named insured at least thirty (30) days prior to the effective date of any cancellation or modification of such policies.

TC-5.03 SUBCONTRACTING AND SUBCONTRACTORS

102 **INSERT**: The following before the paragraph titled '**Subcontractors Prompt Payment**.'

Percentage of Own Workforce Required. The Design-Build Team must perform at least fifty percent of the value of the on-site construction work with its own workforce, not including the percent goal required in the contract proposal to be performed by DBE's. The Designer must perform at least fifty percent (50%) of the value of the design work with its own workforce, not including the work required by DBE's.

106 **ADD**: The following sections at the end of section **'TC-5.05 DETERMINATION AND EXTENSION OF CONTRACT TIME.'**

TC-5.06 OWNERSHIP OF DOCUMENTS

All plans, specifications, inspection records, or other documents ("Documents") generated by the Design-Build Team and all consultants, subcontractors, suppliers, manufacturers performing Work on the Project are the property of the Administration. Upon request by the Administration, the Design-Build Team or any other person or entity performing Work will produce and deliver such Documents as requested, both in hard copy and electronic format.

TC-5.07 ACCESS TO AND RETENTION OF RECORDS

The Design-Build Team and its employees and Subcontractors shall make all project records available for inspection by the Project Manager and all other persons authorized by the Administration, and shall permit such representatives to interview employees during working hours. Project records include daily time reports, records of force account work, quality control or assurance documentation, inspectors reports, employment records, payrolls, equal opportunity records, construction conference records, partnering records, and any other documents in any way related to the Project substantiating payment. These records shall be retained at least three years after final acceptance of the project.

TERMS AND CONDITIONS

TC SECTION 6
RESTRICTIONS AND PERMITS

112 **DELETE:** TC 6.10 – RECYCLED OR REHANDLED MATERIAL in its entirety.

INSERT: The following.

TC 6.10 – RECYCLED OR REHANDLED MATERIAL.

Refer to 900.03 in the Contract Documents.

TERMS AND CONDITIONS

TC SECTION 6
RESTRICTIONS AND PERMITS

TC-6.12 — STRUCTURE UNDERCLEARANCES AND OVERHEAD CLEARANCES

114 **DELETE:** The last paragraph, "Resurfacing" in its entirety.

INSERT: The following.

Resurfacing. The minimum underclearances shall be maintained whenever resurfacing a roadway. This may require grinding the existing pavement prior to placing the resurfacing material. Immediately after completing the resurfacing operation and when the lane closures are still in the effect, the Contractor, in the presence of the Engineer, shall measure the minimum vertical underclearance. The Engineer will submit results to the Office of Structures. The cost of these measurements will be incidental to other pertinent items specified in the Contract Documents. Whenever highway overpass bridges are in the general vicinity of a pedestrian bridge and the grinding is not required to maintain the specified clearances, the roadway under the pedestrian bridge shall be ground to provide a higher undreclearance than the adjacent bridges. This requirement will be waived whenever the Engineer contacts the District Engineer and the Office of Structures and determines that the grinding would have an adverse effect on drainage, utilities, etc.

TERMS AND CONDITIONS

TC SECTION 7
PAYMENT FOR DESIGN-BUILD

TC-7.01 MEASUREMENT OF QUANTITIES

DELETE: This section in its entirety.

INSERT: The following:

Unless specifically noted herein, payment for all work within the Scope of Work shall be included in the Lump Sum Price shown on the Proposal Form. The Design-Build Team shall disregard all references in the Standard Specifications to actual quantities, Contract items, Contract unit prices, and any measurement or payment method other than inclusion in the Lump Sum Price.

Payments to the Design-Build Team shall be full compensation for furnishing all materials and for performing all work under the contract in a complete and acceptable manner and for all risk, loss, damage, or expense of whatever character arising out of the nature of the work or the prosecution thereof.

TC-7.02 PAYMENT ALLOWANCES FOR STORED MATERIALS

DELETE: The opening statement:

INSERT: The following statement:

When the Contractor requests payment allowance for stored materials, those materials must be identified as an Item within the Progress Payment Breakdown described in TC-7.11. The following terms and conditions shall apply:

TC-7.05 PROGRESS PAYMENTS

(a) Current Estimate.

127 **DELETE:** **(2) Variable Retainage** in its entirety**.**

INSERT: The following:

(3) Variable Retainage. The Contract will be subject to a variable retainage based upon the Administration's performance evaluations of the successful proposer and a minimum retainage for the landscaping items of work. Those qualifying may have retainage reduced upon request of the Contractor with consent of surety. This request shall be processed through the District Engineer. Landscaping items of work are not eligible to have a reduction in retainage below the minimum percentage outlined below. If at any time during the performance of the work, the evaluation of the Contractor changes, retainage reduction may be reconsidered.

Minimum Qualifications are as follows: After 50 percent project completion and upon request, Contractors with 'A' evaluations for the last two years may be reduced from 5 percent to 1 percent. Project completion percentage will be based upon actual work completed (excluding monies paid for stored materials). An interim evaluation of the current project would need to be completed and would need to be an 'A'.

At 50 percent project completion and upon request, Contractors with 'B' evaluations or any combination of 'A' and 'B' evaluations for the last two years may be reduced from 5 percent to 2.5 percent, and remain at that level until released upon final payment. Project completion percentage will be based upon actual work completed (excluding monies paid for stored materials). An interim evaluation of the current project would need to be completed and would need to be an 'A' or 'B'.

Contractors with 'C' evaluations or any combination of 'C' and 'D' evaluation for the past two years will begin and remain at 5 percent for the life of the project.

Contractors with a 'D' evaluation for the last two years will begin at 5 percent. Project performance will be evaluated monthly with the retainage being raised to 10 percent for continued 'D' performance.

New Proposer. Contractors who have not been previously rated by the Administration may be eligible for a reduction in retainage. To be eligible, their past performance on highway and bridge work shall be documented by the government agency with whom they had a contract and their performance shall be documented on Administration forms. Contractors who do not fit into the above criteria would require a 5 percent retainage throughout the life of the Contract.

Landscaping Items of Work. For all landscaping items of work, the retainage shall be 25 percent for the life of the project. Project performance will be evaluated monthly with the retainage being raised to 30 percent for neglect, improper maintenance, or failure to complete operations as required or directed. This retainage will be paid to the Contractor only at the final payment.

(b) Semi-Final Estimate Payments.

129 **DELETE:** Delete the entirety of subsections (1), (2), and (3).

INSERT: The following:

(1) Upon completion of the project and the acceptance by the Administration for maintenance, the Administration, at the Contractor's request and with the consent of surety, will initiate a Memorandum of Action by the Director, Office of Construction, State Highway Administration, authorizing semi-final payment. Such a semi-final estimate payment will be based upon: (a) quantities the Administration has computed and set up as proposed final quantities, and (b) a reasonably accurate estimate for those quantities for which the Administration has not yet completed computations. The quantities that the Administration sets forth as proposed final quantities shall be so designated. To arrive at the amount of the semi-final estimate, the following will be deducted from the apparent estimated value of the Contract: (a) total of all amounts previously paid to the Contractor as current estimates, (b) the retainage for landscaping items of work, (c) sums deemed chargeable against the Contractor including penalties and liquidated damages, and (d) as an additional retainage, a

sum not less than 1 percent of the total value of the Contract, excluding landscaping items of work.

(2) In cases where there has been substantial completion of the project and there are remaining only inconsequential or minor work items such as painting, seeding, mulching, or planting to be completed and such items cannot be completed for an extended period of time because of seasonal or weather conditions, a semi-final inspection will be made. If the work completed is found to be satisfactory, then there is deemed to be a partial acceptance on the entire project except for the uncompleted work items. Upon the above referred to partial acceptance, the Administration, within 30 days from such partial acceptance, upon request of the Contractor and with consent of surety, shall pay to the Contractor, what is hereby known as a partial semi-final estimate payment. Such a semi-final estimate will be based upon: (a) quantities the Administration has computed and set up as proposed final quantities, and (b) a reasonably accurate estimate for those quantities for which the Administration has not yet completed computations. The quantities that the Administration sets forth as proposed final quantities shall be so designated. To arrive at the amount of the semi-final payment, the following will be deducted from the apparent estimated value of the Contract: (a) total of all amounts previously paid to the Contractor as current estimates, (b) the retainage for landscaping items of work, (c) sums deemed chargeable against the Contractor including penalties and liquidated damages, and (d) as an additional retainage, a sum not less than 1 percent of the total value of the Contract, excluding landscaping items of work.

(3) If all retained funds have not been paid to an escrow agent, as provided for in (a)(4), the Administration shall, upon payment of the semi-final estimate, place the remaining retainage in a interest-bearing escrow account, as designated and on such terms and conditions as specified by the procurement officer. At the time of the final payment, any retainage due, and any interest accrued on the retainage due from the time of payment of the semi-final estimate, shall be paid to the Contractor.

130 **ADD:** The following at the end of Section TC-7.05:

(c) Application for Progress Payment.

In order to receive payment, the Design-Build Team shall submit a written Application for Progress payment to the Administration on a monthly basis. Receipts, invoices, and other vouchers, including invoices from subcontractors shall be included. Invoices shall be based on the proportionate quantities of the various classes of work satisfactorily designed, checked, and completed or incorporated in the work in accordance with the Schedule of Work and the value thereof determined from the Contract Progress Payment Breakdown as described in TC-7.11. If the Application for Progress Payment is inconsistent with the Payment Breakdown, the Projected Schedule of Payments, or the actual progress of work, the Application must include a written explanation for such inconsistencies and the Administration reserves the right to withhold the applicable payment in whole or in part.

(d) Payment of Invoices.

All invoice payments shall be subject to correction in subsequent invoices and payments and upon final acceptance and payment. No payment shall be made when, in the judgment of the Administration, the work is not proceeding in accordance with the provisions of the Contract or when the total value of the work done since the last estimate amounts to less than $500.00. Portions of the progress payment may be withheld in accordance with the Contract provisions.

(e) Payment for Mobilization.

The total of payments for Mobilization will not exceed 10% of the Contract Price (less price adjustments and incentives).

(f) Payment for Changes.

Differing site conditions, changes, and extra work meeting the requirements of this Contract will be paid using the following methods as appropriate:

a. Unit prices agreed upon in the order authorizing the work.

b. An agreed upon lump sum amount.

c. On a Force Account basis, if agreement cannot be reached and if directed by the Administration. Refer to TC-7.03

TC-7.10 COST BREAKDOWN AND SCHEDULE OF PAYMENTS

.01 Submittal of Cost Breakdown

Concurrent with the submission of the Price Proposal, the Design-Build Team shall submit to the Administration an itemized Cost Breakdown and supporting documentation to be used to evaluate Price Proposals and as a basis of payment. This breakdown shall present a realistic and documentable presentation of the costs for the major elements of work that comprise the lump sum price for the work. At a minimum, the following Lump Sum Items shall be included:

Clearing & Grubbing
Mobilization (refer to TC-705,e.)
Design Engineering (including Utility relocation engineering)
As-Built Drawings
Engineer's Office
Maintenance of Traffic
Construction Stakeout
Earthwork - Excavation & Embankment
Drainage
Erosion & Sediment Control
Culverts
Retaining Walls
Bridge Structures

Paving Items – hot mix asphalt, concrete pavement, and graded aggregate base
Concrete
W-beam and concrete barrier
Topsoil, Seed & Mulch
Landscaping Plantings
Lighting & Electrical
Pavement Markings
Permanent Signing
Signals and Beacons

The Design-Build Team shall also submit to the Administration a Cost Breakdown of the Design Engineering item. This cost breakdown shall include the name and fee for each consultant and subconsultant firm that is included in this item.

The Administration may require additional items to be identified and included prior to approval

Note that to enable the Administration to make effective progress payments, the successful Design-Build Team will be required to submit for approval the more detailed Progress Payment Breakdown described in TC-7.11. All progress payments will be based on an approved Progress Payment Breakdown. The Progress Payment Breakdown may be submitted in place of the Cost Breakdown described above.

All costs associated with the preparation, submission, or revision of any Cost Breakdown will not be considered as an item for payment, but shall be included in the Design-Build Team's Lump Sum price.

The successful Design-Build Team will be required to submit an Initial Critical Path Method Project Schedule Design-Build Activities Chart within thirty (30) working days after notification of Award. This is in addition to the requirements outlined in Section 109- Critical Path Method Project Schedule Design-Build.

.02 Review and Approval

Within 14 working days after Execution of the Contract, the Administration shall approve the Cost Breakdown or return it to the Design-Build Team with deficiencies noted. The Administration will not approve a Contract Cost Breakdown that is unbalanced. The Design-Build Team shall then submit the Cost Breakdown until an acceptable Cost Breakdown is approved. The Design-Build Team is responsible for incorporating time for submission and approval of the Cost Breakdown in its Schedule of Work.

.03 Projected Schedule of Payments

Within 7 working days after approval of the Cost Breakdown, the Design-Build Team shall provide the Administration with a Projected Schedule of Payments for the Project. This schedule will provide the Administration with an estimate of monthly cash flow requirements by forecasting the Design-Build Team's monthly

Applications for Progress Payments for the duration of the Project. The Projected Schedule of Payments must be in accordance with the Contract, the approved Cost Breakdown.

.04 Justification of Cost Breakdown or Projected Schedule of Payments

The Administration may require the Design-Build Team to provide explanations and supporting documentation if the Cost Breakdown or Projected Schedule of Payments indicate unbalancing or do not reasonably reflect the actual cost of performing the work or the value of work received by the Administration.

TC-7.11 CONSTRUCTION PROGRESS PAYMENT BREAKDOWN

.01 Submittal of Progress Payment Breakdown

The successful Design-Build Team shall submit to the Administration an itemized Progress Payment Breakdown and supporting documentation to be used as a basis for payment. This breakdown shall be a realistic and documentable presentation of the costs for the major elements that comprise the Contract Lump Sum price for the work. The breakdown shall be sent to the District Engineer. No progress payment will be made until such time that this breakdown has been accepted by the Administration. The Design-Build Team shall submit additional updates to the Payment Breakdown as the design and construction progresses and as directed by the Administration. The Administration reserves the right to request additional detail from the Design-Build Team in order to process progress payments. The breakdown shall be in MS Excel format and include at a minimum, the following items.

Section 1000

LS for Design Costs
LS for Mobilization (refer to TC-7.05, e.)
LS for As-Builts
LS for Clearing & Grubbing
LS for Engineer's Office
LS for Maintenance of Traffic
LF of Temporary Barrier
LF of Temporary Striping
SF of Temporary Signs
EA of Drums
EA of Arrow Panels
EA of VMS

Section 2000

CY of Excavation

Section 3000

LF of RCCP
LF of CMP
LF of HDPE Pipe
EA of Drainage Structures
LF of Underdrain Pipe
LS for Erosion & Sediment Control
LS for Stormwater Management

Section 4000 (if applicable)

CY of Structure Excavation
LF of Piling
LF of Caissons
CY of Substructure Concrete
CY of Superstructure Concrete
LS for Reinforcing Steel
LS for Fabricated Structural Steel
LS for Cleaning & Painting New Structural Steel
LS for Pre-stressed Concrete Beams & Panels
LS for Retaining Walls
LS for Noise Barrier
LS for Retaining Walls

Section 5000

SY of Graded Aggregate Base
Tons of Superpave Asphalt Mix for Surface
Tons of Superpave Asphalt Mix for Base
Tons of Superpave Asphalt Mix for Wedge/Level

SY of Grinding Existing Pavement
SY of Portland Cement Concrete Pavement (if applicable)
LF of Pavement Markings

Section 6000

LF of Curb & Gutter or monolithic median
LF of Traffic Barrier
EA of Traffic Barrier End Treatments
LF of Concrete Traffic Barrier
LF of Chain Link Fencing

Section 7000

SY of Topsoil
SY of Permanent Seeding
SY of Temporary Mulch and Temporary Seed

SY of Soil Stabilization Matting
LS for Plantings (Tree, Shrub, Bulbs, Annuals and Perennial) Installation
LS for Establishment, Care & Replacement, and Warranty of Plantings and Seeding

Section 8000

CY of Concrete for Foundations
LS for Sign Structures
SF of Permanent Signing
EA of Lighting Structures
EA of Signal/Beacon Structures
LF of Wire, Conduit for Lighting, Beacons and Signals

The breakdown shall also contain the Design-Build Team unit prices for Superpave Asphalt Mix, Superpave Asphalt Mix for Pavement Patching, each type of concrete mix to be used on the project, and each type of pavement marking. These prices will be used to determine a reduction in payment if necessary due to materials not meeting required specifications such as PCC compressive strength, AC content, asphalt density, pavement marking thickness, and reflectivity. Additionally, the breakdown shall include the hourly rate, including overhead, for each Design Key Staff member. This price will be used by the Administration to set a baseline cost associated with any work determined to be out of scope and agreed to by the Administration prior to the work being performed.

The Design-Build Team shall use the Progress Payment Breakdown format in preparing and documenting its Applications for Payment. The Administration will use the Cost Breakdown to assist in evaluating requests for payment. All costs associated with preparation, submission, or revision of the Progress Payment Breakdown will not be considered as an item for payment, but shall be included in the Design-Build Team's Lump Sum price.

TC SECTION 7
PAYMENT

TC-7.09 PRICE ADJUSTMENT FOR DIESEL FUEL

(a) General. A Price Adjustment (PA) will be made to provide additional compensation to the Contractor or a credit to the Administration for the fluctuation in the cost of diesel fuel.

The monthly index price used for calculating the PA will be the On-Highway Diesel Fuel Price for the Central Atlantic Region published by the U.S. Department of Energy, Energy Information Administration, at www.eia.doe.gov. The monthly index price will be the average of the weekly prices posted for the month.

The prevailing base index price will be the price specified for Diesel Fuel currently posted at www.roads.maryland.gov (Business Center /Contracts, Bids, and Proposals) prior to bid opening. A historical database will be maintained by the Administration.

The adjustment factors for specific categories of the work are included in Table TC-7.09. Category A,C, D will apply to this Contract.

The PA will be calculated when the index for the current month increases or decreases more than 5 percent of the base index. The total dollar amount of fuel adjustment will be limited to 5 percent of the Contract Total Amount as bid. If an increase or decrease in costs exceeds 5 percent of the Contract Total Amount as bid, no further adjustment will be made.

Computations for adjustment will be as follows:

$$\text{Percent Change} = [(E - B)/B] \times 100$$

$$PA = [E - (B \times D)] \times F \times Q$$

Where:

PA = Amount of the price adjustment
E = Current monthly index price
B = Prevailing base index price
D = 1.05 when increase is over 5%; 0.95 when decrease is over 5%
F = Applicable fuel adjustment factor from Table TC-7.09
Q = Quantity of individual units of work

TABLE TC-7.09

COST ADJUSTMENT FACTORS FOR DIESEL FUEL			
CATEGORY	**DESCRIPTION**	**UNITS**	**FACTOR**
A	Sum of Cubic Yards of Excavation in Category 200	Gallons/Cubic Yard	0.29
B	Sum of Structure Concrete in Category 400	Gallons/Cubic Yard	1.892
C	Sum of Aggregate Base in Category 500	Gallons per ton	0.60
D	Sum of HMA in Category 500	Gallons per ton	3.50
E	Sum of Rigid Concrete Pavement in Category 500	Gallons/Cubic Yard	0.95

Any difference between the checked final quantity and the sum of quantities shown on the monthly estimates for any item will be adjusted by the following formula:

$$FPA = [(FCQ \div PRQ) - 1] \times EA$$

Where:

FPA = Final PA for the item that increased or decreased
FCQ = Final Checked Quantity of the item
PRQ = Total Quantity of the item reported on the most recent estimate
EA = Total PA of the item shown on most recent estimate

(b) Price Adjustment Criteria and Conditions. The following criteria and conditions will be considered in determining the PA.

(1) Payment. The PA will be computed on a monthly basis. PA resulting in increased payment to the contractor will be paid under the item Price Adjustment for Diesel Fuel. The item amount will be established by the Administration, and shall not be revised by the Contractor. PA resulting in a decreased payment will be deducted from monies owed the Contractor.

The monthly base price for determining a PA for all work performed after the Contract completion date, as revised by an approved time extensions, will be the monthly base price at the time of the Contract completion date (as extended) or at the time the work was performed, whichever is less.

(2) Expiration of Contract Time. When eligible items of work are performed after the expiration of Contract time with assessable liquidated damages, no PA will be made.

(3) Final Quantities. Upon completion of the work and determination of final pay quantities, an adjusting Change Order will be prepared to reconcile any difference between estimated quantities previously paid and the final quantities.

(4) Inspection of Records. The Administration reserves the right to inspect the records of the Contractor to ascertain actual pricing and cost information for the diesel fuel used in the performance of the applicable items of work..

(5) Additional Work. When applicable items of work, as specified herein, are added to the Contract as additional work, in accordance with the Contract provisions, no PA will be made for the fluctuations in the cost of diesel fuel unless otherwise approved by the Engineer. The Contractor shall use current fuel costs when preparing required backup data for work to be performed at a negotiated price.

(6) Force Account. Additional work performed on a force account basis, reimbursement for material, equipment, and man-hours as well as overhead and profit markups will be considered to include full compensation for the current cost of diesel fuel.

CATEGORY 100
PRELIMINARY

PRE-CONSTRUCTION STRUCTURE SURVEYS

DESCRIPTION. Conduct pre-construction surveys of selected structures within the project area. Reports are to be prepared by a qualified and approved firm that can demonstrate prior work regarding these specialized services. The physical inspection of the structures shall be made by a Professional Structural Engineer and a vibration control consultant who can demonstrate having made at least five such surveys within the last two years. The report shall be prepared and signed by the individuals that make the inspection. Final approval of this firm and individuals will be at the discretion of the Engineer

MATERIALS. Not Applicable

CONSTRUCTION. Conduct Pre-Construction Survey on all structures located at:

Royal Farms Store, 3901 Ten Oaks Road

13589 Triadelphia Road

13544 Triadelphia Road

13559 Triadelphia Road

Additional structures may be added at the discretion of the Engineer. This survey is to serve as proof of the condition of the existing structures prior to construction.

(a) Obtain permission to enter private property and residences for the purpose of conducting surveys.

(b) Do not enter any structure without documented permission from the Owner.

(c) Notify the Engineer if access and a signature from the Owner cannot be obtained.

Survey Reports. Perform a detailed inspection of the interior and exterior of the indicated structures. Inspect all rooms, walls, ceilings and basements. Note cracks, displacements and structural deficiencies as to location, length, size, width, etc.; record observations in the survey report and illustrate them with accurate sketches. Provide sufficient color images of the interior and exterior of these structures with particular attention paid to existing cracks or structural deficiencies, plus overall condition and appearance of each structure. Document the conditions of appurtenances, such as chimneys, fireplaces, pipes, cables, transmission lines, wells and other water systems. Provide dimensions in US standard measurements.

Include color 3 in. x 5 in. prints and digital imagery on DVD with color index prints printed four images per page in each report. Include a description of the contents of each image with a

label identifying the structure, description of deficiency, location in or on the structure, and date image was taken. Index these descriptions to the photograph number on the print. Images produced by a digital camera must be obtained with a digital resolution of at least 10 megapixels. Prepare the survey report in 8 1/2 in. x 11 in. format for each structure. Also include the following:

Copy of the Release-to-Enter

(a) Names and Responsibilities of Inspection Party

(b) Existing Conditions

(c) Notes

(d) Sketches

(e) Color index prints (4 images per page) of digital images with date and image location

(f) Digital imagery on DVD

(g) Accurate and complete index of all abbreviations used

Submit five copies of the report for review and approval a minimum of ten working days prior to the start of any construction. Provide one copy to the property owner.

A post-construction survey that meets the requirements of the pre-construction survey shall be made for each designated structure.

Vibration Surveillance. Submit the proposed plan for the vibration monitoring for approval. Seismic monitoring with multiple geophones is required for this project. Include the type and layout of sensing devices in the plan. The proposed methods and plans shall be approved prior to any construction activity. The Administration's approval of the proposed vibration monitoring and preconstruction survey does not relieve the Contractor of any responsibility for damage to structures that were included or omitted from the vibration monitoring program.

Perform a baseline vibration study before construction activities begin.

Record the vibrations during construction. Conduct construction activities in order to eliminate the occurrence of damage to structures. Vibrations caused by construction activity shall not exceed the threshold for residential buildings with plastered walls per R8-81.

When it is determined that any construction activity has an adverse effect on adjacent structures, the construction activity operations may be suspended while corrective action is taken. Continue surveillance as directed.

Immediately notify the Engineer when the vibration surveillance indicates unacceptable levels of vibrations to structures. A meeting shall be held between the Engineer, the Contractor, and the vibration control consultant to determine the best course of action to reduce vibrations in the area of concern.

MEASUREMENT AND PAYMENT. Structure surveys will be measured and paid for at the Contract unit price per each structure. The payment will be full compensation for the physical inspections, photographs, data collection, preparation and submission of reports.

Payment will include the pre-construction and post-construction surveys, vibration baseline testing, and vibration monitoring during construction.

CATEGORY 100
PRELIMINARY

DELETE: SECTION 102 – REMOVAL AND DISPOSAL OF EXISTING BUIDLINGS in the Standard Specifications in its entirety.

INSERT: The following:

SECTION 102 — REMOVAL AND DISPOSAL OF EXISTING BUILDINGS

DESCRIPTION. Demolish structures on the six (6) properties in Howard County located at the addresses below. Abandon the onsite wells and septic system specified within the project limits as specified or as directed.

2871 MD Route-32 West Friendship, MD 21794
2875 MD Route-32 West Friendship, MD 21794
2885 MD Route-32 West Friendship, MD 21794
3102 MD Route-32 West Friendship, MD 21794
3106 MD Route-32 West Friendship, MD 21794
3110 MD Route-32 West Friendship, MD 21794
2615 Louanne Ct. West Friendship, MD 21494

1

A Hazardous Materials Survey (HMS) was performed by Chesapeake Environmental Management, 42 North Main Street, Bel Air, Maryland 21014 to determine the presence of hazardous materials in or around the above-mentioned properties.

The HMS reported the following:

Address	ACM	LBP	Mercury	PCB's	Ozone Depleting	Well / Septic	UST/ AST	Other
2871 MD Route-32	N	N	N	N	Y	Y	N	Y
2875 MD Route-32	Y	Y	Y	N	Y	Y	Y	Y
2885 MD Route-32	N	Y	N	N	N	Y	Y	Y
3102 MD Route-32	Y	Y	Y	Y	Y	Y	Y	Y
3106 MD Route-32	Y	Y	Y	Y	Y	Y	Y	Y
3110 MD Route-32	Y*	Y	Y	N	Y	Y	Y	Y
2615 Louanne Ct.	N	Y	Y	N	Y	Y	Y	Y

1

ACM = Asbestos Containing Material, LBP = Lead Based Paint, PCBs = Polychlorinated Biphenyls, and AST = Aboveground Storage Tank.
Y = materials were observed

N = materials were not observed
Y*= materials were observed but not submitted to laboratory for testing

A copy of the report of the HMS is included in the RFP.

MATERIALS.

Graded Aggregate Base (GAB)	901
Controlled Low Strength Material (CLSM)	902.16

CONSTRUCTION. Remove hazardous materials from the structures and dispose of in accordance with Federal, State, and local regulations. Provide a Health and Safety plan prepared by a Certified Industrial Hygienist that addresses how contaminated zones will be monitored during demolition and removal. Cost of worker safety issues shall be incidental to the appropriate Contract items.

Demolish the structures and remove and dispose of all debris as directed. Remove any basements or foundations found under the structures and dispose of all debris and backfill as directed.

Abandon the existing well and septic system in a manner compliant with COMAR 26.04.04.11 and Howard County Department of Health codes.

Water Well. Abandon as follows.

(a) Any existing well must be sealed by a licensed well driller.

(b) Remove the water pump then fill the well with a cement/water mix pumped in from bottom up.

(c) File an Abandonment Report with Howard County Department of Health.

Septic System. Contact the Howard County Department of Health to determine if they require one of their representatives on site to monitor the septic tank abandonment.

(a) Open the septic tank and have a pumper truck remove the waste material.

(b) Convey the waste material to the local Waste Water Treatment Plant.

(c) Fill the septic tank with GAB or flowable backfill.

Leave drain field in place if applicable. Any seepage pits encountered must be opened and filled with common borrow then tamped using a backhoe. Any septic lines left exposed must be excavated and disposed of as specified.

MEASUREMENT AND PAYMENT. Payment for the removal and demolition of the structures and the abandonment of well and septic system will be lump sum. The lump sum will be full compensation for demolition of the structures, removal of debris, removal and disposal of hazardous material, backfilling with CLSM and GAB, compaction, grading, all excavation, safety

measures, labor, equipment, tools, necessary permits, and incidentals necessary to complete the work.

CATEGORY 100
PRELIMINARY

SECTION 103 – ENGINEERS OFFICE

144 **DELETE:** 103.01 to 103.04 in its entirety.

INSERT: The following.

103.01 DESCRIPTION. Furnish, clean, and maintain in good condition an Engineers office at an approved location within the immediate vicinity of the project. The office shall be separate from any offices used by the Contractor, and it and all items therein shall be for the exclusive use of the Administration's Engineers and Inspectors. Rented properties that conform to the type of office specified in the Contract Documents will be acceptable.

103.02 MATERIALS. Not applicable.

103.03 CONSTRUCTION. Set up, equip, and make the office ready for use at least five days prior to commencement of construction work on the project. Progress payments for professional services may be made prior to the commencement of construction work. Leave the office and appurtenances in place until all field records are complete. Upon removal of the office, restore the location to a condition acceptable to the Engineer.

Unless otherwise specified, the office and all furnished equipment and accessories shall become the property of the Contractor at the completion of the project.

103.03.01 Mobile Housing Unit. Provide a mobile housing unit having floor space of at least 100 ft^2 and window area of at least 10 ft^2. Ensure it is entirely enclosed and waterproofed and has a door that locks. Provide a table 36 x 48 x 40 in. high and one closet equipped with a lock. Furnish two keys for each lock. Provide satisfactory heating and cooling. Relocate the unit as directed.

103.03.02 Handicap Accessibility. When handicap accessibility is necessary, comply with the Federal Register-Volume 56 No. 144-Americans with Disability Act (ADA) Accessibility Guidelines for Buildings and Facilities.

103.03.03 Mobile Office Trailers. Anchor in accordance with the manufacturer's recommendations. Office trailers, as defined under the Industrial Building and Mobile Act of Maryland, shall be approved by the Maryland Department of Housing and Community Development and bear the Maryland Certification Insignia in the interior of the office.

103.03.04 Quality Control Laboratory. Section 915.

103.03.05 Requirements for all Offices.

(a) Entirely enclosed, waterproofed, and completely insulated to at least an R11 rating.

(b) Double thick floor with building paper placed in between the floor layers.

(c) Finished inside and outside as approved.

(d) A ceiling height of at least 7 ft, a pitched roof, and a ventilating louver in each gable.

(e) A 4 x 1 ft sign with the message "ENGINEERS OFFICE - STATE HIGHWAY ADMINISTRATION" attached to or mounted in front of the office. The sign shall have a black background and have white lettering at least 3 in. high.

(f) A 5 x 7 in. no smoking sign posted on the outside of each entrance to the office, plant laboratory, and mobile housing unit.

(g) Interior and exterior doors equipped with different key locks. Interior doors keyed alike. Exterior doors keyed alike. An additional dead bolt lock for each exterior door. Four keys for each interior and exterior lock.

(h) Windows capable of being opened and closed. Equip with latches, screens, and venetian blinds or shades.

(i) Electrified in accordance with national and State electrical codes with satisfactory artificial lighting and lighting services. Ensure an illumination level of at least 75 ft-c.

(j) Equipment capable of heating the office to at least 70 F and cooling to at least 78 F.

(k) A restroom facility in accordance with the State Department of Health and Mental Hygiene or other authorities having jurisdiction. Connect to water and sewage or a well and septic system. Provide a pressurized water system capable of maintaining at least 20 psi. Furnish a wash basin, water closet, soap holder, paper towel holder, and mirror.

(l) Maintain the facilities in a clean and sanitary condition. Sweep the floor and remove the trash daily. Damp mop and wax the floor biweekly. Clean the interior and exterior of all windows monthly. Perform all work on an as needed basis and when requested.

(m) Protect the Administration and Administration employees from any loss or damage to their property stored in the Engineers Office. Provide protection in the amount of twenty thousand dollars ($20 000), nondeductible, per each occurrence, for any loss or damage due to fire, theft, vandalism, storms, or floods. Complete the reimbursement, replacement, or repair within 30 days from the date the Engineer reports the loss.

(n) A parking area for the exclusive use of Administration employees. Provide the specified number of spaces. Post signs to designate the assigned parking areas. Stabilize the parking area as directed.

(o) Fire extinguishers of a dry chemical or multi-purpose ABC type (at least 10 lb), equipped with a visual air pressure gauge, and maintained in accordance with OSHA standards.

(p) A 24 unit first aid kit furnished and maintained as described in the Code of Federal Regulations, Title 29 Subpart D, Section 1926.50(d)2.

(q) A 4 x 8 ft waterproof bulletin board. Place in an easily accessible area within the project limits and conspicuously displayed to all employees. Post and maintain all pertinent and required notices for the duration of the project.

(r) Touch-tone telephones equipped with an answering device capable of answering, recording, storing, and playing back incoming messages at least 30 minutes in length and recording outgoing messages up to 15 seconds in length. The device shall be voice activated, beeperless, record as long as the speaker speaks, and play back recorded messages without dial tone or pauses.

Replace stolen equipment and equipment that becomes defective or for any other reason does not function as intended. Provide an equal or better unit within eight hours after notification. Replacement shall be at no additional cost to the Administration. Post emergency telephone numbers at a conspicuous location.

(s) One 12 ft^3 electric refrigerator.

(t) An approved cassette player/recorder with cassettes or digital recording device.

(u) One paper copier machine, with automatic document feed capable of printing at least 15 copies per minute and documents of up to 11 x 17 in. Supply paper and provide service as needed.

(v) One sanitary electric water cooler, including bottled water and disposable cups.

(w) One paper shredder capable of shredding at least 10 sheets (20 lb bond) at a time. Throat width of at least 12 in. Speed of at least 20 feet per minute. Auto reverse or auto stop for paper jams. Power of at least 115 v.

103.03.06 Computer System. Furnish 2 desktop computers and 0 laptop computers.

General Requirements.

(a) IBM compatible with an Intel or AMD processor.

(b) Minimum hard drive storage of 500 GB (gigabyte).

(c) One CD-RW drive (re-writable CD-ROM).

(d) Operating System. Minimum Microsoft® Windows 7. The computer system will not be acceptable unless all Microsoft Windows Critical Updates are installed.

(e) Printer. When an Engineers Office is specified, furnish a color all-in-one laser printer/scanner/copier/fax with at least 64 MB of RAM and meeting the following minimum requirements:

(1) Input paper capacity of 150 sheets.

(2) Automatic document feed of 35 page capacity.

(3) Printer resolution up to 600 X 2400 dpi, and a print speed (color) of at least 15 ppm.

(4) Scanner resolution must be capable of 1200 x 2400 dpi optical. Built in Copier resolution must be capable of up to 600 X 600 dpi. Copier speed of at least 15 ppm.

(5) Fax speed of at least 2 sec / page.

(f) Software. Supply all manuals and software on original disks for retention in the Engineers Office or Administration facility for the duration of the Contract.

(1) Microsoft® Office 2007 Professional for Windows™ or later.

(2) Install and configure antivirus/antispyware software to perform an automatic update when the microcomputer system connects to the internet. (Antivirus/AntiSpyware software approved for Administration web email: *Norton, McAfee, Sophos, or ETrust.) *Norton Internet Security includes Antivirus and a Personal Firewall.

(g) Internet Access. Provide unlimited internet service approved by the Engineer. Where available, provide internet high-speed service (DSL or cable). With DSL or cable internet service, provide an external router device. Provide firewall software to protect the computer from security intrusions.

(h) Accessories.

(1) When an Engineers office is specified, provide a standard computer workstation with minimum desk space of 60 X 30 in. and a padded swivel type chair with armrests.

(2) 8-1/2 X 11 in. xerographic paper as needed.

(3) Toner and ink as needed.

(4) Maintenance agreement to provide for possible down time.

(5) Physical security system to deter theft of the computer and components.

(6) Three 4-GB USB flash drive storage devices.

(7) Blank recordable CD-RW media as needed.

Desktop Specific Requirements.

(a) Minimum processor speed of 3.0 GHz.

(b) Minimum of 4 GB RAM.

(c) Enhanced 101 key keyboard with wrist rest.

(d) Super video graphics accelerator (SVGA).

(e) Mouse and mouse pad.

(f) Flat-panel LCD monitor (19 in. minimum) meeting Energy Star requirements.

(g) Uninterruptible power supply (UPS).

Laptop Specific Requirements.

(a) Must meet military standard of durability MIL-STD 810G

(b) Minimum processor speed of 2.4 GHz.

(c) Minimum 2 GB SDRAM.

(d) Minimum 15" 1024x768 (XGA), daylight-readable, 500nits (cd/m2) LCD display.

(e) Power Supply. Two lithium ion battery packs with overcharge protection, an AC adaptor, and a vehicle DC power adaptor that operates the laptop and simultaneously charges the laptop's internal battery.

(f) Carrying Case.

(g) Printer. When an Engineers Office is not specified, furnish a portable B&W printer with DC power adapter and having a minimum resolution of 1200 dpi, at least 8 MB of RAM, and a print speed of at least 15 ppm. (Note: A color printer may be substituted if a digital camera is specified. Refer to SP-Section 113).

(h) Internet Service. If an Engineers office is not specified, furnish the laptop with an internal wireless broadband card and broadband internet service.

Have the computer system furnished complete and ready to use at least five days prior tto the payment of the first progress payment.

If for any reason the system fails to operate, is stolen, or is otherwise unavailable for use, it shall be replaced or repaired within 48 hours.

When the computer system is no longer required, the Construction Management software system including original user/operator guide manuals, program disks, and all data files (including those stored on USB flash drives, CD-R's, etc.) will be removed by the Engineer and

delivered to the District Engineer and become the property of the Administration. The remaining computer systems shall remain the property of the Contractor.

103.03.07 Facsimile (FAX) Transceiver for all Offices.

Provide a FAX machine that:

(a) Is connected to a dedicated phone jack with a separate independent telephone line and phone number.

(b) Is in accordance and compatible with CCITT Group Transmission Standards (see specific line items for compatibility requirements).

(c) Uses public switched telephone networks and standard two wire leased line through RJ11C jacks or similar devices.

(d) Transmits at least 9600 BPS with automatic stepdown to compensate for phone line conditions.

(e) Is capable of transmitting a standard 8-1/2 x 11 in. page within 20 seconds through a clear phone line, based on CCITT #1 test chart.

(f) Is capable of two levels of resolution with contrast control:

(1) Standard 200/96 lines

(2) Fine 200/196 lines

(g) Is capable of self-test and providing activity reports with page headers, time, and date.

(h) Uses standard copy paper for receiving transmissions.

(i) Has an automatic document feeder tray (see specific requirements for each transceiver class).

(j) Has handsets.

(k) Has automatic answer, receive, and disconnect features.

(l) Provide the FCC registration number, ringer equivalence, and connection circuitry for each transceiver.

103.03.08 Specific Field Office Requirements.

Type A Engineers Office – Standard office trailer with at least 200 ft^2 of floor area under one roof.

Type B Engineers Office – Standard office trailer with at least 400 ft^2 of floor area under one roof.

Type C Engineers Office – Standard office trailer with at least 700 ft^2 of floor area under one roof.

Type D Engineers Office – One-story structure containing at least 1300 ft^2 of floor area under one roof. Modular construction is acceptable. Office trailers are not acceptable.

Table 103 Specific Requirements

ENGINEERS OFFICE				ITEM
A	**B**	**C**	**D**	
–	1	2	–	Inner Offices–100 ft^2 each
–	1	1	–	General office area
–	–	–	4	Inner Offices–120 ft^2 each
–	–	–	1	Conference room–240 ft^2
–	–	–	1	Storeroom with shelves–120 ft^2
1	1	1	2	Restroom, 30 ft^2
–	1	1	1	Inner office ingress and egress to the other rooms
3	4	4	5	32 x 60 in. Executive type desks with center drawers
3	4	4	5	Swivel chairs, padded with arm rests
1	1	1	1	30 x 72 in. slant top drafting table and stool, approximately 40 in. high at the front edge
1	2	3	6	30 x 72 in. folding utility table, 30 in. high
–	–	–	1	12-person conference table with padded chairs
2	6	10	12	Additional padded chairs
1	2	2	3	Plan racks
1	1	1	2	Coat racks
1	1	1	1	3 x 6 ft blackboard or whiteboard
1	2	3	3	Electronic desk calculators with memory and tape readout (including manuals, and tapes as needed)
1	1	2	6	Legal size steel filing cabinets, 4 drawer fire resistant (D label) with locks
–	2	2	2	Standard size steel filing cabinets, 4 drawer with locks
1	1	1	5	Bookcases having four shelves 36 x 12 in.
1	2	2	2	Closets, full height, measuring at least 24 x 30 in., equipped with locks, and at least two shelves in each
1	1	1	–	Utility cabinet with 3 adjustable shelves
1	1	1	–	Overhead cabinet at least 8 ft long, 15 in. deep, and 18 in. high
1	1	1	2	Fire extinguisher as specified in 103.03.05

1	2	2	4	Telephones with separate lines, as specified in 103.03.05
2	2	2	2	Battery-operated smoke detectors
4	8	10	15	Designated parking spaces

103.03.09 Recycling. Recycling of recyclable paper (bond, newsprint, cardboard, mixed paper, packaging material and packaging), bottles (glass and plastic), and aluminum cans will be required at the Engineer's Office and the Contractor's facilities for the project.

Furnish approved containers, and remove the material from the site on an approved schedule or as directed. All material shall be taken to an authorized recycling facility. Maintain a log for the duration of the project documenting the type of materials recycled. The log shall include the types of material, date, time, location of facility, and signature line. Furnish a copy of the log at the completion of the project and upon request.

The Contractor shall be considered the owner of any profit and be responsible for all incurred costs.

103.04 MEASUREMENT AND PAYMENT. Engineer's office will not be measured but will be paid for at the Contract lump sum price for the pertinent Engineers Office specified.

Payment of 50 percent of the Contract lump sum price will be payable on the first estimate subsequent to complete installation of the Engineers office. The remaining 50 percent will be prorated and paid in equal amounts on each subsequent monthly estimate. The number of months used for prorating will be the number estimated to complete the work. The final month's prorata amount will not be paid until the office is removed and the area is restored. The payment will be full compensation for site preparation, utility costs, all specified furnishings, to provide, equip, clean, maintain, insure, remove and dispose of the office, restore the site, recycling, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

The only exception to the all-inclusive Contract lump sum price is the stabilization of the parking area, which will be measured and paid for using the pertinent items as directed.

Computer. The computer system will not be measured but the cost will be incidental to the Contract price for the Engineers Office item. If an item for Engineers Office is not specified, the cost of the computer system will be incidental to the payment for Mobilization. In absence of either item, payment will be incidental to the other items specified in the Contract Documents

CATEGORY 100
PRELIMINARY

SECTION 104 — MAINTENANCE OF TRAFFIC

104.01 TRAFFIC CONTROL PLAN (TCP)

104.01.01 DESCRIPTION.

DELETE: The fourth paragraph sentence "Refer to contract Documents for Work Restrictions." in its entirety.

INSERT: The following.

Work Restrictions.

Work is not permitted on the following holidays indicated below with an "X", nor is work permitted on the day immediately preceding and immediately following the holidays indicated below with an "X".

☒ New Year's Day, January 1
☐ Martin Luther King's Birthday, the third Monday in January
☐ President's Day, the third Monday in February
☒ Good Friday
☒ Easter Weekend
☒ Memorial Day, the last Monday in May
☒ Independence Day, July 4
☒ Labor Day, the first Monday in September
☐ Columbus Day, the second Monday in October
☐ Veterans Day, November 11
☒ Thanksgiving Day, the fourth Thursday in November
☒ Christmas Day, December 25

Work is not permitted on the following weekend days indicated below with an "X".

☒ Saturdays, unless prior written approval is given by the Engineer
☒ Sundays, unless prior written approval is given by the Engineer

TEMPORARY LANE OR SHOULDER CLOSURE SCHEDULE			
ROADWAY	**# LANE(S) / SHOULDER CAN BE CLOSED**	**DAY OF THE WEEK**	**CLOSURE PERIOD (TIME OF DAY)**
I-70 Westbound	0/1	Monday through Friday	12:01 AM to 5:00 AM 9:00 AM to 3:00 PM 7:00 PM to 12:00 M
	1/1	Monday through Thursday	12:01 AM to 5:00 AM 8:00 AM to 2:00 PM 7:00 PM to 12:00 M
	1/1	Friday	12:01 AM to 5:00 AM No Daytime Closures 7:00 PM to 12:00 M
	2/1	Monday through Thursday	12:01 AM to 5:00 AM 10:00 PM to 12:00 M
		Friday	12:01 AM to 5:00 AM
I-70 Eastbound	0/1	Monday through Friday	12:01 AM to 5:00 AM 9:00 AM to 3:00 PM 7:00 PM to 12:00 M
	1/1	Monday through Thursday	12:01 AM to 5:00 AM 10:00 AM to 3:00 PM 7:00 PM to 12:00 M
	1/1	Friday	12:01 AM to 5:00 AM No Daytime Closures 7:00 PM to 12:00 M
	2/1	Monday through Thursday	12:01 AM to 5:00 AM 10:00 PM to 12:00 M
		Friday	12:01 AM to 5:00 AM

MD 32, I-70 No lane closures shall be allowed 1-½ hours before an Orioles or Ravens Game on eastbound I-70 and 1-½ hours after an Orioles or Ravens Game on westbound I-70.	Complete Temporary Closure (15 minutes or less)	Monday through Friday	12:01 AM to 5:00 AM
MD 32	0/1	Monday through Friday	12:01 am to 5:00 am 9:00 am to 3:00 pm 8:00pm to 12:00 M
MD 32/Behind Barrier Wall	0/1	All days	All times
MD 32	1/1	Monday through Friday	12:01 am to 5:00 am 8:00 pm to 12:00 M
MD 32	1/1	Saturday	12:01 am to 5:00 am
MD 32/Burnt Woods Road Interchange Ramps	Temporary Ramp Closure	Monday through Friday	12:01 am to 5:00 am 8:00 pm to 12:00 M
		Saturday	12:01 am to 5:00 am

ADD: The following after the last paragraph, "Any monetary savings...and the Administration."

When closing, or opening a lane or shoulder on freeways, expressways, and roadways with posted speed ≥ 55 mph, ensure a work vehicle is closely followed by a protection vehicle (PV) during installation and removal of temporary traffic control devices. The PV shall consist of a work vehicle with approved flashing lights, either a truck-mounted attenuator (TMA) with support structure designed for attaching the system to the work vehicle or a trailer truck-mounted attenuator (TTMA) designed for attaching the system to the work vehicle by a Pintle hook and an arrow panel (arrow mode for multilane roadways and caution mode on two-lane, two-way roadways).

Temporary Traffic Control for shoulder work along freeways, expressways, and roadways with posted speed ≥ 55 mph shall include the use of a PV. The PV shall be outfitted with a TMA or TTMA as noted above and be positioned on the shoulder to protect the work area throughout the duration of the shoulder work operation.

The work vehicle size and method of attachment shall be as specified in the TMA/TTMA manufacturer's specification as tested under NCHRP and/or MASH Test Level 3.

When a temporary lane or shoulder closure is in effect, begin work within one hour after the lane is closed. For any delay, greater than one hour and no work in progress, remove the lane/shoulder closure. Ensure the Traffic Manager attends the Pre-Construction, Pre-Structural Steel Erection, Pre-Concrete Placement, Pre-MOT Shift, and Pre-Paving Meetings and is prepared to competently discuss traffic control, the Traffic Control Plan (TCP), and the procedures to be implemented for lane closures.

All closures shall be in conformance with the approved TCP and at the direction of the Traffic Manager and the Engineer.

Workers and equipment, including temporary traffic control devices needed for setting up a lane closure or restriction, are prohibited in the lane/shoulder to be closed or restricted before the time permitted in the Contract Documents unless otherwise approved by the Engineer.

Temporary traffic control devices to be used for lane/shoulder closure may be placed on the shoulder of the roadway by workers no earlier than 30 minutes prior to the actual time lane/shoulder closure or restriction is permitted. When temporary traffic control devices are being installed, ensure that all work vehicles involved in the installation display flashing lights that provide a 360-degree visibility of the vehicles. These lights shall remain on until the full installation of TTC devices is complete. Temporary traffic signs may be displayed to traffic at this time.

Workers shall not enter any lane open to traffic. Workers may be present on shoulders to prepare for lane closure setup no earlier than 30 minutes prior to the actual time lane/ shoulder closures or restrictions are permitted. During preparation for the lane closure, ensure that all work vehicles at the site and involved in the installation of the lane closure or restriction display flashing lights that provide 360-degree visibility of the vehicles, as required by MD 104.01-18B. These lights shall remain on while the vehicle remains in the work zone and until the full implementation of the road closure or restriction is complete.

Restore all temporary lane or shoulder closures at the end of the closure period and ensure that no travel lane has been reduced to less than 11 ft on expressways, freeways and 10 ft on other roadways. Prior to opening the closed lane or shoulder, clear the lane or shoulder of all material, equipment, and debris.

Failure to restore full traffic capacity within the time specified will result in a deduction assessed in conformance with the following.

This is in addition to the requirements specified in TC-4.02.

The lane closure penalties for freeways are categorized by the District in which they are located.

The following fee structure will be followed:

ASSESSED DEDUCTIONS FOR FREEWAYS	
ELAPSED TIME, (MINUTES)	**DEDUCTION**
For 1 Lane Closures	
1 – 10	$ 1,000.00
Each minute over 10	$500.00 per minute (In addition to original 10 minute deduction)
For 2 or more Lane Closures	
1 – 10	$ 2,000.00
Each minute over 10	$1,000.00 per minute (In addition to original 10 minute deduction)

The lane closure penalties for other roads are categorized by intersection Level of Service. The penalty for other roads with Level of Service D, E or F is greater than that for Level of Service A, B or C.

For Level of Service A, B or C, the following fee structure will be followed:

ASSESSED DEDUCTIONS FOR OTHER ROADS	
ELAPSED TIME, (MINUTES)	**DEDUCTION**
For 1 Lane Closures	
1 – 10	$ 150.00
Over 10	$75.00 per minute (In addition to the original 10 minute deduction)
For 2 or more Lane Closures	
1 – 10	$ 300.00
Over 10	$150.00 per minute (In addition to the original 10 minute deduction)

For Level of Service D, E or F, the following fee structure will be followed:

ASSESSED DEDUCTIONS FOR OTHER ROADS	
ELAPSED TIME, (MINUTES)	**DEDUCTION**
For 1 Lane Closures	
1 – 10	$ 300.00
Over 10	$150.00 per minute (In addition to the original 10 minute deduction)
For 2 or more Lane Closures	
1 – 10	$ 600.00

Over 10	$300.00 per minute (In addition to the original 10 minute deduction)

To modify the work restrictions, submit a request to the Engineer in writing with at least 72 hours notice. Do not implement any changes until written approval from the Engineer is received. Include a copy of the original work restrictions with the written request. The Engineer also reserves the right to modify or expand the methods of traffic control or working hours as specified in the Contract Documents.

CATEGORY 100
PRELIMINARY

SECTION 104 — MAINTENANCE OF TRAFFIC

104.21 CELLULAR TELEPHONES.

104.21.01 DESCRIPTION. Furnish and maintain new or like new cellular telephones for use by the appropriate Administration personnel. Each telephone shall be furnished with a hands-free device and be delivered to the Engineer at time of Notice to Proceed, fully activated and operational. They shall remain operational until returned to the Contractor at final acceptance of the entire project in conformance with GP-5.13.

104.21.02 MATERIALS.

Cellular Telephones	As approved by the Engineer

104.21.03 CONSTRUCTION. Not applicable.

104.21.04 MEASUREMENT AND PAYMENT. The number of cellular telephones required for this Contract is zero. The cellular telephones will not be measured but will be incidental to the Contract price for the Engineers Office item. If an item for Engineers Office is not specified, payment for the cellular telephones will be incidental to the payment for Mobilization. In the absence of either item, payment will be incidental to the other items specified in the Contract Documents. The payment will be full compensation for furnishing the telephones and hands-free devices, activation fees, battery replacement, monthly service fees, extended coverage charges, air time (peak and nonpeak time per minute), roaming rates, long distance fees in conformance with the schedules provided, and for all material, labor, equipment, tools, and incidentals necessary to complete the work. If any of the telephones become defective, are stolen, or for any other reasons do not function as intended, they shall be replaced in-kind at no additional cost to the Administration. Nonfunctioning or stolen telephones shall be replaced within eight hours after the Contractor is notified by the Engineer.

Ownership of the telephones will remain with the Contractor. The Administration assumes no responsibility or liability for the condition of the telephones when they are returned.

CATEGORY 100
PRELIMINARY

DELETE: SECTION 107 – CONSTRUCTION STAKEOUT in the Standard Specifications in its entirety.

INSERT: The following.

SECTION 107 — CONSTRUCTION STAKEOUT FOR DESIGN-BUILD PROJECTS

107.01 DESCRIPTION. This work shall consist of furnishing, placing and maintaining construction layout stakes as specified in the Contract Documents or as directed by the Engineer.

The Design-Builder shall, as part of the construction stakeout operation, before any clearing operation commences, demarcate any wetlands and the limit of clearing throughout the entire project as shown in the Contract Documents and labeled as Limit of Clearing or Wetlands to the satisfaction of the Engineer.

Where limits of clearing are not shown in the Contract Documents, the limit of clearing will be the top of cut, toe of slope or limit of ditch excavation.

107.02 MATERIALS. The material for flagging the clearing limits shall be a 3 in. international orange vinyl material with "CLEARING LIMIT" printed on it with 2 in. letters. The material for flagging wetlands shall be the Administration's standard 1-1/2 in. pink and white striped vinyl flagging with "SHA WETLAND" printed on it with blue letters.

107.03 CONSTRUCTION.

107.03.01 Line and Grade.

The Design-Build Engineer will provide the Design-Builder with the following:

(a) Control Points.

(1) Control Points for horizontal and vertical control shall be as shown on the Preliminary Plans.

(b) Structure Stakeout.

(1) A staked out center line or working line, whichever applies, with stations not over 100 ft apart and extending at least 100 ft beyond ends of the structure.

(2) When the structure is on a curve, the Design-Build Engineer will furnish a staked out center line or working line, whichever applies, consisting of stations not over 100 ft apart and including the P.C., P.T., and at least one point on the tangents beyond each end of the curve.

(3) At least two bench marks, one on each end of the structure, will be established by the Design-Build Engineer.

The Design-Builder will provide the following:

(a) Roadway Stakeout.

(1) A staked center line of the roadway with the maximum spacing of stations (stakes, nails, crosses, etc.) of 100 ft.

(2) Establish appropriately spaced bench marks and the necessary references including all points of curvature (P.C.), and points of tangency (P.T.) for the preservation and control of the center line.

Horizontal Referencing:

- The Design-Builder will establish references to all Base Line of Construction Controls. This will include all Points of Curvature (P.C.s) and Points of Tangency (P.T.s).
- Reference points shall be positioned in pairs with the closest point placed Twenty (20) feet outside the limit of construction. Should these points fall beyond the Right of Way Line, approval from the property owner or tenant must be obtained prior to setting. Right angle and radial ties to Baselines are preferred but not required.
- Reference points, typically, shall be Number #5 (five) 5/8”Rebar two (2)feet long with a State Highway Administration(SHA) Yellow Cap affixed to the top. SHA Caps will be supplied by the SHA Plats and Surveys Division. In areas unsuitable for Rebars, markers of a stable, permanent nature shall be used,(crosses in concrete, PK nails, Railroad spikes, etc.) NOTE: Wooden hubs are not to be used for any referencing purpose.
- References, when positioned, shall be hand referenced to local points of permanency (trees, structure corners, utility poles, etc).measured to a 100^{th} of a foot.

Vertical Referencing:

- The Design-Builder will place and establish permanent Bench Marks on structures along the project Baseline. These marks will be pre-stamped Brass Discs supplied by the S.H.A. Plats and Surveys Division and are to be placed in a suitable surface at time of pour and finish. In non-structure areas, permanent points in stable positions (Square cuts in existing concrete, Boat spikes in Power poles / large trees etc.) are acceptable.
- Benches shall be referenced to the Base Line of Construction by Station plus and offset distance.
- Spacing of Vertical Control shall be a minimum of Five (5) per mile.
- Elevations on all Benches shall be established by differential leveling and return Loop check.

NOTE: In the Horizontal and Vertical Referencing process, all work shall be shown and documented in SHA Field Survey book/s supplied by the S.H.A. Plats and Surveys Division. Upon project completion, all books shall be returned to the S.H.A. Plats and Surveys Division for archiving.

For questions regarding the S.H.A'.s specifications for Baseline Referencing or examples of S.H.A. Construction Stakeout bookwork, contact the S.HA.s Plats and Surveys Division in Baltimore, Maryland at 410-545-8940.

107.03.02 Equipment and Personnel. The Design-Builder shall engage a Registered Professional Land Surveyor, licensed in the State of Maryland, to determine all lines and elevations for various parts of the Work. The Surveyor shall have 3 to 5 years experience as a party chief or higher and have demonstrated experience working with the Maryland Plane Coordinate System – NAD 83/91 and NAVD 88, or similar. The surveyor shall use competent personnel and state of the art equipment for all engineering work required to set and maintain the elevations and dimensions as specified in the Contract Documents.

107.03.03 Control Markers. The Design-Builder shall be responsible for preserving the centerline and benchmarks set by the Design-Build Engineer. When the centerline and benchmarks are disturbed or destroyed, they shall be replaced by the Design-Builder at no additional cost to the Administration.

107.03.04 Control Stakes. For roadways as specified in 107.03.01, the Design-Builder shall furnish, set and preserve stakes at each station along each side of the project on the right-of-way or easement line, whichever is furthest from the center line of construction. Where only part of an ultimate dual highway is to be constructed, the stakes on the side of the future improvement shall be set 10 ft beyond the construction limits. On each of these stakes shall be marked its offset distance from the center line and its top elevation or the cut or fill to the profile grade line. Additional stakes as needed for horizontal and

vertical controls necessary for the correct layout of the work shall be set by the Design-Builder.

107.03.05 Layout. For structures as specified in 107.03.01, the Design-Builder shall proceed with the layout work. However, before any actual construction begins, the Design-Builder shall rerun and check the Design-Build Engineer's lines and grades and then establish all center line or working line intersections with the center line or center of bearing of all piers, bents and abutments. From these field layouts, the Design-Builder shall check the proposed span lengths by electronic distance measurement or chaining. When chaining is used, the measurements shall be compensated for temperature, sag, and horizontal alignment. The Design-Builder shall also check the location of the structure to affirm its correct location with relation to existing structures, roads, and existing conditions that are to remain in their original positions. If any discrepancies are found, the Design-Builder shall notify the Design-Build Engineer at once in writing, otherwise, it will be assumed that all planned dimensions, grades and field measurements are correct. All lines established on the ground shall be preserved or referenced, marked, and kept available at all times.

The Design-Builder shall establish the field elevations for all bridge seats and assume responsibility for finishing to proper grade. If any steel beams or girders are incorporated in the project, the Design-Builder shall run elevations over the tops of the beams or girders after they are in place, before any forms are attached to them, to determine the deflection of each member. This information shall then be applied to the deflection diagram to determine the corrected elevation of bottom slab forms and screed supports. After the Design-Builder has assembled this information, it will be checked by the Engineer before final adjustments are made and the placing of any concrete in the forms.

107.03.06 Utilities. The Design-Builder shall furnish to the utility companies or agencies working within the limits of the project, promptly upon request, reference to control points, alignment and grade data, so that they may properly locate and coordinate their work and improvements in relation to the project.

Intersection Utility Stakeout. The Design-Builder shall notify the appropriate agencies listed below a minimum of 72 hours (excluding weekends and holidays) prior to the Design-Builder's anticipated beginning of any underground work.

(a) Request a MISS UTILITY stakeout and possess a valid MISS UTILITY clearance ticket number for any underground work.

(b) Contact all utilities within the limits of the project who are not a member of MISS UTILITY and obtain a stakeout of their respective facilities.

(c) Request the Office of Traffic & Safety's Signal Operations Section to stakeout Administration maintained traffic signal facilities.

(d) Request the District Engineer to stakeout their lighting facilities.

The Design-Builder shall stakeout the proposed construction as indicated in the Contract Documents and allow the Design-Build Engineer to verify location of the proposed facilities.

107.03.07 Right-of-Way and Easement Lines. The Design-Builder shall define only right-of-way and easement lines of the project for adjacent property owners, promptly upon request.

107.03.08 Subgrade, Subbase and Base Controls. The Design-Builder shall furnish for subgrade, subbase and base courses, a string line and grade with fixed controls having a maximum longitudinal and transverse spacing of 25 ft.

The Design-Builder shall place along each form line for cement concrete pavement line and grade with fixed controls not to exceed 25 ft.

107.03.09 Flagging. The flagging shall be placed continuously through wetland areas. In areas where trees are not to be disturbed, the Design-Builder shall individually flag those trees in a line along the clearing limits that are not to be moved or destroyed. If the clearing or wetland flagging has been destroyed and the Engineer determines that its use is still required, the Design-Builder shall reflag the areas

If the Design-Builder does not replace destroyed flagging within 48 hours after notification by the Engineer that replacement flagging is needed, the Engineer may proceed to have the area reflagged. The cost of the reflagging by the Engineer will be charged to the Design-Builder and deducted from any monies due under the Contract.

At the completion of construction, the Design-Builder shall remove all flagging.

107.04 MEASUREMENT AND PAYMENT. Payment for all work for Construction Stakeout FOR Design-Build Projects shall be included in the Lump Sum Price shown on the Schedule of Prices for the all-inclusive Project Lump Sum. The payment will be full compensation for furnishing, placing and maintaining construction layout stakes, flagging of clearing limits and wetlands, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

CATEGORY 100
PRELIMINARY

SECTION 107 — CONSTRUCTION STAKEOUT FOR DESIGN-BUILD PROJECTS

107.03 CONSTRUCTION.

ADD: The following.

107.03.10 Traffic Control Devices. For installation of Traffic Control Devices, arrange a meeting with the Engineer and representatives from the Traffic Operations Division to stakeout all items indicated on the sketches, plans, and in the Special Provisions. This meeting shall occur prior to any work after the notice to proceed. No work shall proceed before the stakeout is approved by the Engineer.

107.04 MEASUREMENT AND PAYMENT.

ADD: The following.

Intersection Utility Stakeout. Intersection utility stakeout for traffic control devices will not be measured but the cost will be incidental to other pertinent items specified in the Contract Documents.

CATEGORY 100
PRELIMINARY

DELETE: SECTION 109 — CRITICAL PATH METHOD PROJECT SCHEDULE in the Standard Specifications in its entirety.

INSERT: The following.

SECTION 109 ─ CRITICAL PATH METHOD PROJECT SCHEDULE DESIGN-BUILD

109.01 DESCRIPTION. Plan, schedule, and construct the project by using a Critical Path Method Project Schedule (CPM). Use the CPM for coordinating and monitoring the work specified in the Contract Documents including all activities of subcontractors, vendors, suppliers, utilities, railroads, the Administration, and all other parties associated with the construction of the Contract. The CPM schedule shall be used for coordinating activities for both design and construction tasks by incorporating all activities into one CPM schedule. All work including but not limited to activities associated with design elements, milestones, permits, utility relocations, and submittals shall be represented by schedule activities. All work including but not limited to submittals, major procurement, delivery, and construction activities shall be included. All appropriate schedule logic relationships between the design element activities and the corresponding construction activities shall be shown. Base the CPM upon the entirety of the Contract Documents. Utilize CPM software that generates files compatible with Primavera Project Planner.

Float. The CPM utilizes float. Float is defined as the amount of time between when an activity "can start or finish" and when an activity "must start or finish". Float is a shared commodity for the use of the Administration and the Design-Build Team and is not for the exclusive use or benefit of either party. Both parties have the full use of the float until depleted.

Scheduling Representative. Designate a scheduling representative prior to submission of the Initial Critical Path Method Project Schedule (ICPM). The scheduling representative is the person primarily responsible for development and maintenance of the CPM schedule, the Design-Build Team's representative in all matters regarding the schedule, and the designated attendee for all schedule related meetings. Replacement of the scheduling representative will require written approval from the Administration.

Submit the qualifications of the scheduling representative to the Administration for approval. This approval is required before the ICPM will be accepted. The scheduling representative shall have at least three years of verifiable experience for preparing and maintaining CPM project schedules on Contracts of similar size and complexity.

Initial Critical Path Method Project Schedule (ICPM). The ICPM shall consist of:

(a) A time scaled diagram of acceptable scale and format that is acceptable to the Engineer. Clearly label and identify each activity. Show all relationships between activities.

(b) Tabular reports with activities sorted as follows:

(1) Activity ID. Provide predecessors and successors for each activity with leads and lags shown.

(2) Activity ID. Provide and clearly define the resources assigned to each activity.

(3) Early Start, Total Float.

(4) Total Float, Early Start.

(5) Project Area (if applicable).

(6) Project Phase (if applicable).

(7) Responsibility, e.g., Design-Build Firm, Designer, Constructor, specific subcontractor, specific supplier, the Administration, etc.

Provide in the header of each tabular report: the project name, Contract number, data date, run date and number, and report type.

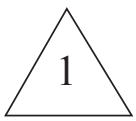
Provide in the body of each report: the activity identification, activity description, original and remaining duration, early/late start and finish dates, percent complete, actual start/finish dates, total float, and calendar designation for every activity.

(c) Written Narrative (WN). Comply with the requirements described hereinafter.

(d) Printed Calendars. Include a listing, description, and calendar form tabulation of all calendars used. Include the total number of anticipated work days required to complete the Contract work.

Delineate holidays and anticipated nonwork days or periods. Explain in the WN the basis for determining each nonwork day or period.

(e) A data disc containing all of the information contained in the ICPM and in a format compatible with Primavera Project Planner software. All construction activities shall have durations not exceeding 10 working days, unless otherwise approved. Activities representing review and approval of construction submittals by the Administration shall be given a duration of not less than 30 calendar days. Activities representing review and approval of design submittals by the Administration shall be given a duration of not less than 45 calendar days. A short list of highly critical approval activities may be submitted. The Engineer will make every effort to expedite the approval of these submittals; however, this will not alter the requirement to include 30 calendar days for design submittal approvals and 45 calendar days for construction submittal approvals. Schedule the duration for activities such as curing and pre-load in calendar days. Durations for procurement activities will be evaluated on a case-by-case basis.



The latest calculated early finish date in the ICPM shall equal the calendar date for completion specified in the Contract Documents. If an earlier completion date is submitted, the Administration, upon approval of the ICPM, will issue a change order to adjust the Contract time to the completion date shown on the ICPM.

Resource load all construction activities in the schedule with the material, equipment, and manpower planned to be utilized in accomplishing each activity. Provide a full explanation of the resource loading in the WN.

The Engineer reserves the right to specify the number of activities and to require an additional breakdown of the activities at any time.

Utilize activity codes to categorize activities by at least the following: project area; construction phase; design phase; and responsibility, e.g. Design-Build Firm or specific subcontractors.

Provide a WN as part of the ICPM. Explain the sequence of work, the critical path, interim completion dates, project phasing, nonwork days or periods, maintenance of traffic, and labor and equipment resources. Explain how the ICPM provides for permit requirements, environmental requirements, coordination with other public Contractors, milestone dates (for the Contract or other related contracts), coordination with other entities, coordination with all utility companies, special nonwork days or periods, and weather. Explain the specific scope of each activity and the basis used to determine the original duration of each activity, i.e. production rates and anticipated quantities. Address all activities quantified in the Contract Documents. Explain the following in the WN.

(a) Relationships between activities not obviously identified.

(b) Equipment usage and limitations.

(c) Manpower usage and limitations.

(d) Use of additional shifts and overtime.

(e) Activity codes, abbreviations, and activity identification system.

(f) All calendars utilized in the CPM.

(g) Date or time constraints.

(h) All abbreviations.

(i) Use of calendars.

(j) Scheduling of weather and temperature sensitive activities.

(k) Design Phase/milestone dates.

Complete and submit the proposed ICPM within 30 calendar days after receiving the Notice of Award. Submit five sets of all required information for review and acceptance. Do not start any work until the ICPM is accepted. Upon issuance of the Notice to Proceed, the start date utilized in the ICPM will be adjusted to comply with the Notice to Proceed.

The Engineer will complete the review of the ICPM within 30 calendar days after submittal. If required, a Joint Review Conference will be convened at which time the Engineer and Design-Build Firm may make corrections and adjustments to the proposed ICPM. If a revision is necessary due to the Engineer's review or the Joint Review Conference, submit the proposed revision within seven calendar days after receiving the Engineer's review comments or within seven calendar days after the date of the

Joint Review Conference, whichever is the latest. Make revisions in accordance with the requirements for the ICPM. The Engineer will respond to the revised ICPM within seven calendar days after receipt.

Any delay in starting work caused by the acceptance of the ICPM by the Engineer will not be considered as a basis for any adjustment in the Contract amount or time.

Upon notification that the ICPM has been accepted, that document will become the CPM of record. The CPM of record shall be the Design-Build Firm's work plan for completing the entire Contract as specified in the Contract Documents.

Failure to adhere to the CPM of record will be cause for the Administration to deny requests for additional compensation or extensions of the Contract duration and may result in the withholding of pay estimates.

CPM Updates. Provide monthly updates of the CPM of record. Update submissions shall include the activity data as specified in (a) through (e) of the ICPM. Use the update to describe the progress to date. The WN shall include a description of the work performed during the update periods, current critical path, the amount of float on the critical path, any delays or disruptions experienced during the period of the update, any change in manpower or equipment, and any potential delays or disruptions.

The scheduling representative and the Engineer will meet to review, mutually agree to, and sign-off on the information required to update the schedule (actual start and finish dates, remaining durations, and percentages complete). Use an acceptable update form. The data date for each update shall be seven days prior to the cut-off date of the pay estimate for that month. Submit the update within seven calendar days from the data date. Failure to submit the update on a timely basis may result in the withholding of pay estimates. Upon acceptance by the Engineer, the update shall become the CPM of record for the period between its data date and the data date of the next approved update or revision.

Do not include any revisions to the CPM without prior approval.

Revisions to the Schedule of Record. Revisions are defined as one or more of the following:

(a) A change in the original duration of an activity.

(b) A change in the logic of the schedule.

(c) A change in the calendars or to the calendar to which an activity is assigned.

(d) A change to resources.

(e) A change to any actual date, previously established.

(f) The deletion or addition of an activity.

(g) A change to, addition of, or deletion of a date or time constraint.

(h) A change to, addition of, or deletion of an activity code.

(i) A change to an activity description.

(j) Any change other than updating an activity.

Discuss any proposed revision to the CPM verbally with the Engineer. If the revision is minor in nature, the Engineer may allow the revision to be included on the next Update of the CPM. If the Engineer determines that the revision is not minor in nature, submit the proposed revision for review and approval prior to deviating from the approved CPM.

When a revision to the CPM is required due to changes in the Contract initiated by the Engineer, immediately contact the Engineer to discuss the changes. If the revision is minor in nature, the Engineer may allow the revision to be included on the next Update of the CPM. If the Engineer determines that the revision is not minor in nature, submit the proposed revision for review and approval prior to deviating from the approved CPM.

The Engineer may allow a deviation from the approved CPM for specific mitigating activities.

Submit the proposed revision in the same format and with the same requirements used for the ICPM. The proposed revision shall be made to the CPM of record at the time the revision is made, i.e. the revision shall include all update information and revisions previously approved and the additional progress to the date of the revision. The WN accompanying the proposed revision shall describe the reason for the revision, the resulting critical path, and all particulars of the revision. These shall include but not be limited to changes in the method or manner of the work, changes in specifications, changes in resources, addition or deletion of work, increased or decreased quantities, defective work, and acceleration of the work.

The Engineer will review and respond to the proposed revision within 14 calendar days after receipt. Resubmit, if required, within seven calendar days after receipt of the Engineer's review comments. The Administration reserves the right to reject any proposed revision that adversely impacts the Administration, utilities, or other concerned parties.

Extensions of Contract Time. Make requests for extension of Contract time in writing and subject to the notice and timeliness of submission provisions as provided for elsewhere in the Contract. Requests for an extension of Contract time will be evaluated by the Engineer's analysis of the CPM of record and any proposed revision submitted. The request shall include a WN of the events, which would require an extension of the Contract time.

Only delays to activities that affect the Contract completion date will be considered for an extension of Contract time. The extension of the specified Contract completion date will be based upon the number of calendar days the Contract completion date is impacted as determined by the Engineer's analysis.

When an acceptable Update or Revision is not submitted within the time limits prescribed above, pay estimates may be withheld until an acceptable Update or Revision is submitted.

109.02 MATERIALS. Not Applicable.

109.03 CONSTRUCTION. Not Applicable.

109.04 MEASUREMENT AND PAYMENT. Payment for the accepted Initial Critical Path Method Project Schedule, Critical Path Method Project Schedule Revisions, and all accepted Critical Path Method Project Schedule Updates shall be included in the Contract Lump Sum Price for the Design-Build item.

CATEGORY 111
MATERIALS

SECTION 111 —SAMPLING DEVICES, TESTING AND SAFETY EQUIPMENT

111.03 CONSTRUCTION

DELETE: Subsection (g) in its entirety.

INSERT: The following.

(g) Sampling Asphalt Mixtures prior to Compaction (MSMT 457).

(1) A 25ft. measuring tape.
(2) Random selection cards numbered from 0 to width of the paving lane in 1 ft. increments.
(3) 10 x 6 x 12" sample boxes
(4) One-gallon plastic wide-mouth jugs.
(5) Core storage containers.
(6) Spatula.
(7) Spray paint or other suitable marking material.
(8) GPS equipment.
(9) Infrared Surface thermometers, NIST Traceable Calibration, backlit, handheld/pistol grip (-4°F to minimum 400°F, 1.5% accuracy).
(10) Square end shovel, fire shovel, or grain shovel.
(11) Scoop.
(12) 24 ft. of 18-gauge mechanical wire or equivalent to tie through each hole of the plate template.
(13) Masonry nails or equivalent per MSMT 457, Method A.

CATEGORY 100
PRELIMINARY

SECTION 113 — DIGITAL CAMERA

113.01 DESCRIPTION. Furnish and maintain new or like new digital cameras for use by Administration personnel. For projects that do not include an Engineer's Office, furnish one color printer. The digital cameras and printer shall be delivered to the Engineer at the time of the Notice to Proceed. They shall remain operational and not be returned to the Contractor until final acceptance of the entire project, in conformance with GP-5.13.

113.02 MATERIALS.

(a) Digital Camera. Each digital camera shall meet the following minimum requirements and be furnished with the specified accessories:

(1) Photo Managing Software.

(2) 16.0 megapixel image resolution and 5X optical zoom.

(3) AC adapter, 2 sets of rechargeable batteries, and battery charger.

(4) 16 GB SD Card or memory stick with all items required for downloading.

(5) Lens Cover, Shoulder Strap, and Carrying Case.

(b) Color Printer. The printer shall have at least 8 MB RAM, 2400 x 1200 dpi resolution, a color print speed of 13 ppm, and a duty cycle of 5,000 pages/month.

113.03 CONSTRUCTION. Not applicable.

113.04 MEASUREMENT AND PAYMENT. The number of digital cameras required for this project is _2_. The digital cameras and printer will not be measured but the cost will be incidental to the Contract price for the Engineers Office item. If an item for Engineers Office is not specified, payment will be incidental to the payment for Mobilization. In the absence of either item, payment will be incidental to the other items specified in the Contract Documents. If a digital camera or printer becomes defective, is stolen, or for any other reason does not function as intended, it shall be replaced with an approved camera or printer at no additional cost to the Administration. A nonfunctioning or stolen camera or printer shall be replaced by the SHA Project prime contractor within 5 days after the Engineer notifies the Contractor.

Ownership of the camera(s) and printer(s) will be with the assigned SHA project personnel during the progression of the project. Pictures and removable media will be the property of the State Highway Administration. The State Highway Administration assumes neither responsibility nor liability for the condition of the camera when returned after project is satisfactorily completed.

CATEGORY 200
GRADING

SECTION 200 — INTELLIGENT COMPACTION FOR EMBANKMENTS

DESCRIPTION. Construct fill embankments with soils and unbounded aggregate utilizing Intelligent Compaction (IC) processes within the project limits. IC uses vibratory rollers equipped with a measurement/ documentation system to record various critical compaction parameters during the compaction process.

Provide rollers and other associated equipment necessary to complete the compaction requirements. The IC rollers may be utilized during production with other standard compaction equipment and shall be used for the evaluation of the compaction operations.

EQUIPMENT. Refer to the equipment manufacturers' operating instructions and the following:

Intelligent Compaction (IC) Rollers.

(a) IC rollers shall be self-propelled single-drum vibratory rollers equipped with accelerometers mounted in or about the drum to measure the interactions between the rollers and compacted materials in order to evaluate the applied compaction effort. IC rollers may be smooth or pad footed drums.

(b) The output from the roller is designated as the Intelligent Compaction Measurement Value, which represents the stiffness/modulus of the materials based on the vibration of the roller drums and the resulting response from the underlying materials.

(c) Real Time Kinematic Global Position System (GPS) radio and receiver units shall be mounted on each IC roller to monitor the drum locations and track the number of roller passes.

(d) The IC rollers shall include an integrated on-board documentation system that is capable of displaying real-time color-coded maps of IC measurement values including the stiffness/modulus response values, location of the roller, number of roller passes, roller speeds, together with the vibration frequency and amplitude of roller drums.

(e) The display unit shall be capable of transferring the data by means of a USB port.

Real Time Kinematic Global Position System (RTK-GPS). The Universal Transverse Mercator (UTM) is a metric-based, 2-dimentional Cartesian coordinates system that uses projection

techniques to transform an ellipsoidal surface to a flat map the can be printed on paper or displayed on a computer screen.
Geodetic Coordinates: A coordinate system to describe a position in longitude, latitude, and altitude based on specific geodetic datum.

Base Station. A single ground-based system that consists of a GPS receiver, GPS antenna, radio, and radio antenna to provide L1/L2 differential GPS correction signals to other GPS receivers within a range limited by radio, typically 3 miles (4.8 Km) in radius without repeaters.

Rover. A portable GPS radio/ receiver for in- situ point measurements shall be provided and operated by the contractor.

Data Analysis Software. The software program will analyze the data from the IC roller for coverage, uniformity, and stiffness/modulus values. Provide the following Essential IC Data Information and IC Data Elements.

(a) Essential IC Data Header Information.

(b) Essential IC Data Elements.

CONSTRUCTION. Refer to Section 204 and the following:

Quality Control Plan. Prepare and submit a written Quality Control Plan (QCP) for the project. Embankment operations shall not begin before the QCP has been accepted. The QCP shall contain the following:

General Requirements.

(a) State how the contractor proposes to control the materials, equipment, and construction operations to complete the embankment construction.

(b) Include an organizational chart showing all Quality Control (QC) personnel.

(c) The QCP shall be signed and dated by the Contractor's representative when submitted.

(d) Submit the QCP no later than 15 days prior to the start of embankment construction.

(e) The QCP shall contain the name, telephone number, duties, and employer of all QC personnel necessary to implement the QCP. The minimum qualification of quality control personnel are as follows:

(1) QCP Field Manager or Plan Administrator. The person responsible for the execution of the QCP. The Field Manager shall have a minimum of 5 years experience in quality control activities in construction operations.

(2) IC Roller Operator. The person responsible for operating the IC roller and attached IC equipment. Sufficient training for the roller operator shall be supplied by the equipment manufacturer.

(3) One person may perform the duties of the Field Manager and the QC technician.

(4) IC Equipment. The Roller supplier, make, roller model, number of IC rollers to be provided, and the GPS system.

Ineffective or unqualified equipment or QC personnel may be replaced as determined by the Engineer. Construction operations may be halted until corrective actions are taken.

Quality Control Technician (QCT). The QCT shall be responsible for the following:

(a) GPS check testing for the IC rollers and rovers.

(b) Test Section construction establishing target values for all specified sampling and testing procedures.

(c) Monitoring of the construction operations and the IC roller(s) during production and final proofing operations.

(d) Quality Control sampling and testing.

(e) Downloading and analysis of the IC-data from the roller(s).

Testing Facility. Refer to 915.01.06

Materials Sampling and Testing. The procedures for sampling and testing the embankment and the frequency of tests are as directed and as follows:

(a) Moisture. Per T 272. The minimum frequency of tests per lift of material shall be three tests for each construction area. Tests results shall be within ±2 percent of the optimum moisture content.

(b) Strength. Per D 6951, E 2583 or E 2835, and T 310. The minimum frequency of tests shall be a minimum of one test for each 1000 cubic yards.

(c) Maximum Dry Density and Optimum Moisture Content. Per T 180 C or D. Additional testing may be required when test results indicate a change in soil type.

(d) IC Roller Data. The frequency of obtaining the data shall be a minimum of two times each day or as determined.

Provide procedures in the QCP detailing corrective actions for when the test results do not meet the specified requirements.

GPS Check Testing. The contractor, GPS representative and IC roller manufacturer shall conduct a check to ensure the proper setup of the GPS, IC rollers and the rovers prior to the start of construction.

Test Sections. Construct a test section to determine the number of passes required to achieve compaction at the optimum moisture content.

(a) Test sections shall be approximately 150 ft long and 12 ft wide and may be part of the initial production operations.

(b) The IC roller shall be used on the test sections to establish the target modulus/stiffness or CCV/CMV as correlated with standard testing devices.

(c) GPS measurements for all testing devices will be obtained with the rover for correlation to the modulus/stiffness or IC-CMV.

(d)) Place fill in accordance with Section 204.

(e) The use of an in-situ device, nuclear gauge, LWD or plate load tests is required to validate the IC target stiffness/modulus or CMV values.

Mapping. Map/proof the initial layer of the fill to identify weak areas that may need to be addressed in advance of the production fill operations and to provide information regarding the stiffness of the existing roadway. Subsequent mapping may be conducted to address changes in the fill that affect the target IC-MV. Modulus/ stiffness or the density.

IC Construction Operations Criteria. A minimum coverage of 90% of the individual construction area shall meet the optimal number of roller passes and 70% of the target IC-MV.

Soil Management. Refer to Sections 203 and 204.

Documentation. Provide the following documentation within 24 hours.

(a) Quality Control Tests. All QC test results shall be signed by the QCT.

(b) Equipment. The type of rollers used each day of soil compaction and the IC roller used for mapping the compaction of the soil. Also, note the positioning of the IC roller(s) during the compaction operations.

(c) IC Roller Data. Provide the data from IC roller(s) and the data analysis software for the Test Section, Mapping and individual IC construction area operations.

(d) Modulus/ Stiffness or IC-MV Analysis. Analyze the IC-MV data for conformance to the requirements for coverage area and uniformity. Submit the results from the software in both all passes and proofing data files. All passes data includes the data from all of the passes and proofing data is the data from the last pass within a given area at the completion of the individual IC construction area operations.

MEASUREMENT AND PAYMENT. Intelligent Compaction for Embankments will not be measured but paid as a lump sum for providing for the Intelligent Compaction on the project. Payment includes all costs related to providing the IC roller including the fuel, roller operator, GPS system, or any other equipment required for the IC process, all quality control procedures including IC rollers and GPS systems representatives support, on-site training and the testing facility.

CATEGORY 200
GRADING

SECTION 200 – Soil Nailing

DESCRIPTION. This work shall consist of designing and constructing a permanent soil nail system as specified herein. The Contractor shall furnish all labor, plans, drawings, design calculations and all other materials and equipment required to design and construct the soil nail system in accordance with this specification. Soil Nails shall be inserted into existing soil masses by high-pressure air or nails can be self drilling. The soil nails reinforce locally unstable shallow soil sloughs by transferring the tensile and shear resistance developed by the soil nails from the stable side of the slip plan to the unstable side. The soil nails shall be installed to the limits shown on the plans or as determined by the Engineer.

MATERIALS.

Soil Nails. The Contractor can opt to use one of the following depending the approved design.

1. **Launched Soil Nails:** Furnish launched soil nails composed of a 1.5 inch outside diameter, 0.120 inch wall thickness, hot-dipped galvanized, 36ksi steel tube. When applicable, provide perforated tubes that can serve as both horizontal drains and as tensile elements. Do not reuse excess cutoffs from previously launched nails.

2. **Permanently Cased Soil Nails**: Furnish permanently cased soil nails that are a three stage construction including installation of (1) an outer tube (minimum 1.5 inch outside diameter, minimum 0.120 inch wall thickness hot-dipped galvanized steel tube that is mechanically deformed, threaded, or specially galvanized through a drossing process to produce a plurality of surficial asperities); (2) neat cement grout that completely fills the outer tube; and (3) an inner bar consisting of epoxy coated, #6 (or greater) grade 60 or grade 75 rebar or thread bar depending on final design load. When applicable, provide perforated tubes that can be pressure grouted.

3. **Self Drilling Soil Nails:** Furnish self drilling soil nails that consist of a hollow, threaded bar with a sacrificial drill bit. Multiple bars may be coupled to produce final length. Bar thread pattern should be continuous and conform to the pullout requirements of ASTM A 615. Bar outer diameters shall be a minimum of 1.5 inches and up to and 3 inches depending on design load.

Bearing Plates AASHTO M183

Plate Material: ASTM A36 Steel or stronger
Plate Coating: Hot dip galvanized in accordance with ASTM A153/A123
Plate Thickness: 3/8 or 1/2 inch, depending on design

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Plate dimensions: Square or Diamond Shaped, minimum area 48 square inches

Shotcrete 423

Welded Wire fabric AASHTO M55

Wire Strength: 75 ksi or greater

Wire Coating: Minimum of 0.8 ounces/square foot (as determined by ASTM A-90) Zinc/Aluminum Alloy (as per ASTM B750-09). Plain hot-dip galvanized is not acceptable. Mesh Opening Size: 2.56 inches or smaller (using maximum circle method), area of opening shall not be less than 8.2 square inches

Grout. Grout shall consist of 846 lb/yd^3 of Type II portland cement, 6 $\pm$ 1 percent air entrainment by volume, mortar sand aggregate, and water proportioned to provide a pumpable mixture. The 28 day compressive strength shall be 3500 psi minimum.

DESIGN REQUIREMENTS

The Contractor's design shall be performed by a professional Geotechnical Engineer licensed in the State of Maryland with experience in the design and construction of permanent soil nail walls.

Design the soil nail system using Allowable Stress Design (ASD) method as outlined in FHWA's Geotechnical Engineering Circular No.7 "Soil Nail Walls". Refer to applicable FHWA documents such as FHWA – FPL -93-003 "Application Guideline for Launched Soil Nails" for additional guidelines. The Contractor's design calculations shall demonstrate that a minimum factor of safety of 1.3 against global slope failure shall be attained with the design spacing, length etc of the soil nails.

CONSTRUCTION.

The Contractor shall have completed at least 3 permanent soil nail system projects during the past 3 years totaling at least 10,000 square feet of face area and at least 500 permanent soil nails. Follow the following general guidelines for construction;

1. **Launched Nails**: Furnish launched galvanized soil nails, and equipment and incidentals necessary to complete work. Insert Launched Nails with a single stroke at a chamber pressure between 750 and 3000 psi. Inserted length and spacing shall be determined based upon the shop drawings submitted for the area. Do not leave more than 4 feet of launched soil nail exposed after launching unless approved by the Engineer. Cut off the exposed portion of installed nails for inclusion into shotcrete or flush to ground in the case of no shotcrete work when not required

by plans. Do not reuse remaining lengths from cut nails for Launched Soil Nails. The Contractor bears the risk of unforeseen groundwater or adverse launching conditions.

2. **Permanently Cased Soil Nails**: Permanently cased soil nails shall be constructed by launching an outer tube with a single stroke at a chamber pressure between 750 and 3000 psi or by drilling a hole to prescribed depth at the prescribed location as shown on the plans, inserting a 1.5 inch (or larger) outside diameter steel pipe (Outer Tube) to stabilize the drill hole, fully encasing the inside of the outer tube with grout and immediately inserting an epoxy coated #6 (or larger depending on required tensile strength) reinforcing bar as the inner bar. Provide perforated tube and grout under pressure. The Contractor bears the risk of unforeseen groundwater or adverse launching or drilling/casing conditions, including excess grout take.

3. **Self Drilling Soil Nails**: Use drilling rigs capable of drilling through materials to be encountered to the dimensions and orientations required for the soil nail design. Drill straight and clean holes at locations shown in the accepted submittals. Drill hole locations and inclinations are required to be within 6" (150 mm) and 5 degrees, respectively, of that shown in the accepted submittals unless approved otherwise by the Engineer. Drill all self drilling nails with continuous grout injection unless approved otherwise by the Engineer. The Contractor bears the risk of unforeseen groundwater or adverse drilling conditions, including excess grout take.

4. **Welded Wire Fabric:** The mesh shall be stretched tight across the slope and over the nail tips. Shallow depressions at least 12 inches in diameter and at least 8 inches deep shall be dug around the nail tips. Galvanized steel plates shall be installed over the nail.

5. **Shotcrete:** Construct shotcrete with the thickness shown on the approved Contractor's shop drawings with welded wire fabric. Clean the face of the excavation and other surfaces to be shotcreted of loose materials, mud, rebound, overspray or other foreign matter that could prevent or reduce shotcrete bond. Protect adjacent surfaces from overspray during shooting. Avoid loosening, cracking, or shattering the ground during excavation and cleaning. Remove any surface material that is so loosened or damaged to a sufficient depth to provide a base that is suitable to receive the shotcrete. Remove material that loosens as the shotcrete is applied. Do not place shotcrete on frozen surfaces.

   Maintain a clean, dry, oil-free supply of compressed air sufficient for maintaining adequate nozzle velocity at all times. Use equipment capable of delivering the premixed material accurately, uniformly, and continuously through the delivery hose. Control shotcrete application thickness, nozzle technique, air pressure, and rate of shotcrete placement to prevent sagging or sloughing of freshly-applied shotcrete.

Orient nozzle at a distance and approximately perpendicular to the working face so that rebound will be minimal and compaction will be maximized. Pay special attention to encapsulating reinforcement. Do not work rebound back into the construction. Where shotcrete is used to complete the top ungrouted zone of the nail drill hole near the face, position the nozzle into the collar of the drill hole to completely fill the void.

A clearly defined pattern of continuous horizontal or vertical ridges or depressions at the reinforcing elements after they are covered with shotcrete will be considered an indication of insufficient reinforcement cover or poor nozzle techniques. In this case immediately suspend the application of shotcrete and implement corrective measures before resuming the shotcrete operations. Correct the shotcreting procedure by adjusting the nozzle distance and orientation, by insuring adequate cover over the reinforcement, by adjusting the water content of the shotcrete mix or other means.

Repair shotcrete surface defects as soon as possible after placement. Remove and replace shotcrete that exhibits segregation, honeycombing, lamination, voids, or sand pockets. In-place shotcrete not meeting the specified strength requirement will be subject to remediation. Possible remediation options include placement of additional shotcrete thickness or removal and replacement, at no additional cost to SHA.

Clean and wet the surface of a joint before adjacent shotcrete is applied. Where shotcrete is used to complete the top ungrouted zone of the nail drill hole near the face, to the maximum extent practical, clean and dampen the upper grout surface to receive shotcrete, similar to a construction joint.

Do not install shotcrete if the ground is frozen. Maintain cold weather protection if the temperature after placement is below 40°F until the in-place compressive strength of the shotcrete is greater than 725 psi. Cold weather protection may require blankets, heating under tents, or other means acceptable to the Engineer. Deposit the shotcrete mix at a temperature of not less than 40°F or more than 100°F.

Suspend shotcrete application during high winds and heavy rains unless suitable protective covers, enclosures or wind breaks are installed. Remove and replace newly placed shotcrete exposed to rain that washes out cement or otherwise makes the shotcrete unacceptable. Provide a polyethylene film or equivalent to protect the work from exposure to adverse weather.

Use 6 to 12 inch strip drains full width of shotcrete (down slope) at six foot centers to eliminate water build-up behind the shotcrete. Strip drain shall be fully encased in filter media. Drains shall extend beyond the face of the shotcrete at the downhill face. Ensure that bottom ends are open and free of shotcrete.

SOIL NAIL SAMPLING AND TESTING

Acceptance of the soil nails will be by the Contractor's certification to SHA stating the material composition and installation conforms to these specifications, combined with visual inspection of the in place soil nails and shotcrete by SHA. SHA reserves the right to require testing by the Contractor. Any requested testing of the soil nail shall follow appropriate procedures as outlined in FHWA Geotechnical Engineering Circular No. 7 and manufacturer's recommendations. Materials found not in compliance with the requirements of this Contract shall be rejected, removed and replaced at the Contractors expense.

Soil nails that do not penetrate minimum design length from the slope surface shall be rejected. Do not remove nails which do not meet minimum design length. An additional nail will be installed within an 18 in. radius of the rejected soil nail.

SUBMITTALS.

Submit the documentations outlined below at least 45 days prior to the start of construction of soil nailing. The contractor is responsible for detailing the general layout of the proposed soil nail wall system. Working drawings shall conform to TC-4.01.

Additional time required due to incomplete or unacceptable submittals shall not be cause for time extension, impact, or delay claims. All costs associated with incomplete or unacceptable submittals shall be at no additional cost to SHA.

Prepare and submit two copies of the submittal. One copy should be submitted to the Engineer. Submit the 2nd copy to the following:

Maryland State Highway Administration
Engineering Geology Division
7450 Traffic Drive
Hanover, MD 21076

Approval of the above submittals does not relieve the Contractor of his responsibility for the successful completion of the work.

The submittal shall include:

A. The Contractor shall submit a brief description of at least 3 projects, including the owner agency's name, address, and current phone number; location of project; project contract square foot of soil nail system installed including number of soil nails; and scheduled completion date and actual completion date for the project.

B. Design plans, shop drawings and design computations shall be prepared and signed by a registered Professional Engineer licensed in the State of Maryland. Plans and calculations shall include the following;:

1. An elevation view indicating elevations at top and bottom of soil nail wall.
2. Length, size, and spacing of soil nails.
3. All culverts, utilities, signs, lights, etc. that affect the soil nail system.
4. Any general notes required for construction of the soil nail.
5. Slope stability computations, including computer output, and an explanation of assumptions and analysis details within the program.
6. Cross section plots showing critical failure planes for internal and global failure modes; and a summary of the critical failure surface(s) search.
7. Cross section plots showing critical failure planes for internal and global failure modes; and a summary of the critical failure surface(s) search.
8. Sliding stability computations.
9. Pullout computations.

C. The Contractor is responsible for providing the necessary survey and alignment control; nail locations, and verifying limits of soil nail installation. Submit a Construction work Plan to the Engineer that includes the following.

1. The start date and proposed detailed wall construction sequence.
2. Drilling and grouting methods and equipment, including the drill hole diameter proposed to achieve the specified pullout resistance values shown on the plans and any variation of these along the wall alignment.
3. Nail grout mix design, including compressive strength test results (per AASHTO T106/ASTM C109) supplied by a qualified independent testing lab verifying the specified minimum 3-day and 28-day grout compressive strengths. Previous test results for the same grout mix completed within one year of the start of grouting may be submitted for verification of the required compressive strengths.
4. Nail grout placement procedures and equipment.
5. Shotcrete materials and methods.
6. Soil nails testing methods and equipment setup.
7. Identification number and certified calibration records for each test jack and pressure gauge and load cell to be used. Jack and pressure gauge shall be calibrated as a unit. Calibration records shall include the date tested, the device identification number, and the calibration test results and shall be certified for an accuracy of at least 2 percent of the applied certification loads by a qualified Independent testing laboratory within 90 days prior to submittal.
8. Manufacturer Certificates of Compliance for the soil nail ultimate strength, nail bar steel, Portland cement, centralizers, bearing plates, epoxy coating, and encapsulation.

MEASUREMENT AND PAYMENT

The soil nail system measured for payment will be the nearest whole number of square feet of treated slope face between within the limits shown on the plans or as determined by the Engineer. Payment will be full compensation for design, working drawings, on-site representation, preparation of the site, mobilization, geotechnical investigation, supply and installation of strip drains, soil nails, shotcrete and welded wire fabric, bearing plates, grout, and for all other material, labor, equipment, tools, and incidentals necessary to complete the work.

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CATEGORY 200
GRADING

SECTION 200 – GEOTEXTILE INCLUSION

DESCRIPTION. Furnish and Install geotextile inclusions in fill embankments to the lines and grades shown on the plans or as directed.

MATERIALS.

Geotextile Inclusions.: Class SD Type II Nonwoven 921.09

CONSTRUCTION.

The geotextile inclusions are to be used as a compaction aid and installed per the manufacturers' recommendations. Geotextile inclusions shall be minimum 12 feet in width. The vertical spacing of the geotextile inclusions shall be 3 ft. Place geotextile inclusions concurrently with the embankment material.

Unroll the geotextile onto the horizontal fill surface; parallel the centerline of the embankment. The outside edge of the geotextile shall be within 1 ft of the finished slope face. Pull the geotextile tight prior to backfilling. The geotextile shall be held in position by suitable means until the subsequent soil layer can be placed.

Do not allow tracked construction equipment to operate on the exposed geosynthetic. Place a minimum of 6 inches of uncompacted fill on the geotextile before operating tracked vehicles over the geosynthetic. Keep turning of tracked vehicles to a minimum to prevent tracks from displacing the fill and the geosynthetic. Rubber-tired equipment may pass over the exposed geosynthetic at speeds of less than 10 mph. Avoid sudden braking and sharp turns.

MEASUREMENT AND PAYMENT.

Geotextile inclusions will be measured and paid for at the Contract unit price per square yard of geotextile placed. The payment shall be full compensation for all material, labor, equipment, tools and incidentals necessary for the placement of geotextiles

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CATEGORY 200
GRADING

SECTION 200 – Reinforced Soil Slope

DESCRIPTION. This work shall consist of design, furnishing materials and construction of Reinforced Soil Slope (RSS) to the lines and grades shown on the Plans, cross sections and/or as directed by the Engineer using Geosynthetic Reinforcement. The term "Geosynthetic Reinforcement" shall be considered to be inclusive of geotextile and geogrids and shall be applicable to both primary and secondary reinforcements as shown on the plans.

MATERIALS.

Geosynthetic Reinforcement.	900
Wire for Welded Wire Face	AASHTO M55

Reinforced Fill Material. The reinforced fill material for Reinforced Soil Slopes shall conform to the following requirement:

	Requirement	
Gradation	Sieve Size	Percent Passing(by mass)
	2"	100
	No. 4	50 (max)
	No. 200	7 - 12
PI	Less than 5%	
PH	3-9 (AASHTO T 289)	

AASHTO A-2-6, A-2-7, A-4, A-5, A-6 and A-7 materials are not acceptable as reinforced fill material. The reinforced fill material shall be free from organic, recycled and other deleterious materials.

CONSTRUCTION.

The Contractor shall design and construct the RSS in conformance with the typical sections shown on the plans and the following design and construction requirements. The Contractor shall be responsible for all aspects of the RSS design and construction.

a) Design Criteria.

The Contractor shall use the following design criteria for the RSS and FHWA NHI-00-043 Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Design and Construction Guidelines.

Criteria		**Requirement**
Design life		75 years (min)
Total strain in primary reinforcement		10% (max)
Design Traffic Surcharge		250 lb/ft^2
Embedment length* for primary reinforcement		3-ft (min)
Minimum length of secondary reinforcement		6-ft (min)
Internal Factor of Safety	Internal stability (Internal & compound)	≥ 1.3
	Surficial Stability	≥ 1.3
	Pull-out Resistance	≥ 1.5
External Factor of Safety	Global Stability (deep seated failure)	≥ 1.3
	Failure against rapid drawdown conditions	≥ 1.1
	Sliding	≥ 1.3
	Local bearing failure (lateral squeeze)	≥ 1.3
	Bearing Capacity	≥ 2.5
Vertical spacing of Geosynthetic reinforcement	Primary reinforcement	3-ft (max)
	Secondary reinforcement	12-in (max)

*****The embedded length (Le) is defined as the length of reinforcement behind the most critical sliding surface. The embedded length for each reinforcement layer shall be sufficient to provide adequate pullout resistance as shown by the Contractor's design calculations.

The design of the reinforced soil slope shall consider the maximum ground water table and 100-year water surface elevation of the existing Storm Water Management (SWM) Pond.

b) Soil Design Parameters:

Reinforced Fill materials. The minimum angle of internal friction (φ), and the effective angle of internal friction (φ') of the reinforced fill material shall be 32 degrees or greater. The Contractor shall use one of the following tests to determine the shear strength parameters of the reinforced fill material:

1) ASTM D 3080 sheared at a slow rate to insure adequate drainage or
2) ASTM D 4767 (CU) triaxial tests with the pore pressure measured to determine the effective strength parameters.

The Contractor shall provide at least three shear strength test results conforming that the Reinforced Fill material to be used meets or exceeds the above minimum requirements.

Retained Soil and Foundation Material. The above soil properties (table above) are derived based on the existing geotechnical information near the proposed RSS location. It is the Contractor's responsibility to confirm and use these soil parameters. The Contractor has the option of conducting geotechnical investigation at the RSS location for the design of the RSS. The Contractor's geotechnical investigation shall be in conformance with FHWA NHI-00-043 Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Design and Construction Guidelines and applicable AASHTO Guidelines

c) Drainage.

A drainage blanket shall be installed along the interface of the retained fill and reinforced fill material to intercept the seepage water. The drainage blanket shall be composed of AASHTO #57 Aggregate wrapped in Class SE geotextile filter and be a minimum of 2/3 of the height of the slope. The drainage blanket shall have 100% coverage for the entire slope. Underdrain pipe shall be used to collect the water from the drainage blanket. Under drain shall be outletted at all low points and at intervals not to exceed 50 feet. A minimum of two outlets shall be provided for each slope. The Contractor shall refer to the typical reinforced soil slope section included on the Contract plans for the details.

d) Secondary Reinforcement and Surficial Stability.

Secondary reinforcement shall be used to provide long term surficial stability. Surficial stability calculations for the secondary (intermediate) reinforcement shall be provided. Refer to (a) Design Criteria for surficial stability requirements.

e) Facing Construction and Erosion Control

The Contractor shall use Welded Wire Facing for the facing construction. The Contractor shall submit construction details showing the construction of the facing with installation details for the Engineer's approval.

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Welded Wire Facing: The welded wire facing consists of galvanized welded wire mesh and galvanized wire support struts. The galvanized welded wire mesh shall meet the requirements of AASHTO M 55 and AASHTO M 111. The welded wire mesh shall have a minimum length 10 feet, maximum 4 inch by 4 inch mesh opening. The wire used shall have minimum wire size number W 4, and minimum Coating Thickness Grade 65.

Horizontally adjacent facing panels shall be butted together such that no gap between facings exists. Butted together facing panel splices shall be offset from each other in adjacent layers so that the splices do not line up with one another from layer to layer. The maximum height of each welded wire facing shall be 2-ft.

The Contractor shall install permanent erosion control. The installation of SSM permanent erosion control shall be in conformance with the facing construction method selected by the Contractor. As part of the RSS design submission, the Contractor shall submit Slope Erosion Control Plans and installation details for SSM for the Engineer's approval. The contractor shall maintain the surficial stability of the RSS during construction of the project. The RSS shall be vegetated immediately after construction to prevent or minimize erosion due to rainfall and surface runoff.

f) Geosynthetic Delivery, Storage and Handling.

Geosynthetic roll identification, storage and handling shall be in conformance to ASTM D 4873. Each shipping document shall include a notation certifying that the material is in accordance with the manufacturer's certificate. Geosynthetic material shall be wrapped with a material that will protect the geosynthetic from damage due to shipment, water, sunlight, mud, dirt, debris and contamination. The protective wrapping shall be maintained during periods of shipment and storage. The geosynthetic roll shall be elevated off the ground and adequately covered to protect them from the following: site construction damage, precipitation, ultra-violet radiation including sunlight, chemicals that are strong acids or strong bases, flames including welding sparks, temperature greater than 140 F, and lower than -20 F and any other environmental condition that may damage the physical property of the geosynthetic. The material shall be accompanied by a certification stating that the geosynthetic material delivered conforms to the properties used in design. This certification shall be given to the Engineer. Damaged geosynthetic shall be replaced by the Contractor, at no cost to the Administration.

g) On Site Representative.

The geosynthetic supplier shall provide a qualified and experienced representative with at least five (5) years of geosynthetic construction for RSS on site, for a minimum of 3 days, to assist the Contractor and the Engineer at the start of construction of the Reinforced Soil Slope. The representative shall also be available on an as needed basis as requested by the Contractor or Engineer during construction of the slope.

h) Excavation and Foundation Preparation

The foundation surface for the Reinforced Soil Slope shall be level and its width shall be at least the design length of the bottom reinforcing element. The Contractor shall maintain the stability of the back slope of excavation at all times during construction. The Contractor shall direct all surface runoff from adjacent areas away from the RSS construction site.

The RSS foundation shall be prepared and proof rolled as specified in 204.03.01. Unstable foundation materials encountered during foundation preparation for the RSS shall be removed to the depth as specified by the Engineer. The removed material shall be backfilled with material meeting the requirements of Select Borrow in Section 916 or other equivalent material as approved by the Engineer. Spring Control shall be as directed by the Engineer and in conformance with Section 306.

The Contractor is alerted that boulders have been encountered in the project area and may be encountered during the excavation for the RSS.

i) Geosynthetic Placement

The geosynthetic reinforcement shall be installed in accordance with the manufacturer's recommendations, unless otherwise modified by these specifications. The geosynthetic reinforcement shall be placed within the layers of the compacted soil as shown on the plans or as directed.

The geosynthetic reinforcement shall be placed in continuous longitudinal strips in the direction of main reinforcement. Correct orientation of the geosynthetic reinforcement shall be verified by the Contractor and approved by the Engineer. Joints in the machine (strong) direction (perpendicular to the slope) shall not be permitted with geotextile or geogrid. Horizontal coverage of less than 100 percent shall not be allowed unless specifically detailed in the construction drawings. In the case of 100% coverage in plan view adjacent strips need not be overlapped.

Place only that amount of geosynthetic reinforcement required for immediately pending work to prevent undue damage. After a layer of geosynthetic reinforcement has been placed, the next succeeding layer of soil shall be placed and compacted as appropriate. After the specified soil layer has been placed, the next geosynthetic reinforcement layer shall be installed. The process shall be repeated for each subsequent layer of geosynthetic reinforcement and soil.

j) Reinforced Fill Material Placement.

Reinforced fill material placement for the Reinforced Slope shall be in conformance with 204.03 except as modified below:

Reinforced fill material shall be placed, spread, and compacted in a manner that minimizes the development of wrinkles and displacement of geosynthetic reinforcement. Reinforced fill material shall be graded away from the slope crest and rolled at the end of each work day to prevent ponding of water on the surface of the reinforced soil mass. During construction of the slope, the contractor

shall grade the top of the slope to ensure that surface runoff is directed away from the face of the RSS. The Engineer may direct that an earth berm be used to direct runoff away from the face of the RSS. This grading shall be maintained until vegetative growth is established to the satisfaction of the Engineer.

Geosynthetic reinforcement shall be placed to lay flat and pulled tight prior to backfilling. After a layer of geosynthetic reinforcement has been placed, suitable means, such as pins or small piles of soil, shall be used to hold the geosynthetic reinforcement in position until the subsequent soil layer can be placed.

When using geogrid, the geogrid shall be installed on the top of flat surface and be tensioned prior to placement of fill material. No bending or tilting or dip is allowed for the Geogrid. The geogrid shall be tensioned with the help of rods or equivalent material. Sharp, heavy rocks shall not be used to secure the geogrid.

Tracked construction equipment shall not be operated directly upon the geosynthetic reinforcement. A minimum of 6 in. of uncompacted fill is required prior to operation of tracked vehicles over the geosynthetic reinforcement. Turning of tracked vehicles shall be kept to a minimum to prevent tracks from displacing the fill and the geosynthetic reinforcement. Rubber-tired equipment may pass over the geosynthetic reinforcement at speeds less than 10 mph as approved by the Engineer. Sudden braking and sharp turning shall be avoided.

The front 6-inches of the reinforced fill material at the slope face shall be thoroughly mixed with topsoil, seeding and fertilizer to create a vegetated face.

Reinforced fill material shall be compacted to 92% of maximum dry density within ± 2 percentage points of optimum moisture content when tested as specified in T 180. The frequency T 180 testing shall be one test every 500 cubic yards of reinforced fill material placed.

k) Installation of guardrail posts, pavement underdrain etc

The Contractor shall take into consideration the installation guardrails posts and underdrains in the design of the RSS.

The Contractor shall install guardrail posts, pavement under drains, and etc in a manner that prevents buldging of the slope face and prevents ripping, tearing or pulling of the geosynthetic reinforcement. Holes through the geosynthetic reinforcement shall be the minimum size necessary for the guardrail post. The contractor shall demonstrate to the Engineer prior to beginning guardrail post inslattaltion that the installation method will not rip, tear or pull the geosynthetic.

l) Final Slope Geometry Verification.

The Contractor shall confirm that as-built slope geometry conform to approximate geometry shown in the Contract Documents.

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CONTRACTOR QUALIFICATIONS

The Contractor shall have successfully completed at a minimum of three (3) RSS projects within the past five years. The projects shall be identified by project name, location, project description, size, completion date, and contract manager. The Contractor's qualification shall be submitted to the Engineer for review and approval at least 30 days prior to start of the RSS construction.

CONTRACTOR SUBMITTALS

At least 30 working days prior to the construction of RSS, the Contractor shall submit for Administration's approval, three sets of detailed design calculations, working drawings which shall include the geosynthetic certification package, and six sets of inspection verification samples. Geosynthetic samples shall be of sufficient size to permit direct comparison and verification. The calculation and drawings shall be prepared and signed by a professional engineer licensed in the State of Maryland. The reinforced slope design and construction materials shall be approved by the Administration, and all decisions concerning the approval will be final unless directed by the Engineer. No work on the RSS shall begin without written approval of the Engineer. The submittal shall be sent to the Engineer and to the following address:

Maryland State Highway Administration
Engineering Geology Division
7450 Traffic Drive
Hanover, MD 21076

Working drawings shall conform to Section TC-4.01 of MDSHA's Standard Specifications for Construction and Materials (July 2008). Design calculations and working drawings shall include the following:

a) Plan and elevation sheets:

I. An elevation view indicating elevations at top and bottom of RSS.

II. Length, size, spacing, and type or grade of primary reinforcement, including secondary reinforcement.

III. Internal drainage alignment, elevations, slope face exit points and outlet details.

IV. Plan view shall reflect the horizontal alignment and shall indicate the offset from the horizontal control line to the front face of the slope.

V. All culverts, utilities, signs, lights, etc. that affect the reinforced soil slope.

VI. Any general notes required for construction of the reinforced soil slope.

VII. Limits and extent of reinforced soil fill volume.

VIII. Right of Way Limits.

IX. Erosion and Sediment Controls.

b) Cross sections showing limits of construction fill requirements, excavation limits and drainage alignment.

c) Geosynthetic reinforcement materials certification package.

d) Facing construction details, erosion control for reinforced slopes, and all details for facing modules, showing all dimensions necessary to construct the element, erosion control, reinforcing steel, and the location of reinforcing attachment devices embedded in the panels. All details of the architectural treatment or surface finishes. Material description and properties for erosion control.

e) Secondary reinforcement details including material type, spacing, material properties with certification, and construction.

f) Temporary slope face support, if required.

g) All details for construction of the Reinforced Soil Slope around drainage facilities, overhead sign footings, abutments and other obstructions to geosynthetic placement. If additional steeping of the slope is required at large cross pipes, box culvert, etc., details shall be provided.

h) Detailed design computations including:

I. Allowable strength computations for the geosynthetic reinforcement. The allowable tensile strength shall be based on the ultimate tensile strength and partial factors of safety approved by the Engineer. The use of an allowable strength without the supporting documentation of the ultimate tensile strength and partial factors of safety will not be acceptable by the Administration.

II. Slope stability computations, including computer output, and an explanation of assumptions and analysis details within the program. The reinforced slope stability microcomputer program used for the stability computations must meet the requirements of FHWA NHI-00-043 Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Design and Construction Guidelines

and applicable AASHTO Guidelines.

III. Cross section plots showing critical failure planes for internal and global failure modes; and a summary of the critical failure surface(s) search.

IV. Sliding stability computations.

V. Pullout computations.

VI. Seismic stability computations, where applicable.

VII. Surficial stability calculations.

VIII. Erosion control and surficial stability measures considered for permanent stability of the slope

i) Proposed schedule for construction of the Reinforced Soil Slope including the date of start of construction, sequence of construction detail, and date of seeding and mulching.

j) Laboratory testing for gradation, PH, plasticity index test results confirming that the Reinforced fill material meets or exceeds the requirement specified in materials section of this specification.

k) The Contractor shall also provide at least three shear strength test results conforming that the Reinforced Fill material to be used meets or exceeds the requirement specified in materials section of this specification.

l) The Contractor shall submit three samples (each weighing at least 35 pounds) of the reinforced fill material approved for Reinforced Soil Slopes to the Administration for verification purpose at least 30 days prior to its use.

m) Statement of design responsibility as specified in the design requirements of this Specification.

n) The Plans and design computations shall be prepared and signed by a registered professional engineer, licensed in the State of Maryland.

o) The Contractor shall provide documentation of experience in design, material installation and construction of similar previously constructed Reinforced Soil Slope projects. This includes a list of at least four (4) RSS projects successfully completed by the Contractor.

Additional time required due to incomplete or unacceptable submittals will not be cause for time extension, impact, or delay claims. All costs associated with incomplete or unacceptable submittals shall be at no additional cost to the Administration. Approval by the Engineer will not relieve the

Contractor of its responsibilities to design and install the RSS in accordance with the plans and specifications.

MEASUREMENT AND PAYMENT.

Reinforced Soil Slopes will be measured and paid for at the Contract bid unit price per vertical square foot. Payment will be full compensation for design, working drawings, on-site representation, preparation of the site, excavation, geotechnical investigation, supply and installation of geosynthetic reinforcement, all fill materials (both in the reinforced zone and behind the reinforced zone), laboratory testing, facing system, soil stabilization matting, any temporary forms for facing support, any additional borrow required, compaction of backfill materials, spring control, drainage blanket and underdrain, surficial stability control, temporary earth retaining systems, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Excavation of unsuitable foundation materials located within the limits for the Reinforced Soil Slopes will be measured and paid for at the Contract bid unit price per cubic yard for Class 1-A Excavation. Backfill material for these areas will be measured and paid for at the Contract bid unit price per cubic yard for the pertinent excavation or borrow item.

CATEGORY 200
GRADING

SECTION 201 — ROADWAY EXCAVATION (CLASS 1, CLASS 1-A, CLASS 2)

201.01 DESCRIPTION.

ADD: The Following:

201.01.03 Wet Material from Excavation.

The Contractor shall note that some material from excavation on this project may have moisture contents in excess of optimum moisture content. These materials shall be dried to specification requirements for use in embankment construction. No additional compensation will be allowed for re-handling, drying, or disposing of these wet materials.

201.03 CONSTRUCTION.

201.03.09 Unsuitable Material.

DELETE: The last sentence in its entirety:

INSERT: The following.

Backfill material for Class 1-A Excavation shall be Select Borrow or Geosynthetic Stabilized Subgrade using Graded Aggregate Base, or other suitable material as directed by the Engineer. The Design-Builder may select a different material for the backfill of Class 1-A Excavation if a non-specified pavement section is used.

omtsp 03-09-2018

CATEGORY 200
GRADING

SECTION 201-ROADWAY EXCAVATION (CLASS 1, CLASS 1-A, CLASS 2)

201.01 DESCRIPTION.

ADD: The following.

201.01.03 Rock. Rock is present on this project and may be encountered in excavation for roadway, structures, pipe culverts, utilities or other project features. Consider the presence of rock when developing unit prices for excavation, structures, pipe culverts, utilities, and related items. No additional compensation will be allowed for rock excavation on the project.

201.03 CONSTRUCTION

201.03.04 Rock Excavation.

INSERT: The following after the first sentence in **(b) Blasting**:

If blasting is the proposed method for rock excavation, employ the following additional safety measures:

(1) No blasting within 300 linear feet of the existing structures;

(2) Use a double layer of blasting mats; and,

(3) Temporary lane closures on Northbound and Southbound MD 32 will be required for the actual blast when blasting at the project site.

Temporary lane closures will be determined upon review of the submitted blasting plan.

CATEGORY 200
GRADING

SECTION 203 — BORROW EXCAVATION

203.01.02 Notice to Contractor — Borrow Pits.

ADD: After the first paragraph.

This project is located in Howard County. The following conditions applicable to the county or city shall be complied with and documented.

DISTRICT 1

Dorchester (DO) County
Site plan approved by Soil Conservation District.
Grading permit from County Highway Department (except City of Cambridge).
Planning and Zoning approval for use.
Critical Areas approval (if applicable).
Inspection by County.

Somerset (SO) County
Site plan approved by Soil Conservation District.
Grading Permit from the County.
Land Use permit.
Critical Areas approval by Planning and Zoning (if applicable).
Inspection by SHA.

Wicomico (WI) County
Site plan approved by Soil Conservation District.
Certificate of compliance with Planning and Zoning if located in Critical Area.
Inspection by SHA.

Worcester (WO) County
Site plan approved by Soil Conservation District.
Critical areas approved by Planning and Zoning (if applicable).
Inspection by SHA.

DISTRICT 2

Caroline (CO), Cecil (CE), Queen Anne's (QA) and
Talbot (TA) Counties
Site plan approved by Soil Conservation District.
Planning and Zoning approval.
Critical Areas approval (if applicable).
Inspection by SHA.

Kent (KE) County
Site plan approved by Soil Conservation District.
Grading permit.
Planning and Zoning approval.
Critical Areas approval (if applicable).
Inspection by SHA.

DISTRICT 3

Montgomery (MO) County
Sediment control permit and plan approval by County
Department of Environmental Protection, Division of
Water Resources Management, Storm Water Management Section/Sediment Control.
Approval by Maryland National Capital Park and Planning Commission (if applicable).
Inspection by County.

Prince Georges (PG) County
Site Plan approved by Soil Conservation District.
County Grading Permit.
Tree conservation plan approval by Maryland National Capital Park and Planning Commission (if applicable).
Critical Areas approval (if applicable).
Payment of all pertinent county fees and/or securing of county required bonding.
Inspection by SHA with oversight by County.

DISTRICT 4

Baltimore (BA) County
Site Plan approved by the Department of Environmental Protection and the Soil Conservation District.
County Grading Permit.
Critical Areas approval by the Department of Environmental Protection and Resource Management (if applicable).
Inspection by County.

Harford (HA) County
Site Plan approved by Soil Conservation District.
County Grading Permit.
Critical Areas approval (if applicable).
Inspection by County.

DISTRICT 5

Anne Arundel (AA) County
Site Plan approved by Soil Conservation District.
Planning and zoning approval - special exception required.
Grading plan issued by the County Department of Inspections and Permits.
Critical Areas approval (if applicable).
Inspection by County and SHA.

Calvert (CA) County
Site Plan approved by Soil Conservation District.
Grading plan issued by the County after a mining permit or exemption is issued.
Critical Areas approval (if applicable).
Inspection by SHA.

Charles (CH) County
Site Plan approved by Soil Conservation District.
Special exception granted by the County.
Critical Areas approval (if applicable).
Inspection by SHA.

St. Mary's (SM) County
Site Plan approved by Soil Conservation District.
County Grading Permit.
Critical Areas approval (if applicable).
Inspection by SHA.

DISTRICT 6

Allegany (AL) County
Site plan approved by Soil Conservation District.
Informational copy of plans to County Planning and Zoning Commission.
Inspection by SHA.

Garrett (GA) and Washington (WA) Counties
Site plan approval by Soil Conservation District.
Inspection by SHA.

DISTRICT 7

Carroll (CL) County
Site plan approved by County Planning Commission.
Sediment control plan approval by Soil Conservation District.
County Grading Permit.
Inspection by County.

Frederick (FR) County
Site plan approved by Soil Conservation District.
County Grading Permit.
Inspection by SHA.

Howard (HO) County
Site Plan approved by Soil Conservation District.
County Grading Permit.
Inspection by County.

BALTIMORE CITY (BC)

Site plan approved Baltimore City Department of Public Works (BCDPW).
Inspection by BCDPW.

STATE AND FEDERAL PROPERTY

Borrow pits located on state and federal property are subject to Maryland Department of the Environment approval.
Inspection by SHA.

CATEGORY 200
GRADING

SECTION 204 — EMBANKMENT AND SUBGRADE

204.03 CONSTRUCTION.

204.03.01 Embankment Foundation.

DELETE: Paragraph **(b)**

INSERT: The following as a new paragraph **(b)**.

Embankment over Existing Pavement. Remove bound pavement materials in areas where embankment is being placed on existing pavement. Removal of the bound pavement materials should be paid for as Class 1 Excavation and should be considered as waste.

204.03.05 Stability of Embankments

INSERT: The following after 204.03.05:

Unstable embankment foundations shall be treated by undercutting and backfilling with Geosynthetic Stabilized Subgrade (GSS) using Graded Aggregate Base or Select Borrow; bridging with a thick embankment lift; providing drainage; or other suitable treatment as determined by the Engineer at the time of construction.

CATEGORY 300
DRAINAGE

ACCESS ROAD WITH CELLULAR CONFINEMENT LOAD SUPPORT SYSTEM

DESCRIPTION. Construct access roads with cellular confinement load support systems.

MATERIALS.

No. 7 Aggregate	M 43, No. 7
Geotextile, Non-Woven	919.01, Class SE
Securing Pins and Staples	919.03
Topsoil	920.01
Fertilizer	920.03.01
Straw Mulch	920.04.01
Wood Cellulose Fiber	920.04.02
Soil Stabilization Matting (SSM)	920.05, Type A
Fasteners for SSM	920.05.02
Seed	920.06
Turfgrass Sod	920.06.03
SHA Turfgrass Seed Mix	920.06.07 (a)
SHA Special Purpose Seed Mix	920.06.07 (b)
SHA Temporary Seed Mix	920.06.07 (c)
Water	920.09.01

Geogrid. Non-woven geotextile strips thermos-welded into a cellular system. Cells shall be at least 2 in. long, 4 1/4 in. wide, and 2 in. deep. When extended, the grid shall cover at least 107 sq. ft.

CONSTRUCTION. Prepare subgrade per 208.03 and 211.03.02.

Place geotextile on the prepared surface for the full width of the area to be covered. Unroll the geotextile parallel to the base line. Do not drag the geotextile across the grade. Remove wrinkles and folds by stretching and pinning. Overlap the end of the roll in the direction of aggregate placement. Pin all roll ends and roll end overlaps a maximum of 5 ft on center. Pin roll edges and roll edge overlaps a maximum of 5 ft on center. For curves, fold or cut the geotextile and overlap in the direction of the turn. Pin folds in the geotextile a maximum of 5 ft on center. Immediately repair or replace damaged geotextile as directed. Overlap geotextile patches at least 3 ft into undamaged geotextile. Do not allow construction equipment on the bare geotextile.

Place aggregate on top of geotextile. Use the end dumping and spreading method. Place a single lift parallel to the baseline and at the thickness required to provide the specified compacted depth.

Starting with a panel of geogrid, use temporary pegging to hold one end and pull the geogrid out to its maximum length of 26 ft. This will reduce the width of the panel. Do not overextend. When

necessary, cut the geogrid to shape or size. Lay the next geogrid panel in the same way, adjacent to the first, and staple each of the open cell edges together to create a single panel out of the two grids. Continue with this method of installing remaining panels of geogrid. Exercise care and do not walk on the geogrid. Walk only on timber boards placed on the geogrid when necessary to walk in areas of installed geogrid. When on a slope, fix the grid at regular intervals on the ground with pegs.

Do not stand on the empty geogrid itself until completely filled. Fill each end of the geogrid with a handful of aggregate to hold it in place. Ensure the geogrid is in constant contact with the ground when placing aggregate into the geogrid cells. Use a timber board on top of the geogrid to help better ensure contact is made. Once the ends have been filled, remove the temporary pegs or push them completely into the ground for improved stability. The geogrid may be filled manually or mechanically. If filled mechanically, do not drop the aggregate from more than 18 in. above the ground.

Rake the aggregate into the geogrid cells so that they are filled to the top. Once the area has been completed and the cells are filled to the top of the geogrid, place topsoil on the aggregate-filled geogrid cells per 701.03.

Placement of Topsoil. Place topsoil on the aggregate infill material to a minimum depth of 4 in. per 701.03.

Perform turfgrass establishment per Section 705 or turfgrass sod establishment per Section 708, whichever is specified. When turfgrass seed is specified, also install Type A soil stabilization matting (SSM) per Section 709.

MEASUREMENT AND PAYMENT. Access Road with Cellular Confinement Load Support System will be measured and paid for at the Contract unit price per square yard for Access Road with Cellular Confinement Load Support System. The payment will be full compensation for furnishing and installation of all geotextile, geogrid, aggregate, pegs, fasteners, pins, staples, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Topsoil will be measured and paid for per 701.04.

Soil Stabilization Matting (SSM) will be measured and paid for per 709.04.

Turfgrass Establishment will be measured and paid for per 705.04

Turfgrass Sod Establishment will be measured and paid for per 708.04.

Replacement of damaged geotextile with undamaged geotextile will be at no additional cost to the Administration.

CATEGORY 300
DRAINAGE

STORMWATER MANAGEMENT (SWM) FACILITY AS-BUILT CERTIFICATION

DESCRIPTION. Submit a certification package that affirms that stormwater management (SWM) facilities and practices are constructed as specified or are functionally equivalent to the designs in the approved SWM Report, revising the certification package as needed until approved.

SWM As-Built Engineer. The SWM As-Built Engineer (ABE) is responsible for assembling and certifying the SWM certification package. Duties include adequately documenting that the SWM facilities have been constructed as specified, and performing inspections during pertinent construction activities for SWM facilities and practices. The ABE shall be a Professional Engineer (P.E.) registered and licensed in the State of Maryland and who has at least three years of experience in SWM facility design and SWM facility construction. Submit one copy of the ABE's resume to the Engineer. The resume shall include the following.

(a) Full name of the ABE, License No. and expiration date.

(b) Name of employing company or firm.

(c) Contact information.

(d) Relevant work experience.

(e) Proof of valid certification of the Maryland Department of the Environment (MDE) Responsible Personnel for Erosion and Sediment Control training course (formerly "Green Card"). Note: All certifications for the former course MDE Responsible Personnel Training for Erosion and Sediment Control ("Green Card") expired on December 31, 2016 and are no longer valid.

The ABE shall have the option to use designees, who are under the direct supervision of the ABE, to perform certain duties on behalf of the ABE. The duties shall be limited to the following.

(a) Documenting that the SWM facilities have been constructed as specified, including writing activity inspection reports, taking photographs, and obtaining copies of material approvals and material test results.

(b) Performing inspections during pertinent construction activities for SWM facilities and practices, completing the pertinent portions of the SWM facility as-built certification data tables.

When the ABE elects to use designees, submit the names and resumes of designees authorized by the ABE to represent the ABE to the Engineer. Only authorized designees may represent the ABE for the limited duties specified.

SWM Facility As-Built Certification Package. The SWM facility as-built certification package contains documentation that verifies that that all SWM facilities and practices on the Contract have been constructed as specified or are functionally equivalent to the designs in the approved SWM Report.

The SWM facility as-built certification package shall include the following for each SWM facility in the Contract, presented neatly and legibly, and organized in an easy-to-follow format.

(a) SWM facility construction inspection reports. The inspection reports shall include the following.

(1) The SWM facility identification number (BMP No. or SWM Fac. No.) and type of SWM facility or practice.

(2) The date and location of the activity.

(3) Photographs, taken during inspections, that clearly show the construction activities as listed on the pertinent SWM facility as-built data tables, with narrative descriptions of what appears in the photographs, the dates the photographs were taken, and the locations.

(4) Verification of whether SWM facility as-built construction is as specified, noting any deviations from the Contract Documents and how the deviations have been addressed.

(b) Photographs of SWM facilities and practices after all landscaping has been installed and established, with narrative descriptions of what appears in the photographs.

(c) Copies of pertinent material approval forms.

(d) Copies of pertinent material and installation test reports and results.

(e) Completed as-built certification data tables.

(f) Green line as-built surveys of the SWM facilities and practices signed and sealed by a Professional Land Surveyor (PLS) who is registered and licensed in the State of Maryland. The as-built survey data shall be overlaid on the appropriate Contract plan sheet(s) and profile sheets, at the same scale and datum, and are coordinately correct. The as-built survey data shall be green in color, clearly legible and easily distinguishable from the Contract Document information. The SWM facility as-built surveys shall include the following.

(1) Contours. One-foot contour intervals or otherwise match the contour intervals shown in the Contract Documents. Contours shall cover the entire footprint of the SWM facility or practice as well as inflow and outflow conveyances when ditches or similar features convey runoff into or out of SWM facilities and practices.

(2) Drainage Structures. Includes all drainage structures within the footprint of the SWM facility, including but not limited to inlets, manholes, flow splitters, risers, weirs, end sections, headwalls, and end walls. As-built data shall include but is not limited to top of structure elevations, structure lengths, and structure widths; pipe inverts; pipe sizes, materials, and flow directions; orifice elevations; opening sizes; weir dimensions and elevations; check dam locations and dimensions; grates; and trash racks.

(3) Riprap and Aggregate. Includes dimensions of riprap and other areas within the footprint of the SWM facility and practice that show a surface layer of aggregate or riprap, including forebays.

(4) Embankment Information. Includes embankment heights, widths, and elevations; clay core locations, dimensions, and elevations; cut-off trench locations, dimensions, and elevations; pertinent filter diaphragm information; and pertinent pipe cradle information. Data that cannot be obtained from a field survey shall be provided by the ABE for inclusion with the SWM facility as-built survey.

(5) SWM Facility Maintenance Access Roads.

(6) Fences. Includes fence that surrounds the footprint of the SWM facility or practice.

(7) SWM Facility Profiles. Includes an overlay of green line as-built data on SWM facility profiles and typical sections including but not limited to check dam spacing, check dam top elevations, check dam dimensions, invert elevations, subdrain sizes, subdrain materials, aggregate and soil thicknesses, material types, clay core dimensions, and cut-off trench dimensions. Data that cannot be obtained from a field survey shall be provided by the ABE for inclusion with the SWM facility as-built survey.

(8) Certification. Seal, signature, license number, and date of license expiration of the PLS who completes the SWM facility as-built survey.

(g) Applicable supporting computations demonstrating that the functionality of the SWM facilities and practices meet the approved designs as presented in the approved SWM Report. This is only necessary when tolerances are not met and shall include but is not limited to water surface elevations, freeboard, storage volumes, depths, and other pertinent SWM functionality data that demonstrates the SWM facility performances meets the approved design.

(h) A narrative of justification for as-built deviations in SWM facilities and practices. This is only necessary when (g) applies.

(i) A copy of Final Acceptance from the Administration's Landscape Operations Division for the landscaping establishment.

(j) Seal, signature, license number, and date of license expiration of the ABE.

Information Supplied by the Administration. Upon written request, the Administration will provide CADD files in DGN format and the approved Final SWM Report in PDF format to facilitate completion of the SWM facility as-built certification package. Submit requests to the Engineer.

Submittals and Approval Process. Partial submittals of the SWM facility as-built package may be made as construction of each individual SWM facility and practice is completed. Otherwise, submit the entire SWM facility as-built package within 45 days of completion of construction activities associated with all SWM facilities and practices but not including establishment of the specified landscaping items. The landscaping phase of SWM facilities and practices need not be completed to submit the SWM facility as-built certification package for Structural Acceptance but is required for Final Approval.

Resubmit the SWM facility as-built package with responses to all Administration comments that may be received. Resubmit as many times as necessary, updating the SWM facility as-built package as needed to address all Administration comments, and making any field adjustments as needed to correct deficiencies, until Structural Acceptance is issued. Some SWM facility types require approval from the Maryland Department of the Environment (MDE) in addition to approval from the Administration. Resubmit the SWM facility as-built package with responses to all MDE comments that may be received. The Administration will coordinate reviews and correspondence with MDE.

Concurrent with the Administration review of the SWM facility as-built certification package for Structural Acceptance, ensure establishment of landscaping items continues and ensure the area is permanently stabilized. Once landscaping is established, ensure the remaining data table information is completed and submit the SWM facility as-built certification package for Final Approval.

Submit the SWM facilities as-built package through the Quality Assurance (QA) Toolkit.

MATERIALS. Not applicable.

CONSTRUCTION. Designate an ABE prior to beginning construction of SWM facilities and practices.

Failure to receive approval for the ABE, failure to submit information about the ABE designees, or failure of the ABE, or the ABE designees, to adequately monitor the specified construction

activities will be grounds for replacement of the ABE and reconstruction of all work on SWM facilities and practices that may have already been performed.

Perform all construction activities on SWM facilities and practices only in the presence of the ABE or the ABE designee. Failure to perform work in the presence of the ABE or the ABE designee will be grounds for removal and replacement of the ABE, and reconstruction of all work that may have already been performed.

Prior to beginning or continuing construction activities of SWM facilities and practices, ensure the ABE or the ABE designee is present. If the ABE or ABE designee is not present, suspend work on SWM facilities and practices and do not resume until the ABE or ABE designee is present for the activities.

Whenever the ABE or the ABE designee indicates that SWM facilities and practices under construction do not match the Contract Documents, immediately correct the deficiencies before moving to the next construction activity associated with SWM facilities and practices. If it is not possible to correct deficiencies due to the site conditions or constraints and not due to negligence and inadequate quality of work, cease work on SWM facilities and notify the Engineer.

Upon completion of constructing SWM facilities and practices, perform an as-built survey of the completed facility. Complete installation and establishment of landscaping items need not be completed to perform the as-built survey of SWM facilities and practices.

Submit the SWM facility as-built certification package. Update SWM facilities as-built surveys when adjustments are made to address comments that may be received.

ABE Responsibilities. Ensure that the ABE performs the following.

(a) Is present for all activities specified on the SWM facilities as-built certification data tables, performs duties as specified, and records requisite information for the SWM facility as-built certification package. The ABE may elect to use a designee. Ensure the data is available at the Site and on-demand.

(b) Prepares written inspection reports for construction activities associated with SWM facilities and practices. The ABE may elect to use a designee.

(c) Takes photographs during construction activities of the SWM facilities and practices and of the completed SWM facilities, including photographs with completed landscape planting installation and establishment. The ABE may elect to use a designee.

(d) Obtains copies of material approvals for items associated with the SWM facilities and practices. The ABE may elect to use a designee.

(e) Obtains copies of compaction test results for SWM facility embankments. The ABE may elect to use a designee.

(f) Alerts the Contractor when SWM facilities and practices under construction do not match the Contract Documents. The ABE may elect to use a designee.

(g) When necessary, performs all computations that demonstrate SWM facilities and practices function in the manner as presented in the approved Final SWM Report, including with all revisions to the report that may result from Redline Revisions. At a minimum, the parameters examined by the ABE shall include but are not limited to storage volumes, discharge rates, velocities, detention times, water surface elevations, freeboard, and all other information as recommended by the ABE and as requested by the Administration.

(h) Obtains copies of as-built surveys for the SWM facilities and practices.

(i) Prepares the SWM facility as-built certification package.

Construction Tolerances. As follows. Values outside of tolerance may require computations.

(a) Earthwork. Elevations within 3 in. (0.25 ft) of values specified or as otherwise noted on the pertinent SWM facility as-built data table.

(b) Embankments, Clay Cores, and Cut-Off Trenches. Elevations not less than the values specified.

(c) Drainage Structures. Elevations within 1.25 in. (0.10 ft) of values specified.

(d) Pipe Inverts. Elevations within 1.25 in. (0.10 ft) of values specified.

(e) Riprap. Dimensions within 3 in. (0.25 ft) of values specified.

(f) Freeboard. Not less than the values specified.

(g) Aggregate, Sand, Bioretention Soil Mix (BSM), and Mulch Thicknesses. Not less than values specified.

When construction tolerances cannot be met due to unforeseen site conditions or constraints, ensure that calculations are performed by the ABE before proceeding with the next construction activity associated with SWM facilities and practices. If, after performing computations, the ABE determines that the SWM facilities do not meet the functional parameters in the approved Final SWM Report as constructed, reconstruct the SWM facilities to meet the functional parameters. If this is not possible due to the site conditions or constraints and not due to negligence and inadequate quality of work, cease work on SWM facilities and notify the Engineer.

MEASUREMENT AND PAYMENT. Stormwater Management (SWM) Facility As-Built Certification will not be measured but will be paid for at the Contract lump sum price and incrementally distributed per the payment schedule. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work. No additional compensation will be considered for addressing comments received on the submitted SWM

facilities as-built certification package, revisions to the SWM facility as-built certification package, or any construction activities necessary to address comments that may have been received or necessary to revise the SWM facility as-built certification package.

No adjustment to the payment schedule will be made for partial submittals of the SWM facility as-built certification package.

Payment Schedule. Payments will be made for the SWM facility as-built certification package as follows.

PAYMENT SCHEDULE	
ACTIVITY	**PERCENTAGE OF PAYMENT**
Initial submission of the entire SWM Facility As-Built Certification Package.	60
Structural Acceptance from the Highway Hydraulics Division and the Approving Authority.	30
Final Approval from the Highway Hydraulics Division and the Approving Authority.	10
TOTAL	100

Forfeiture of Payment. Failure to meet the requirements of the payment schedule will result in forfeiture of that percentage of payment.

CATEGORY 300
DRAINAGE

STREAM RESTORATION AS-BUILT CERTIFICATION AND INSPECTOR DESIGN-BUILD

DESCRIPTION. Provide qualified individual in stream restoration work as part of the contract. Arrange for the inspection and survey of stream restoration work and population of Stream Restoration As-Built Checklists during construction activities and submit a Stream Restoration As-Built Checklist Package to the Administration within 7 calendar days of completing construction of the relevant Stream Construction Area. Submit a Final Stream Restoration Certification package to the Administration within 45 calendar days of completing construction of all stream restoration and stabilization areas in the Contract, including landscape installation.

Due to the nature of the work involved and the environmentally-sensitive location of this project, it is imperative that this Contract be awarded to the responsible bidder whose responsive bid meets the requirements and evaluation criteria set forth in this Invitation for Bids, and who possesses the integrity and reliability that shall assure good faith performance of this Contract. Accordingly, the purpose of this Special Provision is to amplify GP-5.04 and GP-8.06 by requiring the Contractor to provide a specially qualified individual in stream restoration as part of the Contract requirements.

Stream As-Built (SAB) Inspector. In addition to the requirements set forth in GP-5.04 and GP-8.06, the Contractor shall assign an SAB Inspector who shall possess special knowledge, background, training, and at least five years of experience in stream restoration design or construction in general, including but not limited to

(a) the maintenance of stream flow, including clean water pumps, dirty water pumps, and other related sediment and erosion control practices;

(b) the construction of scour protection pools, scour protection apron, habitat roughness logs, grade control log structures, clay channel blocks, channel bed material, channel protection and wetland depressional areas;

(c) the planting of riparian buffers and floodplains; and

(d) stream restoration construction stakeout, access to construction zones, clearing, erosion and sediment control installation, and earth disturbance activities in and adjacent to stream projects without disturbing adjacent or nearby natural resources such as wetlands, trees, etc.

The SAB Inspector shall have full authority to manage the construction of all stream-related work elements contained in the Contract Documents. The SAB Inspector is also responsible for the completion of the stream restoration as-built checklist and certification packages.

Select and designate the SAB Inspector prior to beginning construction activities. Ensure the SAB Inspector is on site full-time during all stream work or work that may affect or impact the stream being restored. Submit one copy of the SAB Inspector's resume to the Administration's Environmental Programs Division by two weeks after notice of apparent low bid that includes following information:

(a) Name of SAB Inspector.

(b) Name of employer.

(c) Contact information.

(d) Sufficient documentation of the knowledge, background, training, and specific experience of the SAB Inspector.

(e) Valid certification in the Maryland Department of the Environment (MDE) Responsible Personnel Certification Course, formerly "Green Card" certification.

(f) SHA Basic Erosion and Sediment Control Training for Contractors and Inspectors (Yellow Card) number and expiration date.

No Notice of Award will be issued until the Administration has formally approved the Contractor's assignment of the SAB Inspector. Failure to receive approval for the SAB Inspector or failure of the SAB Inspector to adequately monitor and report the specified construction stages will be grounds for replacement.

The Contractor may replace the SAB Inspector only by requesting such replacement in writing along with the above documentation to the Administration's Environmental Programs Division. The Administration will review the Contractor's request. Before formally assigning the replacement SAB Inspector, the Contractor shall obtain the written approval for the replacement from the Administration. No individual may perform any stream restoration work or other work of any kind that may affect or impact in any way the stream being restored until an approved SAB Inspector is onsite.

Stream Construction Area. Stream Construction Areas are discrete sections of stream work, defined on the plan sheets.

Stream Restoration As-Built (SAB) Checklist. The SAB Checklist is a series of tables divided by Stream Construction Area that are included on the plan sheets. The SAB Checklist is to be used to verify that stream restoration and stabilization areas within that Stream Construction Area have been constructed as specified. This checklist shall be updated on a daily basis as work progresses. Upon completion of a Stream Construction Area, the corresponding SAB Checklist will be submitted to the Administration's Environmental Programs Division as part of a Stream

Restoration As-Built Checklist Package. The components of the SAB Checklist may not be removed or changed without authorization from EPD.

Stream Restoration As-Built (SAB) Checklist Package. The SAB Checklist Package certifies that all stream restoration and stabilization areas within a particular Stream Construction Area have been constructured as specified. This package includes pertinent documentation demonstrating the validity and accuracy of the certification, including the completed SAB Checklist for the relevant Stream Construction Area, and is submitted to the Administration's Environmental Programs Division.

Stream Restoration As-Built (SAB) Certification Form. The SAB Certification Form certifies that all stream restoration and stabilization areas within the project have been constructed as specified. The form is located following this specification.

Final Stream Restoration As-Built (SAB) Certification Package. The Final SAB Certification Package certifies that all stream restoration and stabilization areas within the project have been constructed as specified. It includes pertinent documentation demonstrating the validity and accuracy of the certification, including the completed SAB Certification Form, and is submitted to the Administration's Environmental Programs Division.

MATERIALS. Not applicable.

CONSTRUCTION. Prior to beginning or continuation of all stream restoration work or any work that may affect or impact in any way the stream being restored, ensure the SAB Inspector is present. If the SAB Inspector is not present, suspend all work on stream restoration and stabilization and do not resume until the SAB Inspector is present and observing construction activities. Ensure that the stream restoration and stabilization is constructed as specified in the Contract Documents. Update the SAB Checklist on a daily basis. The SAB Checklist will be made available for inspection by the Administration when requested. Correct any deficiencies reported by the SAB Inspector before proceeding to the next construction activity associated with stream restoration and stabilization.

Submit the SAB Checklist Package to the Administration within 7 calendar days of completing construction of a Stream Construction Area (not including landscaping installation). Incomplete SAB Checklist Packages will be rejected. Submit one full-size hard copy and one digital copy in PDF format on a CD.

Submit the Final SAB Certification Package to the Administration within 45 calendar days of completing construction, including landscaping installation, of all stream restoration and stabilization areas in the Contract. An incomplete Final SAB Certification Package will be rejected. Submit one full-size hard copy and one digital copy in PDF format on a CD. The CD shall also include CADD files in DGN format of the green-line revision plans. The Stream Restoration Site is not considered accepted until the Final SAB Certification Package has been received, reviewed and approved by the Administration's Environmental Programs Division.

Contents of the SAB Checklist Package. The SAB Checklist Package shall contain the following contents, neatly presented and organized in an easy-to-follow format, for the corresponding Stream Construction Area.

(a) Completed SAB Checklist.

(b) Photographs taken documenting construction activities listed on the SAB Checklist with narrative descriptions of the photographs.

(c) Supplemental documentation, such as survey logs and sketches.

(d) Signature, seal, and date of license expiration of a professional engineer (PE) or Professional Land Surveyor (PLS) registered and licensed in the State of Maryland to certify the accuracy, validity, and completeness of the information contained in the SAB Checklist Package and to affirm that the stream restoration and stabilization has been constructed in accordance with the Contract Documents.

Contents of the Final SAB Certification Package. The Final SAB Certification Package shall contain the following contents, neatly presented and organized in an easy-to-follow format, for all stream restoration and stabilization areas in the Contract.

(a) SAB Certification Form, which shall include the signature, seal, and date of license expiration of a PE or PLS registered and licensed in the State of Maryland to certify the accuracy, validity, and completeness of the information contained in the Final SAB Certification Package and to affirm that the stream restoration and stabilization has been constructed in accordance with the Contract Documents.

(b) Photographs of the stream restoration after all landscaping has been installed with narrative descriptions of the photographs.

(c) As-built survey and green line revisions of the stream restoration and stabilization areas. The as-built survey and green line revision data shall be overlaid on the appropriate Contract Plan sheet(s). As-built survey and green line revision data shall be green in color, clearly legible, and easily distinguishable. Printed copies shall be submitted on 34 in. x 22 in. sheets.

(d) Stand-alone as-built plans, depicting as-built information only. Printed copies shall be submitted on 34 in. x 22 in. sheets.

(e) Copy of pre-planting landscaping material inspection reports and landscaping installation phase acceptance memo from the Administration’s Landscape Operations Division.

SAB Inspector Responsibilities. Ensure the SAB Inspector performs the following activities.

(a) Manages the construction of all stream-related work elements contained in the Contract Documents, and is present onsite at all times when either stream restoration work is being performed, or when the Contractor or any of the Contractor's subcontractors is performing work that may affect or impact in anyway the stream being restored.

(b) Updates the Checklist daily. When deviations between the constructed dimensions and the Contract Documents exceed the specified tolerances, notify the Engineer and correct deficiencies. The SAB Inspector shall make the SAB Checklist available for review by the Administration upon request.

(c) Takes photographs documenting construction activities listed on the SAB Checklist and provides narrative descriptions of the photographs.

(d) Takes photographs of the completed stream restoration areas, including photographs documenting completed landscape planting installation, and provides a narrative description of the photographs.

(e) Oversees the completion of green line as-built surveys of the completed stream restoration and stabilization areas. When deviations between the as-built surveys and the Contract Documents exceed the specified tolerances, notify the Engineer to have the contractor correct deficiencies.

(f) Compiles SAB Checklist Packages and the Final SAB Certification Package for submittal to the Administration's Environmental Programs Division.

If the SAB inspector is a PE or PLS registered and licensed in the State of Maryland, the SAB inspector's responsibilities may include certification of the SAB Checklist and Final SAB Certification Packages.

If the SAB inspector is a PLS registered and licensed in the State of Maryland, the SAB inspector's responsibilities may include performing as-built surveys of the completed stream restoration areas.

The Contractor shall be aware and shall understand that the failure of the Contractor to accord and support the authority of the SAB Inspector, as provided hereinabove, shall be a basis for the Administration, in the exercise of its sole discretion, to shut down the Contract until the Contractor complies with this requirement.

The Contractor also shall be aware and shall understand that the failure of the SAB Inspector to comply with any applicable regulatory requirement, to implement any element of the Contract Documents, or to assure compliance by any workman onsite with such requirements or elements,

shall be a basis for the Administration, also in the exercise of its sole discretion, to remove the SAB Inspector from the Contract. The project will remain shut down until the Contractor replaces the SAB Inspector with an individual of equal qualifications, as set forth in this Special Provision, and the Contractor's designation of SAB Inspector has been approved by the Administration.

Stream Restoration As-Built Surveys and Green Line Revision Requirements. Obtain the services of a PLS registered and licensed in the State of Maryland to perform as-built surveys of the completed stream restoration areas and include any green line revisions made during the construction of the stream restoration areas. As-built survey and green line revisions must be overlaid on the appropriate Contract Plan sheets at the same scale and datum. All work and files shall adhere to the CADD Standards established by the Administration. As-built features shall be clearly shown and differentiable from all other features. As-built surveys must include the following minimum coordinately correct information on the Grading Plan Sheet(s), Profile Sheet(s), and Cross Section Sheet(s).

(a) Contours. One foot contour intervals.

(b) Cross Sections and Profiles. Show green line data for stream restoration cross sections and profiles. Data may be obtained by completing as-built surveys and data measured by the SAB Inspector.

(c) Structures. As-built structure limits shall be displayed in plan view. Annotation of structure limits shall be included in profile and cross section in accordance with approved plans.

(d) Certification. Signature and seal of the PLS.

Construction Tolerances. Tolerance limits established in the contract documents must be adhered to. The tolerance limits for stream restoration features requiring as-built certification is provided in the individual special provisions. The tolerance limit for grading is +/- 3 inches of the elevations specified in the contract documents.

When construction tolerances are not met, make field corrections as necessary to bring the work to within the tolerances specified.

MEASUREMENT AND PAYMENT. Stream Restoration As-Built Certification will not be measured but will be paid for at the Contract lump sum price and incrementally distributed according to the Payment Schedule. The payment will be full compensation for services of the SAB Inspector, certifying professional engineer, and/or professional land surveyor; and for all material, labor, equipment, tools, and incidentals necessary to complete the work. Replacement of an SAB Inspector and any related shutdown costs due to the approval of the replacement SAB Inspector shall be at no additional cost to the Administration.

Subsequent inspections, surveys, and as-built re-certification of reconstructed stream restoration and stabilization areas because of failure to address deviations that exceed specified tolerances shall be at no additional cost to the Administration.

Subsequent revisions to and submissions of the SAB Checklist and Final SAB Certification Packages following the initial submission shall be at no additional cost to the Administration.

Approval of the SAB Checklist and Final SAB Certification Packages by the Adminstration's Environmental Programs Division is for the purposes of payment of the Stream Restoration As-Built Certification item only, and will not contradict requirements for acceptance and payment of individual items contained within other specifications.

PAYMENT SCHEDULE		
REQUIREMENTS	**PERCENT OF TOTAL CONTRACT PRICE**	**PAYMENT FOR COMPLETED WORK**
Furnish SAB Checklist Package at the completion of each Stream Construction Area	45% total, split evenly for each SAB Checklist Package	Upon approval of the SAB Checklist Package by EPD
Furnish Final SAB Certification Package	55%, contingent upon approval of all Checklist Packages by OED	Upon approval of the Final SAB Certification Package by EPD

STREAM RESTORATION AS-BUILT CERTIFICATION FORM

I HEREBY CERTIFY THAT THE STREAM RESTORATION SITE SHOWN ON THE PLANS HAS BEEN CONSTRUCTED IN ACCORDANCE WITH THE PLANS INCLUDED UNDER THE CONTRACT NUMBER _____ EXCEPT AS NOTED IN GREEN ON THE "AS-BUILT" DRAWINGS. FURTHERMORE, THE GREEN-NOTED EXCEPTIONS DO NOT ADVERSELY AFFECT THE DESIGN AND/OR THE INTENDED PERFORMANCE OF THE SITE.

Name (Printed) Signature

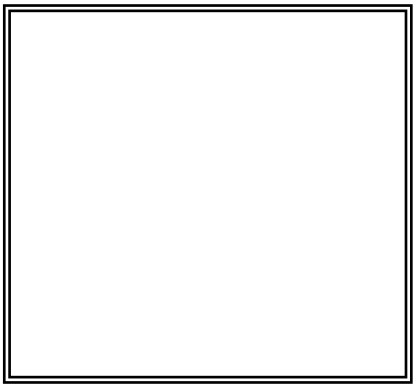
_____

Maryland Registration Number Date

_____

PROFESSIONAL CERTIFICATION: "I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. _____, EXPIRATION DATE_____."

"CERTIFY" MEANS TO STATE OR DECLARE A PROFESSIONAL OPINION BASED ON SUFFICIENT AND APPROPRIATE ONSITE INSPECTIONS AND MATERIAL TESTS CONDUCTED DURING CONSTRUCTION.



CATEGORY 300
DRAINAGE

WETLAND SITE AS-BUILT CERTIFICATION

DESCRIPTION. Inspect wetland creation or restoration site during specified stages of construction, and furnish a completed Wetland Site As-Built Certification Package to the Administration certifying that the Wetland Site have been constructed as specified in the Contract Documents. Inspection of Wetland Site and completion of the Wetland Site As-Built Certification Package may only be performed by an As-Built Inspector.

As-Built (AB) Inspector. Furnish an approved AB Inspector to complete the As-Built Certification. AB Inspectors require licensure in the State of Maryland as a Professional Engineer or Professional Land Surveyor, experienced in Wetland design and construction.

To request approval, furnish a one-page resume for the AB Inspector by two weeks from the Notice of Award. The resume shall include the AB Inspector's name, contact information, relevant professional license(s), employer's name, and relevant work history. Failure to receive approval for the AB Inspector or to monitor the specified construction stages will be grounds for replacement of the AB Inspector.

Wetland Site As-Built Certification Package. The Certification Package certifies that the Wetland Site(s) have been constructed as specified. The submitted package shall include, at a minimum, written descriptions of each phase including photographs during specified construction phases, completed checklists, completed certification forms, vegetation establishment report and approved plans revisions for each site. The as-built survey information shall be superimposed on the approved final plans including contours and a separate plan shall be prepared depicting the as-built information alone as a set.

CADD Work and Files. All work and files shall adhere to the CADD Standards established by the Administration.

The Administration will provide the approved MicroStation CADD files to facilitate the duties of the AB Inspector.

MATERIALS. Not applicable.

CONSTRUCTION. Inspect and complete the appropriate AB checklist for each wetland site. Ensure that the wetland site features are constructed as designed.

Stages for As-Built Inspections by the AB Inspector. Perform minimum inspections for Wetland facilities as follows:

(a) Wetlands.

(1) Upon completion of excavation to sub-grade elevation

(a) During construction of any diversion structures such as inlets, outlets and flow distribution structures.

(b) During placement and backfill of topsoil and, if required, any soil amendments.

(c) Upon completion of final grading and establishment of permanent stabilization.

(d) During and after wetland planting.

(e) Upon the completion of the plant protection mechanisms, if required.

Surveys, Survey Logs and Plan Revision Requirements. Upon completion of each Wetland Site, survey each Wetland Site and provide plan revisions that include the following items:

(a) Multiple verification of the Sub-grade elevations at established cross sections.

(b) Multiple verification of the required topsoil depth and/ or soil amendment depth at established cross sections.

(c) Contours Indicate the grading of the Wetland Site using one (1) foot contour intervals.

(d) Inflow and outflow ditches.

(e) Riprap Indicate the locations dimensions of riprap within Wetland Site and immediately outside of Wetland footprints, if required.

(f) Outfall structures Indicate locations of outfall structures, such as risers and weirs, and include all relevant information such as elevations, dimensions at top, weir lengths and elevations.

(g) Miscellaneous Features Include all other pertinent features in and around the Wetland Site, water surface elevations, and 25 foot setbacks from the wetland edge, access to the wetland site, etc.

Tolerances. Tolerance limits for plan as-built information is as follows:

(a) Earthwork Tolerance. Elevations must be within 3 in. of elevations specified in the Contract Documents.

(b) Structures. Elevations must be within 1.2 in. (0.1 ft) for spillways and weirs.

Submission Requirements. Furnish three hard-copies and one digital copy in PDF format of the Wetland Site As-Built Certification Package to the Administration. Incomplete Wetland Site As-Built Certification Packages will not be accepted by the Administration.

When Wetland Soites do not meet the design parameters, reconstruct, re-inspect, resurvey and recalculate deficient aspects of the Wetland Site and furnish the revised information in the Wetland Site As-Built Certification Package.

MEASUREMENT AND PAYMENT. Wetland Site As-Built Certification will not be measured but will be paid for at the Contract lump sum price. The payment will be full compensation for inspection, photographs, documentation, surveys, plan revisions, completion and submission of the Wetland Site As-Built Certification Package, and for all material, labor, equipment, tools, and incidentals necessary to complete the work. Modifications to rejected Wetland Site As-Built Certification Packages including any associated corrective construction, reconstruction, grading, inspection, planting, stabilization, surveying, engineering analysis and services, and resubmittals will be at no additional cost to the Administration.

Payment Schedule. Payments will be made according to the following schedule when requirements are met:

WETLAND SITE AS-BUILT CERTIFICATION PAYMENT SCHEDULE		
REQUIREMENTS	**PERCENT OF TOTAL CONTRACT PRICE**	**PAYMENT FOR COMPLETED WORK**
Furnish completed Wetland Site As-Built Certification Package	50	At submission to the Administration to the Environmental Programs Division
Receive approval from the Environmental Programs Division	50	At project close-out

Incentive/Liquidated Damages Payments.

The total incentive awarded for this Contract will not exceed $0.00. The rating incentive payment for this contract is $0.00. A final incentive payment for this contract is $0.00

Failure to provide the as-built certification package including plans for each day past the sixty day period from the semi final walk-through inspection will result in liquidated damages being imposed in the amount of $500.00 per day. Failure to provide the as-built certification package including plans within 6 months of the semi final walk through inspection will result in liquidated damages in the amount of $1,000.00 per day.

CATEGORY 300
DRAINAGE

SECTION 308 — EROSION AND SEDIMENT CONTROL

DELETE: SECTION 308 – EROSION AND SEDIMENT CONTROL in its entirety.

INSERT: The following.

SECTION 308 — EROSION AND SEDIMENT CONTROL

308.01 DESCRIPTION. Install and maintain erosion and sediment control (ESC) measures throughout the life of the Contract to control erosion and to minimize the release of sediments into adjacent areas and nearby rivers, streams, lakes, reservoirs, bays, and coastal waters. Implement the approved ESC plan and approved modifications. Identify staging and stockpile areas, and apply ESC measures as approved.

308.01.01 Erosion and Sediment Control Manager (ESCM). Designate an Erosion and Sediment Control Manager (ESCM) to implement the ESC plan and to oversee the installation, maintenance, and inspection of the ESC measures.

308.01.02 Severe Weather Event. A severe weather event is defined as a weather event in which measured rainfall exceeds 3 in. in a continuous 24-hr period based upon rainfall data obtained from the nearest official National Weather Service (NWS) gauge station in proximity to the project site.

308.01.03 Quality Assurance (QA) Toolkit. The Quality Assurance (QA) Toolkit is a web-based system that contains project and permit information, a history of ESC inspection reports, and is used to submit, track and receive approvals for modifications to the ESC plans.

308.02 MATERIALS.

Riprap	901.03
4 to 7 in. Stone	901.05
Asphalt Mixes	904
Pipe	905
Gabion Wire	906
Steel Plate	909.02
Welding Material	909.03
Fence Fabric for Super Silt Fence	914.01.01
Geotextile, Woven and Non-Woven	919, Class E
Geotextile, Woven Slit Film	919, Class F
Soil Amendments	920.02
Compost	920.02.05, Type C
Fertilizer	920.03
Mulch	920.04
Soil Stabilization Matting	920.05

Seed and Turfgrass Sod	920.06
Straw Bales	921.08
2 to 3 in. Stone	M 43, No. 2
3/4 to 1-1/2 in. Stone	M 43, No. 4
No. 57 Stone	M 43, No. 57

308.02.01 Filter Log Casing. Produced from 5 mil thick continuous high-density polyethylene or polypropylene, woven into a tubular mesh netting material with openings in the knitted mesh of 1/8 in. to 3/8 in.

308.03 CONSTRUCTION.

308.03.01 Preliminary. Prior to beginning any construction activity, complete the following.

a) Attend a Pre-Construction Erosion and Sediment Control Meeting with the Engineer and the Regional Environmental Coordinator (REC) to discuss ESC schedule, responsibilities, and modification procedures.

b) Submit the location of the nearest official National Weather Service (NWS) gauge station. Alternatively, a gauge station may be installed. Alternate gauge station proposals must be acceptable to and approved by the Engineer and the REC. Include detailed information regarding the type, location, accuracy, methodology, and security of the rain gauge in the proposal for consideration.

c) Demarcate all wetlands, wetland buffers, floodplains, waters of the United States (WUS), tree protection areas, and the Limit of Disturbance (LOD) per Section 107. Ensure the demarcations are inspected and approved.

308.03.02 Contractor Responsibilities. Prior to beginning any earth disturbing activity, complete the following.

(a) Install ESC measures per 308.03.03. Ensure that controls are inspected and approved.

(c) Ensure that all stormwater runoff from disturbed areas is directed to installed ESC measures.

(d) Do not remove any ESC measure without the approval from the Regional Environmental Coordinator (REC).

(e) Ensure that dewatering practices do not cause any visible changes to stream clarity.

308.03.02 Standards and Specifications. Construct and maintain in good working order all ESC measures as specified and in accordance with the latest versions of the following.

(a) Maryland Department of the Environment (MDE) ESC and stormwater management (SWM) regulations, including but not limited to the pertinent sections of the Annotated Code of

Maryland and the Code of Maryland Regulations (COMAR).

(b) MDE "Maryland Standards and Specifications for Soil Erosion and Sediment Control."

(c) MDE "Maryland Stormwater Design Manual, Volumes I and II."

(d) SHA Field Guide for Erosion and Sediment Control.

Keep a copy of the MDE "Maryland Standards and Specifications for Soil Erosion and Sediment Control" on the project site throughout the duration of the Contract.

308.03.03 Erosion and Sediment Control Plan and Sequence of Construction. Implement the approved ESC plan and Sequence of Construction. All changes to the approved ESC plan or Sequence of Construction require Administration approval. Submit modifications to the approved ESC plan and Sequence of Construction to the Administration using the QA Toolkit at least 14 days prior to the desired time to implement the change. Ensure that all changes are approved before implementing the change.

Submit modifications overlaid on approved plans. Ensure submittals are full-size, reasonably legible, clear, and easily understood; use the standard symbology and names of ESC measures in the Contract Documents; and follow the design requirements specified in 308.03.02 (a) through 308.03.02 (d).

When requested by the Administration, obtain the services of a Professional Engineer, licensed in the State of Maryland, to develop the ESC modification submittals.

308.03.04 Erosion and Sediment Control Manager (ESCM). At least 10 days prior to beginning any work, assign and submit the name and credentials for approval an Erosion and Sediment Control Manager (ESCM). Ensure that the ESCM and the superintendent have successfully completed the MDE "Responsible Personnel Certification Training for Erosion and Sediment Control" and the Administration's "Erosion and Sediment Control Certification Training for Contractors and Inspectors." The certifications must be current for the entire duration of the Contract. If the certification expires or is revoked for either person, immediately replace the person with an appropriately qualified and certified person acceptable to the Administration. No work may proceed without the appropriate certified personnel in place. Any substitutes for the ESCM will be subject to approval. The Administration reserves the right to require a reassignment of the ESCM duties to another individual for any reason.

The ESCM is primarily responsible for and has the authority to implement the approved ESC plans, schedules, and methods of operation for both on-site and off-site activities. The ESCM's duties and responsibilities include the following.

(a) Attendance at the Pre-Construction ESC Field Meeting and periodic field meetings to evaluate the effectiveness of measures already installed and to plan for the implementation of necessary controls proposed for succeeding areas of soil disturbance.

(b) Daily inspections of the ESC measures to ensure that all measures are always in place and to

develop a list of activities and schedules to ensure compliance with the Contract Documents.

(c) Maintenance of a log of the daily inspections in 308.03.04 (b), including actions taken, and submit a written report at the end of each work day.

(d) With the Engineer, conducting post-storm inspections both during and beyond normal working hours and submitting a written report.

(e) Having the authority to mobilize crews to make immediate repairs to the ESC measures during working and non-working hours.

(f) When requested, accompanying the Engineer during REC inspections and inspections made by regulatory agencies.

(g) Coordinating with the Engineer to ensure that all deficiencies are immediately corrected and that the project always complies with the approved ESC plan.

308.03.05 Quality Assurance Ratings. The REC will routinely inspect the Project Site to ensure compliance with the approved Erosion and Sediment Control (ESC) and Stormwater Management (SWM) Plans. The REC will assign scores based on these inspections. The scores will be reported on Form No. OOC61/QA-1: Erosion/Sediment Control and Stormwater Management Field Investigation Report. The REC will use the scores to determine the following ratings.

Quality Assurance Ratings

SCORE	RATING
≥90.0	A
80.0 - 89.9	B
70.0 - 79.9	C
60.0 - 69.9	D
< 60.0	F

(a) Rating A. The Project complies with the approved plan. Minor corrective actions may be necessary.

(b) Rating B. The Project generally complies with the approved plan; however, corrective actions are necessary.

(c) Rating C. The Project generally complies with the approved plan; however, deficiencies noted require corrective action within 72 hours and shutdown conditions may arise quickly. The Project Site will be re-inspected within 72 hours and routine inspection frequency may increase.

(d) Rating D. The Project is in non-compliance. The Administration will shut down earthwork operations. Focus work efforts on correcting ESC deficiencies. The Project Site will be re-inspected within 72 hours. Complete all required corrective actions within the 72-hour period for the Project to be upgraded to a 'B' rating. Failure to upgrade the Project from a 'D' rating to a 'B' or better rating will result in the Project being rated an 'F'. Liquidated damages will be imposed for each day the Project has a 'D' rating and inspection frequency may increase.

(e) Rating F. The Project is in non-compliance. An 'F' rating indicates one or more of the following.

(1) A score of less than 60.

(2) Required permits and approvals have not been obtained.

(3) The approved LOD has been exceeded.

(4) Wetlands, wetland buffers, waters of the US (WUS), floodplains, and/or tree preservation areas have been encroached upon without prior necessary and adequate approval.

(5) The work is not proceeding per the approved ESC plan, Sequence of Construction, and/or ESC schedule.

When a project is in non-compliance, the Administration will shut down the entire project until the project receives a 'B' or better rating. Focus all work efforts on correcting ESC deficiencies. Liquidated damages will be imposed for each day the Project has an 'F' rating and inspection frequency may increase

308.03.06 Shutdowns. If a Project is rated 'C', correct all deficiencies within 72 hours. The Project Site will be re-inspected at the end of the 72-hour period. If the deficiencies have not been satisfactorily corrected, the Project will be rated 'D' and all earthwork operations will be shut down.

If consecutive 'C' ratings are received, expect notification that the overall effort appears marginal and that a shutdown of all earthwork operations is imminent if ESC efforts do not substantially improve within 72 hours. The Project Site will be re-inspected at the end of the 72-hour period. If the deficiencies are not satisfactorily corrected, or if other deficiencies are identified, and the Project receives less than a ‘B’ rating, a 'D' rating will be given and all earthwork operations will be shut down.

If the deficiencies are not corrected in 72 hours, an 'F' rating will be given, and the entire Project will be shut down. When degradation to a regulatorily protected resource, occurs or has already occurred, or if corrective measures remain uncompleted after the 72-hour period, the Administration may elect to have the corrective actions performed by another contractor or by Administration personnel.

The second time that a Project is rated 'F', the ESC Training Certificate issued by the

Administration will be immediately revoked from the superintendent and the ESCM for at least six-months and until successful completion of the Administration's Erosion and Sediment Control Certification Program. Immediately replace the superintendent and ESCM and focus all work efforts on correcting ESC deficiencies.

308.03.07 Severe Weather Event. Maintain, repair, or replace any damaged ESC measures within 72 hours of a severe weather event occurrence.

Refer to GP-7.12 for unforeseen conditions.

308.03.08 Pre-Construction Conference. Present a general overview at the Pre-Construction Conference of how ESC measures shall be implemented.

308.03.09 Initial Controls. Install all perimeter controls, such as silt fence, super silt fence, earth dikes, sediment traps, and sediment basins, prior to grubbing operations.

If it is determined that the clearing area has been disturbed and a potential for sediment runoff or erosion exists, install the controls at that time as directed.

308.03.10 Maintenance. Always maintain ESC measures throughout the life of the Contract, whether active or inactive. Maintain access to all ESC measures until they are removed.

Inspect ESC measures immediately after storm events. Clean out as necessary and repair or replace all damaged ESC measures as the first order of business after the storm event.

308.03.11 Stabilization Requirements. Following initial soil disturbance, complete permanent or temporary stabilization within the following.

(a) Three calendar days for the surface of all perimeter dikes, swales, ditches, perimeter slopes, and all slopes steeper than 3 horizontal to 1 vertical (3:1); and

(b) Seven calendar days as to all other disturbed or graded areas on the Project not under active grading.

(c) Areas between temporary berms, except median areas, need not be stabilized during incremental stabilization.

(d) Sensitive areas may require less than three- or seven-day stabilization. Maintain as necessary to ensure continued stabilization.

(e) Track slopes within two days of establishment per 701.03.

308.03.12 Waste Areas. From the appropriate authority and while coordinating with the Engineer, obtain approval for off-site waste areas not delineated in the Contract Documents. Protect waste areas and stockpile areas with ESC measures per 308.03.11 (a) and (b).

308.03.13 MDE Inspections. Work is subject to field inspections by MDE. If non-compliance is determined, the MDE Water Management Administration (WMA) inspector will immediately notify the Engineer of needed corrective actions. Corrective actions may require a shutdown of construction activities until the non-compliance is satisfactorily corrected. Focus all efforts on correcting ESC deficiencies found during MDE inspections.

308.03.14 Stabilized Construction Entrance (SCE). Construct stabilized construction entrances (SCEs) as specified.

Rehabilitate SCEs with periodic top dressing using additional aggregate, replacing the drainage pipe beneath the SCE if one was installed, or making other repairs to the SCE and sediment trapping devices.

When necessary, place wash racks to prevent tracking of mud and sediment from disturbed areas onto roadways or other areas.

308.03.15 Side or Berm Ditches and Culverts. Construct side ditches in fill areas and berm ditches in cut areas. Construction includes the installation of lining. Protect linings from sediment deposits. Place silt fence along the banks of existing streams as specified prior to placing any culverts. To help avoid sedimentation during construction, divert the streams around the location of the culvert until the proposed culvert and channel are stabilized.

308.03.16 Erosion and Sediment Control Original Excavation. Excavate, construct embankments, grade, and backfill for sediment traps, sediment basins, and other ESC measures.

Ensure that excavation and embankments meet the dimensions for each ESC measure as specified. Stockpile excavated material and use for backfill when the ESC measures are removed.

308.03.17 Erosion and Sediment Control Cleanout Excavation. Remove accumulated sediment from ESC measures and other areas during routine maintenance of ESC measures and as directed.

Clean out sediment traps as necessary to ensure that at least 50 percent of the wet storage capacity is always available. Ensure that riprap outlet sediment traps have at least 75 percent of the wet storage capacity always available. Remove sediment from silt fence and super silt fence when sediment reaches 25% of the height of the fence and from stone check dams when sediment reaches 50 percent of the height of the dams. Remove sediment from stone outlet structures when sediment is within 6 in. of the weir crest.

Place removed sediment in an approved waste site. Material stored on-site may be reused once it is dried and if it meets embankment requirements unless otherwise specified.

308.03.18 Heavy Use Areas. Locate and size heavy use areas used for activities such as staging and storage. From the appropriate authority and while coordinating with the Engineer, obtain approval for off-site heavy use areas not delineated in the Contract Documents. Obtain any necessary permits or modifications for non-specified heavy use areas.

308.03.19 Stockpile Areas. Locate and size stockpile areas. From the appropriate authority and while coordinating with the Engineer, obtain approval for off-site stockpile areas not delineated in the Contract Documents. Obtain any necessary permits or modifications for non-specified stockpile areas.

308.03.20 Earth Dike. Do not use sod as stabilization unless specifically approved.

308.03.21 Temporary Swale. Do not use sod as stabilization unless specifically approved.

308.03.22 Perimeter Dike Swale. Do not use sod as stabilization unless specifically approved.

308.03.23 Pipe Slope Drain. When slope drains are placed on grade, construct interceptor berms to direct flow into the flared end section.

308.03.24 Stone Check Dam. Construct using Class 0 riprap.

308.03.25 Riprap Inflow Protection. Construct per Section 312.

308.03.26 Gabion Inflow Protection. Construct per Section 313.

308.03.27 Rock Outlet Protection. Construct per Section 312.

308.03.28 Gabion Outlet Protection. Construct per Section 313.

308.03.29 Plunge Pool. Construct per Section 312.

308.03.30 Super Silt Fence. Construct as specified with the following exception:

Run a 7-gauge top tension wire continuously between posts.

308.03.31 Filter Berms. Construct berms of wood chips and up to 50 percent compost.

308.03.32 Filter Log. Use compost for the filter media. Install filter logs parallel to contours and perpendicular to sheet flow from disturbed areas.

Where a connection is needed, there are two options based on whether the filter log is being filled on-site or offsite. Overlap prefilled filter logs by 1-ft minimum and staked where they connect. Sleeve filter log casings that are filled onsite. After one filter log section is filled and tied off (knotted), pull the second filter log section over the first (2 ft) and “sleeve,” creating an overlap.

Remove sediment when it has accumulated to a depth of half the exposed height of the filter log. Replace the filter log if torn or damaged. Reinstall the filter log if undermining or dislodging occurs.

Drive stakes perpendicular to water flow at a maximum of 8 ft intervals. Restrict vehicular and construction traffic from crossing filter logs.

Upon stabilization of the drainage area to the filter log and with approval, remove stakes. The filter log may be left in place and vegetated, or removed. In the former case, cut the filter log casing open, remove all non-biodegradable material, spread the compost as a soil supplement, and seed as specified.

308.03.33 Filter Bag. Determine the bag dimensions necessary to provide the required storage volume, determine pump and hose sizes, and install.

308.03.34 Straw Bales. Embed the bales to a depth of at least 4 in., and anchor in place with two No. 4 reinforcement bars, steel pickets, or 2 x 2 in. wood stakes, 36 in. length. Locate the anchoring devices at approximate third points along the longitudinal center line of each bale, driven through the bale and into the ground to a depth of 12 to 18 in.

308.03.35 Stone Outlet Structure. Stabilize the area immediately after removal of the structure.

308.03.36 Temporary Gabion Outlet Structure. As specified in Section 313. Grade and stabilize the area beneath the structure, immediately upon removal.

308.03.37 Portable Sediment Tank. Determine the dimensions necessary to provide the required storage volume.

308.03.38 Dewatering. Dewater only when conditions allow. Ensure that dewatering activities do not cause any visible change to stream clarity. If a sediment plume is visible, immediately cease the dewatering activity. Direct any pumping activity, including dewatering sediment traps and basins, through an approved dewatering device.

308.03.39 Sediment Traps. Excavate sediment traps to the specified length, width, and depth.

At locations where filtration facilities are specified, prevent runoff from adjacent unstabilized areas from entering the locations. Ensure that bottom elevations of sediment control devices are at least 2 ft higher than the finished grade bottom elevation. When converting a sediment trap to a permanent stormwater facility, remove and dispose of all accumulated sediment prior to final grading.

When grading and paving operations are complete and vegetation is established on the slopes and channels to the satisfaction of the Engineer, refill the sediment traps with suitable materials, shape, and permanently stabilize as specified.

308.03.40 Stone for Sediment Control. Place No. 57 aggregate, 3/4 to 1-1/2 in. stone, 2 to 3 in. stone, 4 to 7 in. stone, and riprap as specified.

308.03.41 Maintenance of Stream Flow. Maintain the continuous flow of waterways during operations as specified and as directed.

(a) Implement the approved ESC plan. Any changes to the approved ESC plan require approval from the appropriate regulatory authorities.

(b) A different plan for maintenance of stream flow may be submitted, but approval from the Engineer and the appropriate approval authority is required.

(c) If the stream diversion system as shown is not capable of blocking the flow of water through the soil beneath the system, design and provide an effective means of diverting the water away from the designated areas.

(d) Ensure that all excavation performed within the diverted stream is performed in a dewatered condition, which may require additional pumps, sheeting, shoring, cofferdams, etc.

(e) If the proposed system does not perform satisfactorily or additional material and equipment is required to dewater the site and excavated areas, adjust the stream diversion system and obtain approvals from the appropriate approving authorities.

(f) Securely anchor the stream diversion system in place to prevent movement during high water events. Submit the proposed method of anchoring for approval. Do not install anchors beyond the limits of disturbance (LODs) or infringe on the channel area available for stream flow.

(g) Upon completion of construction and when temporary drainage devices are no longer necessary, with the approval of the REC and the Engineer, remove and dispose of the devices in an acceptable manner.

308.03.42 Sandbags. Furnish and install sandbags to contain or divert water and sediment as specified and as directed.

308.03.43 Removal of Controls. Do not remove ESC measures until all previously disturbed areas are vegetated with at least a 3-in. growth of grass, and removal of the ESC measures is approved by the REC and the Engineer. Immediately stabilize those areas where ESC measures are removed as specified and as directed.

308.04 MEASUREMENT AND PAYMENT. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work. The maintenance, repair, removal and resetting, and final removal of ESC measures will not be measured, but the cost will be incidental to the Contract price to construct the device unless otherwise specified.

308.04.01 ESCM will not be measured but the cost will be incidental to the ESC items.

308.04.02 Implementation of the ESC Plan will not be measured but the cost will be incidental to the Erosion and Sediment Control items.

308.04.03 No claims against the Administration will be considered due to a shutdown of the grading operations or the entire project. When corrective actions are performed by another contractor or by the Administration, all costs associated with the work will be billed to the original Contractor.

308.04.04 When specified, a project may include incentive payments. Starting at the Notice to Proceed, an Incentive Payment will be made for a rating quarter consisting of 3 months when at least four inspections were performed by the REC and an average score equal to or greater than 85.0 for the entire rating quarter is received. The quarterly incentive payment will be made within 60 days after the end of the rating quarter. No incentive will be paid for partial quarters or for quarters with less than four inspections. No incentives will be paid for any quarter in which a 'D' or 'F' rating is received. When a project receives no 'D' or 'F' ratings and the overall average score is equal to or greater than 85.0, the final incentive payment will be made at final project closeout. If a time extension is granted, additional quarterly incentive payments will be drawn from the final incentive payment.

308.04.05 Whenever a project is rated 'D' or 'F', the Liquidated Damages will be assessed. Liquidated Damages must be paid within 30 days from the date of notification.

308.04.06 Incentive Payments and Liquidated Damages**.** The Contract Documents will specify the amounts of incentive payments and liquidated damages that apply if applicable.

308.04.07 Replacement of ESC measures that are damaged and replaced as a result of a Severe Weather Event will be measured and paid for at the Contract unit prices provided that a Quality Assurance Rating of "B" or better was obtained in the previous rating. Restabilization of damaged areas will be measured and paid for at the Contract unit prices. Other damages as a result of an event are subject to TC-7.03.

308.04.08 Stabilized Construction Entrance will be measured and paid for per each and includes all excavation, geotextile, aggregate, pipe, rehabilitation, relocation and incidentals to complete the work.

308.04.09 Wash Racks for Stabilized Construction Entrance will be measured and paid for per each and includes racks, excavation, wash water and incidentals to complete the work.

308.04.10 Erosion and Sediment Control Original Excavation will be measured and paid for at the Contract unit price per cubic yard. The payment will include excavation, backfill, grading and disposal.

308.04.11 Erosion and Sediment Control Cleanout Excavation will be measured and paid for at the Contract unit price per cubic yard. The payment will also include excavation and disposal.

308.04.12 Temporary Mulch will be measured and paid for as specified in 704.04.01.

308.04.13 Temporary Seed will be measured and paid for as specified in 704.04.02.

308.04.14 Turfgrass Sod will be measured and paid for as specified in 708.04.01.

308.04.15 Soil Stabilization Matting will be measured and paid for as specified in 709.04.

308.04.16 Temporary earth berms and interceptor berms for incremental stabilization will not be measured, but the cost will be incidental to the excavation items specified in the Contract Documents.

308.04.17 Heavy Use Areas will not be measured but will be incidental to the pertinent items.

308.04.18 Stockpile Areas will not be measured but will be incidental to the pertinent items.

308.04.19 Earth Dikes will be measured and paid for at the Contract unit price per linear foot. 4 to 7 in. stone, temporary seeding, and soil stabilization will be measured and paid for as specified in 308.04.60, 704.04, and 709.04, respectively.

308.04.20 Temporary Swales will be measured and paid for at the Contract unit price per linear foot. 4 to 7 in. stone, temporary seeding, and soil stabilization matting will be measured and paid for as specified in 308.04.60, 704.04, and 709.04, respectively.

308.04.21 Perimeter Dike/Swales will be measured and paid for at the Contract unit price per linear foot. Temporary seeding and soil stabilization matting will be measured and paid for as specified in 704.04 and 709.04, respectively.

308.04.22 Temporary storm drain diversions will be measured and paid for at the Contract unit price per linear foot of the size specified and will include all grading, pipe, connections and any incidentals necessary to complete the work.

308.04.23 Temporary Asphalt Berm will be measured and paid for at the Contract unit price per linear foot. The removal of the temporary asphalt berm will not be measured but the cost will be incidental to the Contract price.

308.04.24 Clear Water Diversions will be measured and paid for at the Contract unit price per linear foot of the size specified and will include all pipe, connections, anchors, sandbags, sheeting, dewatering and any incidentals necessary to complete the work.

308.04.25 Temporary Barrier Diversions will be measured and paid for at the Contract unit price per linear foot and will include all barrier, sandbags, sheeting, dewatering and any incidentals necessary to complete the work.

308.04.26 Mountable Berms will be measured and paid for at the Contract unit price per each and will include all earthwork, stone, geotextile, and any incidentals necessary to complete the work.

308.04.27 Diversion Fence will be measured and paid for at the Contract unit price per linear foot.

308.04.28 Pipe Slope Drain will be measured and paid for at the Contract unit price per linear

foot. The payment will also include excavation, backfill, flared end section, geotextile, anchors, coupling bands, and pipe elbows.

308.04.29 Stone Check Dam will be measured and paid for as specified in 308.04.60.

308.04.30 Riprap Inflow Protection will be measured and paid for as specified in 308.04.60.

308.04.31 Gabion Inflow Protection will be measured and paid for as specified in 313.04.

308.04.32 Rock Outlet Protection will be measured and paid for at the Contract unit price per square yard of Riprap Slope and Channel Protection.

308.04.33 Plunge Pool will be measured and paid for at the Contract unit price per square yard of Riprap Slope and Channel Protection.

308.04.34 Silt Fence will be measured and paid for at the Contract unit price per linear foot.

308.04.35 Silt Fence on Pavement will be measured and paid for at the Contract unit price per linear foot of Silt Fence.

308.04.36 Super Silt Fence will be measured and paid for at the Contract unit price per linear foot.

308.04.37 Clear Water Pipes through Silt Fence or Super Silt Fence will not be measured but will be incidental to the pipe and silt fence items.

308.04.38 Filter Berms will be measured and paid for at the Contract unit price per linear foot.

308.04.39 Filter Logs will be measured and paid for at the Contract unit price per linear foot for the size specified.

308.04.40 Temporary Stone Outlet Structures will be measured and paid for as specified in 308.04.60. The baffle board and stakes will not be measured but the cost will be incidental to the Contract price.

308.04.41 Temporary Gabion Outlet Structures will be measured and paid for at the Contract unit price per each.

308.04.42 Standard Inlet Protection will be measured and paid for at the Contract unit price per each for Inlet Protection.

308.04.43 At Grade Inlet Protection will be measured and paid for at the Contract unit price per each for Inlet Protection.

308.04.44 Curb Inlet Protection will be measured and paid for at the Contract unit per each for Inlet Protection.

308.04.45 Median Inlet Protection will be measured and paid for at the Contract unit per each for Inlet Protection.

308.04.46 Median Sump Inlet Protection will be measured and paid for at the Contract unit per each for Inlet Protection.

308.04.47 Combination Inlet Protection will be measured and paid for at the Contract unit per each for Inlet Protection.

308.04.48 Gabion Inlet Protection will be measured and paid for at the Contract unit per each for Inlet Protection.

308.04.49 Catch Basin Insert will be measured and paid for at the Contract unit price per each for Inlet Protection.

308.04.50 Removable Pumping Station will be measured and paid for at the Contract unit price per each. The payment will also include excavation, pipe, geotextile, wire mesh, steel plate, hose, pump, and connections.

Stone will be measured and paid for as specified in 308.04.60.

308.04.51 Sump Pit will be measured and paid for at the Contract unit price per each. The payment will also include excavation, pipe, geotextile, wire mesh, steel plate, hose, pump, and connections.

Stone will be measured and paid for as specified in 308.04.60.

308.04.52 Portable Sediment Tank will be measured and paid for at the Contract unit price per each. The payment will also include pipe, geotextile, wire mesh, steel plate, hose, pump, and connections. No adjustments will be made for resizing or relocating portable sediment tanks to meet stream clarity discharge requirements.

308.04.53 Filter Bags will be measured and paid for at the Contract unit price per each and will include pump, hoses, connections, straw bales, sizing, locating, relocating, disposal and any other incidentals necessary. No adjustments will be made for resizing or relocating to meet Permit conditions or turbidity requirements.

308.04.54 Sediment traps will be measured and paid for at the Contract unit price for one or more of the items listed below:

(a) Erosion and Sediment Control Original Excavation as specified in 308.04.10.

(b) Pipe as specified in 303.04.

(c) Stone as specified in 308.04.60.

(d) Inflow protection as specified in 308.04.30 and 308.04.31.

(e) Baffle board and stakes will not be measured but the cost will be incidental to the other items.

(f) Temporary risers will be measured and paid for at the Contract unit price per each.

(g) Anti-seep collars will be measured and paid for at the Contract unit price per each.

(h) Geotextile will not be measured but the cost will be incidental to the stone.

308.04.55 Sediment Basins will be measured and paid for at the Contract unit price for one or more of the following items:

(a) Earthwork as specified in 201.04.

(b) Pipe as specified in 303.04.

(c) Stone as specified in 308.04.60.

(d) Baffle board and stakes will not be measured but the cost will be incidental to the other items.

(e) Temporary risers will be measured and paid for at the Contract unit price per each and include trash racks, draw down devices, concrete bases, projection collars, riser connectors and any other incidentals.

(f) Modifying Stormwater Management Riser Structures and installing dewatering pipe systems will be measured and paid for at the Contract unit price per each for Convert Stormwater Management Riser for Sediment Control. Converting the risers back to their permanent state will be incidental to pipe.

(g) Anti-seep collars will be measured and paid for at the Contract unit price per each.

(h) Geotextile will not be measured but the cost will be incidental to the stone.

308.04.56 Temporary Access Bridge will be measured and paid for at the Contract Lump Sum price.

308.04.57 Temporary Access Culvert will be measured and paid for at the Contract unit price per linear foot.

308.04.58 Onsite Concrete Washout Structures will not be measured but will be incidental to the various concrete mixes.

308.04.59 Restabilization will not be measured when permanently stabilized areas are disturbed by grading operations or other activities not specifically approved.

308.04.60 Stone for sediment control will be measured and paid for at the Contract unit price per ton for the pertinent Stone for Sediment Control item. Geotextile, excavation, and backfill will not be measured but the cost will be incidental to the Contract price.

308.04.61 Straw Bales will not be measured but the cost will be incidental to the pertinent items with which they are used.

308.04.62 Maintenance of Stream Flow will not be measured but will be paid for at the Contract lump sum price. The payment includes design, redesign providing diversion structures regardless of the type required to satisfactorily divert the stream flow, anchoring of the system, excavation, backfill, dewatering the site and excavation within the stream diversion area, maintenance of the diversion system, sandbags, polyethylene sheeting, diversion pipes, pumps, hoses, connections, portable sediment tanks and obtaining any necessary permits. Payment will not be adjusted for alternative stream diversion systems regardless of any changes in quantities from that shown in the Contract Documents. The provisions of GP-4.05 will not apply to this work.

Cleanup and restoration of the stream diversion area that is damaged and replaced as a result of a Severe Weather Event will not be measured but paid for according to TC-7.03.

308.04.63 When sandbags are specified for use other than when incidental to 308.04.24, 308.04.25, 308.04.62, or otherwise specified as incidental, sandbags will be measured and paid for per cubic yard.

CATEGORY 300
DRAINAGE

SECTION 308 — EROSION AND SEDIMENT CONTROL

308.01 DESCRIPTION.

ADD: The following after the third paragraph.

General Notes.

(a) Notification. If an Erosion and Sediment Control Approval is issued for this project, notify the Regional Environmental Coordinator in writing or by telephone at 410-365-0164 prior to the following milestones:

(1) Pre-construction meeting.

(2) Erosion and sediment control meeting (minimum 7 working days prior to commencing earth disturbing activities).

(3) Installation of initial sediment control measures.

(4) Installation of major sediment control basins/traps.

(5) Removal or modification of any sediment control structures.

(6) Removal of all sediment control devices.

(7) Final acceptance by the Administration.

(b) Ingress/Egress Controls. Protect all points of construction ingress and egress to prevent the deposition of materials on public roads. Immediately remove all materials deposited on public roads. The flushing of road surfaces is prohibited.

Control all ingress and egress points through the use of a stabilized construction entrance. Submit locations for approval by the Regional Environmental Coordinator.

(c) Inspection. Inspect all erosion and sediment control measures daily and after storm events. Maintain continuously in an effective operating condition.

(d) Shutdowns and/or Penalties. Total compliance with the approved erosion and sediment control plan is expected at all times. In cases where the Contractor is found to be in non-compliance, the Administration may take steps to impose partial or total shutdowns and impose per day penalties for non-compliance.

The Administration may impose a total or partial shutdown if the project may adversely impact the waters of the State.

(e) Record Keeping. Make the project's approval letter, approved erosion and sediment control plans, approved change requests, daily log books and test reports available on-site for inspection by duly authorized officials.

(f) Erosion and Sediment Control Excavation. Place silt removed from control devices in an approved waste site either on or off the project. Material stored on-site may be reused once it is dried and if it conforms to the Administration's requirements for embankment or any unspecified need.

(g) Utility Work. Follow these additional best management practices for sediment control for utility construction in areas outside of designed controls:

(1) Call "Miss Utility" at 1-800-257-7777 48 hours prior to the start of work.

(2) Place excavated material on the high side of the trench.

(3) Backfill, compact and stabilize trenches for utility installations at the end of each working day. When this is not possible, follow (4).

(4) Place temporary silt fences immediately downstream of any disturbed area intended to remain disturbed for more than one day.

(h) Sensitive Areas. No construction activities are allowed within specified sensitive areas of the project without prior notification of the Engineer. Designate a responsible party to monitor all work in these areas to assure that reasonable care is taken in or adjacent to these areas. Areas considered sensitive are defined as: floodplains, wetlands (tidal, nontidal and associated buffers) critical areas, forested areas, archeological sites, historic sites, parkland, and open water.

(i) Standard Stabilization Note. Following initial soil disturbance or redisturbance, complete permanent or temporary stabilization within 3 calendar days as to the surface of all perimeter controls, dikes, swales, ditches, perimeter slopes, and all slopes greater than 3:1; and 7 days as to all other disturbed or graded areas on the project site.

(j) Site Information (Not for Bidding Purposes).

(1) Total area of site	acres
(2) Area disturbed	acres
(3) Area to be roofed or paved	acres
(4) Total cut	cubic yards
(5) Total fill	cubic yards

(6) Off-site waste/borrow area location (if known)

(k) Incremental Stabilization. Refer to the current Maryland Standards and Specifications for Soil Erosion and Sediment Control for the incremental stabilization of cuts and fills.

(l) Disturbed Areas. Place excavated trench material for any storm drain pipe and underdrain pipe installation on the high side of the trench. Backfill, compact, and stabilize trenches for any storm drain pipe and underdrain pipe installations at the end of each working day.

Stabilize all other disturbed areas at the end of the working day. Place silt fence downgrade of any areas that cannot be stabilized at the end of the work day such that all runoff from the disturbed area will be filtered.

(m) Removal of Controls. Establish permanent stabilization for all contributory disturbed areas and obtain permission prior to the removal of sediment control measures.

Immediately stabilize any areas disturbed by the removal of sediment control measures.

(n) Notice of Enforcement. Sediment and erosion control regulations will be strictly enforced.

Design Certification. Insert the following:

ENVIRONMENTAL INFORMATION

MDE/ PRD #

DESIGN CERTIFICATION

I HEREBY CERTIFY THAT THIS PLAN HAS BEEN DESIGNED IN ACCORDANCE WITH THE MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL, THE 2000 MARYLAND STORMWATER DESIGN MANUAL, VOLUMES I & II INCLUDING SUPPLEMENTS, THE ENVIRONMENT ARTICLE SECTIONS 4-101 THROUGH 116 AND SECTIONS 4-201 AND 215, AND THE CODE OF MARYLAND REGULATIONS (COMAR) 26.17.01 AND COMAR 26.17.02 FOR EROSION AND SEDIMENT CONTROL AND STORMWATER MANAGEMENT, RESPECTIVELY.

_____ _____
NAME SIGNATURE

_____ _____
MARYLAND REGISTRATION NUMBER DATE
P.E., R.L.S. OR R.L.A. (circle)

"PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO._____, EXPIRATION DATE:_____."

CATEGORY 300
DRAINAGE

SECTION 308 — EROSION AND SEDIMENT CONTROL

308.04 MEASUREMENT AND PAYMENT.

308.04.04 Incentive Payments and Liquidated Damages.

CHANGE: The paragraph to the following.

The total incentive awarded for this Contract will not exceed $208,000.00. The quarterly incentive payment for this contract is $8,000.00. A final incentive payment for this contract is $104,000.00 less the total quarterly incentives paid during a contract extension.

For each day that the project has a 'D' rating, liquidated damages will be imposed in the amount of $3,434.00 per day. Failure to upgrade the project to the minimum of a 'B' rating within 72 hours will result in the project being rated 'F'.

For each day that the project has an 'F' rating, liquidated damages will be imposed in the amount of $4,040.00 per day.

CATEGORY 300
DRAINAGE

SECTION 308 – EROSION AND SEDIMENT CONTROL

308.01 DESCRIPTION.

256 **ADD**: After the last paragraph of 308.01.04.

308.01.05 Severe Weather Event. A severe weather event occurs when rainfall exceeds 3 in. over a 24-hr period based upon rainfall data obtained from the nearest official National Weather Service (NWS) gauge station to the Project.

308.03 CONSTRUCTION.

265 **ADD**: After the last paragraph of 308.03.46.

308.03.47 Severe Weather Event. Maintain, repair, or replace any damaged erosion and sediment control devices within 48 hours of a severe weather event occurrence.

308.04 MEASUREMENT AND PAYMENT.

268 **ADD**: After the last paragraph of 308.04.51.

308.04.52. A lump sum payment of **$46,000.00** will be paid for each Severe Weather Event that occurs between the start of grading operations and removal of all erosion and sediment controls for which the Contractor is eligible. The payment will be full compensation for the maintenance, repair and replacement of any and all erosion and sediment control devices damaged during the severe weather event and for all material, labor, equipment, tools, and incidentals necessary to complete the work. Payment for each severe weather event will only be made if the Project has maintained a minimum Quality Assurance rating of "B" immediately before and within the 48 hrs. following the severe weather event and has official weather records documenting the occurrence of the severe weather event have been provided to the Administration.

CATEGORY 400
STRUCTURES

SECTION 402 ─ STRUCTURE EXCAVATION

INSERT: The following after (d).

402.03.04 Cofferdams and Foundation Seals

(e) The Contractor is advised that dewatering of footing excavations is anticipated on this project. The Contractor shall employ the following methods at a minimum to ensure that the duration and volume of pumping are minimized. The Contractor shall, when possible, schedule excavations requiring dewatering during the dry season (June through November) when the water table is anticipated to be at its lowest level. The Contractor shall schedule the excavation to begin during a period when little to no rain is predicted in the 5 day forecast. The Contractor shall employ multiple shifts (two crews working consecutive 10 hour days) to work on the excavation / foundation from the time they begin to dewater for the placement of concrete (footing, subfoundation, or tremie) until the concrete placement is complete. This may involve several iterations when multiple concrete placements are required to get concrete above the water level. It is not the intent of this specification to require multiple shifts to be available during concrete curing. Dewatering pumps shall be run continuously or as needed to maintain a near dry condition in accordance with 420.03.09 (a).

PILE AND DRIVING EQUIPMENT DATA

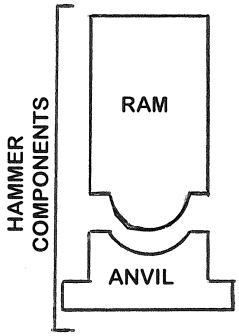
Contract No:_____ Structure Name and/or No.:_____

Project:_____ _____

_____ Pile Driving Contractor or Subcontractor:_____

County :_____ _____

(Piles driven by)



HAMMER

Manufacturer:_____ Model:_____

Type:_____ Serial No.:_____

Rated Energy:_____ @ _____ Length of Stroke

Modifications:_____

_____

_____

_____

_____

CAPBLOCK

Material:_____

Thickness:_____ Area:_____

Modulus of Elasticity – E :_____ (P.S.I.)

Coefficient of Restitution – e :_____

PILE CAP - Helmet / Bonnet / Anvil Block / Drivehead - Weight:_____

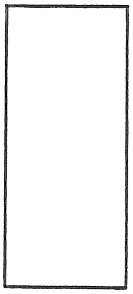
CUSHION

Cushion Material:_____

Thickness:_____ Area:_____

Modulus of Elasticity – E :_____ (P.S.I.)

Coefficient of Restitution – e :_____



PILE

Pile Type:_____

Length (in Leads):_____

Weight / ft.:_____

Wall Thickness:_____ Taper:_____

Cross Sectional Area:_____ (in^2)

Design Pile Capacity:_____ (Tons)

Description of Splice:_____

_____

Tip Treatment Description:_____

_____

NOTE: If mandrel is used to drive the piles, attach separate manufacturer's detail sheet(s) including weight and dimensions.

Submitted By:_____ Date:_____

CATEGORY 400
STRUCTURES

SECTION 412 — DRILLED SHAFTS (CAISSONS)

412.03 CONSTRUCTION.

412.03.03 Geotechnical Engineer.

ADD: The following after the last paragraph, "The geotechnical engineer...depth and bearing."

The Contractor shall provide the services of a geotechnical engineer for this project.

DELETE: SECTION 419 — SUBFOUNDATION INVESTIGATION in its entirety.

INSERT: The following.

CATEGORY 400
STRUCTURES

SECTION 419 — SUBFOUNDATION INVESTIGATION

419.01 DESCRIPTION. Drill supplemental borings at the bridge substructure footings as shown on the Plans, or directed, to determine the exact type of subsurface material and rock in which the drilled shafts or foundations will be located.

419.02 MATERIALS. Not applicable.

419.03 CONSTRUCTION. Perform subfoundation investigation and forward the data to the Office of Structures at least two weeks prior to any foundation excavation.

All test holes shall be drilled by a qualified soils exploration firm with experience in subsurface exploration. Submit the proposed firm to the Engineer for review and approval by the Administration's Geotechnical Explorations Division.

Drill the holes according to the procedures outline in the AASHTO manual on subsurface investigations. Particular attention shall be given to sampling methods T 206 and T 225. Rock classifications shall be made by a geologist according to the AASHTO classification procedures.

Drill all test holes a minimum of depth of 10.0 ft into rock without soil layers.

419.04 MEASUREMENT AND PAYMENT. Subfoundation Investigations will be measured and paid for at the Contract unit price per linear foot for the actual length of the hole drilled below the bottom of footing elevation. No payment will be made for drilling through the overburden material above the bottom of footings. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work.

CATEGORY 400
STRUCTURES

SECTION 420 ─ PORTLAND CEMENT CONCRETE STRUCTURES

420.02 MATERIALS.

ADD: The following at the end of materials list.

Concrete Chloride Content	902.10.11
Chloride Ion Content	902.11.01

CATEGORY 400
STRUCTURES

SECTION 421 — REINFORCING STEEL

421.02 MATERIALS

INSERT:

Stainless Steel Bars	908.03
Low Carbon Chromium Bars	908.13

421.03 CONSTRUCTION.

DELETE: 421.03.08 Substitution in its entirety.

INSERT: The following.

421.03.08 Substitution. Low carbon chromium or stainless steel reinforcing may be substituted on a one-for-one basis for the specified epoxy coated or non-epoxy coated deformed steel bar reinforcing, at the option of the Contractor, as approved by the Engineer. Welding of low carbon chromium bars is prohibited. No adjustment shall be allowed in the size, number, spacing, laps and configuration of the reinforcing for any increase in strength or other properties provided by the substitute reinforcing bars.

There will be no additional compensation for substituting bars of differing material composition in lieu of the bars specified.

CATEGORY 400
STRUCTURES

SECTION 421 — REINFORCING STEEL

421.02 MATERIALS

DELETE:

Galvanizing	A153

INSERT:

Galvanizing	
Reinforcing Steel	A123
Hardware	A153

421.03 CONSTRUCTION.

DELETE: 421.03.06 Splicing in its entirety.

INSERT: The following.

421.03.06 Splicing. Furnish bars in the lengths and have been spliced as specified and as approved in the working drawings. Do not perform additional splicing without approval. Make lap splices with the bars in contact and wired together. Do not weld reinforcing steel or weld attachments to reinforcing steel without approval. Perform welding per AWS D1.4.

CATEGORY 400
STRUCTURES

SECTION 435 — CLEANING AND PAINTING
NEW STRUCTURAL STEEL

435.01.01 Areas to be coated.

(b) Weathering Steel.

ADD: The following after (4).

(5) All steel surfaces when specified. Refer to 436.01.01(a)

435.01.04 Definition of Bridge.

DELETE: 435.01.04 in its entirety.

INSERT: The following.

435.01.04 Minimum Contracting Requirements for Shop Painting. To be eligible to perform the work of removing and applying paint in a shop environment, certification as specified in (a) or (b) is required. All certificates shall be effective prior to Award of Contract and shall remain in effect for the duration of the Contract. Refer to 436.01.03.

(a) SSPC-QP3. Standard Procedure for Evaluating of Qualifications of Painting Contractors; Shop Application to Complex Structures.

(b) AISC 420-10. Certification Standard for Shop Application of Complex Protective Coating Systems.

435.01.05. Definition of Bridge. Refer to 436.01.04.

435.02 MATERIALS.
435.02.01 Paint Systems.

DELETE: The second paragraph "New Steel (Includes New Structures, Repairs, and Widenings)." in its entirety.

INSERT: The following.

New Steel (Includes New Structures, Repairs, and Widenings). The paint shall meet Paint System B. Touch up paint for the shop primer prior to Coats II and III shall conform to Coat I of

Paint System C as approved by the coating manufacturer. The color of the finish coat shall match ACS-STD-595A, exact color as specified.

435.03 CONSTRUCTION.

435.03.06 Field Cleaning and Painting.

ADD: The following at the end of the first paragraph.

Follow the stripe coat schedule per 436.03.21.

DELETE: 435.03.16 Time Restrictions for Field Painting, in its entirety.

INSERT: Restrictions for Shop and Field Painting.

(a) Apply shop paint at any time in an enclosed facility under controlled environmental conditions and in accordance with the manufacturer's recommendations.

(b) For field painting, refer to 436.03.20.

DELETE: 435.03.17 Weather Restrictions for Painting, in its entirety.

INSERT: The following.

435.03.17 Weather Requirements for Painting. Refer to 436.03.19.

CATEGORY 400
STRUCTURES

SECTION 435 — CLEANING AND PAINTING NEW STRUCTURAL STEEL

435.02 MATERIALS.
435.02.01 Paint Systems.

INSERT: The following.

New Steel (Includes New Structures, Repairs, and Widenings). The color of the finish coat shall match ACS-STD-595A, color no. Color No. 26231 (Gray).

CATEGORY 400
STRUCTURES

SECTION 436 — CLEANING AND PAINTING EXISTING STRUCTURAL STEEL

436.01 DESCRIPTION.

436.01.03 Minimum Contracting Requirements for Field Painting.

DELETE: (a) in its entirety.

INSERT: The following.

(a) Standard Procedure for Evaluating Qualifications of Painting Contractors: Field Application to Complex Structures. The Society for Protective Coatings (SSPC) QP-1 Certified Applicator Specialist (CAS) requirements are waived.

436.02 MATERIALS.

DELETE: 436.02.02 Abrasives, in its entirety.

INSERT: The following.

436.02.02 Abrasives. Provide material safety data sheets (MSDS) for the abrasives and a letter, from the abrasive supplier, indicating that expendable abrasives meet SSPC-AB 1 and recyclable abrasives meet SSPC-AB 3. Verify the cleanliness of recycled abrasives per SSPC-AB 2.

436.03 CONSTRUCTION.

436.03.01 Submittals.

DELETE: (a) in its entirety.

INSERT: The following.

(a) Copy of SSPC-QP Certification. Refer to 435.01.04 for shop painting and 436.01.03 for field painting.

436.02 Personnel Qualifications and Responsibilities.

DELETE: (c) in its entirety.

INSERT: The following.

(c) Certified Industrial Hygienist (CIH) or Certified Safety Professional (CSP). When the work includes the disturbance or removal of paint containing toxic metals, ensure an approved CIH or CSP is present when the work is performed. Submit to the Engineer documentation that the CIH or CSP has the following.

(1) Valid certification by the American Board of Industrial Hygiene or Board of Certified Safety Professionals.

(2) Field sampling and oversight experience involving removal of paint that contains toxic metals from structures.

(3) Errors and omissions insurance coverage of not less than $1,000.000.00 for the type of work specified.

All field sampling and testing shall be performed by the CIH or CSP or by an employee working under direct supervision of the CIH/CSP, and shall be witnessed by the Engineer. Notify the Office of Structures Inspection and Remedial Engineering Division at least 24 hours prior to sampling and testing.

The CIH or CSP shall review all results of sampling and testing performed on the project. The CIH or CSP or a person working under their direction, shall prepare written reports interpreting these results for compliance to the applicable regulations. Submit a copy of reports and analysis to the Engineer within five working days after sampling.

Submit a written certification within five days after the end of each month stating compliance with the plans of Action and Compliance Programs specified for worker protection, environmental protection, and waste handling have occurred and all deficiencies found have been addressed. The certification shall be prepared and signed by the CIH or CSP or a person working under their direction.

436.03.03 Quality Control (QC) Plan, Inspection Procedures, and Recording Systems.

DELETE: The last paragraph, "Maintain on site…on site audits."

INSERT: The following.

Maintain on-site copies of the daily job quality control records and make available to the Engineer upon demand. Submit records from on-site audits and inspections from SSPC, MOSH, OSHA, EPA, and MDE.

436.03.04 Inspection Equipment.

ADD: After (q).

(r) Dry film thickness calibration plates traceable to the National Institute of Standards and Technology.

(s) Measuring stick or pole to measure platform under clearance. The stick or pole shall be collapsible and have a minimum measuring height of 20 ft.

436.03.10 Methods of cleaning.

DELETE: The table.

INSERT: The following table.

PAINT SYSTEM	SUBSTRATE	METHOD OF CLEANING
C & D	Abrasive Blast Cleaned Steel	Existing Paint to be Removed - Localized (a) and (b) and complete (h)
E & H	Overcoating Existing Paint	Existing Paint to be Overcoated - Localized (a) and complete (c) followed by (d) and (e)

DELETE: (h) Near White Metal Abrasive Blast Cleaning, in its entirety.

INSERT: The following.

(h) Near White Metal Abrasive Blast Cleaning. Do not use steel shot in the field. When using steel shot in the shop, add the appropriate amount of steel grit and maintain the mixture to produce an etched surface texture and not the peened surface texture that results when blast cleaning with shot alone. The end surface condition shall meet SSPC-SP 10, Near White, and as depicted in SSPC Vis 1. Ensure that abrasives are dry and free of oils, grease, and other harmful materials, such as lead dust, at the time of use. Abrasive media shall produce blasted surfaces having a surface profile height of 1.5 to 4.0 mils as determined per D 4417 Method C.

Whenever the existing condition causes surface profile to exceed 4 mils on weathering steel and in heavily corroded areas of existing structural steel members, apply at least two coats of primer to achieve the minimum dry film thickness specified above the profile.

436.03.15 Surface Condition Prior to Painting.

ADD: After the last paragraph, "Prior to the…cleaned as specified."

Move all hooks, cables, beam clamps, and outriggers during cleaning operation to allow the underlying surfaces to be cleaned. Any containment attachments that cannot be moved during cleaning and painting must be power tool cleaned to SP-11 Bare Metal and coated using Paint System H.

DELETE: 436.03.17 Paint Representative, in its entirety.

INSERT: The following.

436.03.17 Paint Representative. The representative shall be a technical representative of the paint manufacturer. During initial execution of the work the Engineer may require the paint representative to be on site to approve with the Engineer the degree of cleanliness prior to painting and the method of application of the coating system. The Engineer may stop paint operations for failure to meet this requirement regardless of the reason for failure. Areas cleaned prior to ceasing paint operations shall be recleaned if required.

DELETE: 436.03.19 Time Restrictions for Field Painting in its entirety.

INSERT: The following.

436.03.19 Weather Requirements for Painting. All surfaces to be painted shall be sound and cleaned as specified. Painting is allowed when:

(a) There is no presence of rain, snow, fog, or mist dampening or condensing on the surface.

(b) The relative humidity does not exceed the maximum humidity specified by the paint manufacturer.

(c) The ambient temperature in the shade is above 40 F.

(d) The surface temperature is above 35 F or the minimum temperature specified by the manufacturer, whichever is greater, and will be constant or higher until the paint cures to readiness for recoating.

(e) The surface temperature is a minimum of 5 F above the dew point until cure or intermediate coats have been top coated.

(f) The surface temperature is below 120 F or the temperature recommended by the paint manufacturer, whichever is less.

Whenever it is suspected that moisture is condensing upon the surface, the psychrometer will be used to check dew point, etc. If the conditions measured by the psychrometer are marginal, the Engineer may permit a well-defined area of the surface to be lightly moistened with a damp cloth and observed. If the dampness evaporates within 15 minutes, the surface will be considered satisfactory for the application of paint. Regardless of any environmental test results, when fresh paint is damaged, replace or repair the paint at no additional cost to the Administration.

Schedule the operations so that all cleaned surfaces are painted within 24 hours. If rust bloom appears or the air or steel temperature falls below five degrees above the dew point after cleaning and prior to application of the primer coat, reclean the affected areas to the satisfaction of the Engineer at no additional cost to the Administration.

DELETE: 436.03.20 Weather Restrictions for Painting, in its entirety.

INSERT: The following.

436.03.20 Artificial Climate Controls.

(a) Minimum temperature (substrate, air, and material) and all other environmental restrictions shall be maintained as specified. Refer to 436.03.19.

(b) If heat is to be used to reach environmental conditions, use only an indirect heat source that will disperse the heat evenly throughout containment area.

(c) Heat shall be maintained in accordance with the manufacturer's recommendations or time at recoat, whichever is greater, after the coating is completed in the desired areas.

(d) Install an operational automatic temperature data recorder inside the containment area until time to recoat, or manufacturer's recommendations, whichever is greater. The placement will be determined by the Engineer.

(e) Artificial Climate Controls will be at no additional cost to the Administration and no additional time will be added to the contract.

(f) Failure to maintain artificial climate controls will be cause to be denied work until weather dictates that artificial climate controls are not needed.

436.03.21 Application of Prime, Intermediate, and Finish Coats.

ADD: After the second paragraph "Apply all paint…proper coating thickness."

Move hooks, cables, beam clamps, and outriggers whenever possible to allow cleaning and application of all three coats of paint to these areas.

ADD: After the last paragraph "Apply each coat…and the Engineer."

At project completion, all fascia beams shall have a smooth and uniform appearance throughout. Should any fascia have runs, sags, heavy film build, blisters, bubbles, orange peel or any other coating defect which does not give the appearance of a smooth uniform surface, reclean and paint specific areas or the entire fascia as directed by the Engineer.

436.03.28 Field Cleaning Containment System Plan Guidelines.

ADD: The following after (i).

(j) All steel corrugated decking containment materials shall have either fire retardant plastic, impermeable screen or tarpaulins laid on top to prevent the leaking of grit, dust, toxic metals and debris during blast cleaning activities.

DELETE: 436.03.30 Worker Protection and Exposure Monitoring, in its entirety.

INSERT: The following.

436.03.30 Worker Protection and Exposure Monitoring. In addition to complying with all applicable OSHA and MOSH regulations, when the project involves coatings that contain toxic metals, provide the services of a CIH or CSP per 436.03.02(c) and submit a Worker Protection Compliance Program per 436.03.31. The CIH or CSP, or a technician working under the direction of the CIH/CSP shall monitor worker exposures during paint disturbance operations at each structure and provide worker protection oversight.

Regardless of whether or not toxic metals are present, provide a hand wash station with soap and towels at each work site. As dictated by the monitoring results and the applicable OSHA standards, provide a cleanup area with a shower, soap, hot and cold potable pressurized water,

a change area with a locker, and an approved container for collecting and disposing of waste at each work site.

Ensure that the hand wash and shower facilities are available to all site personnel. Hygiene facilities shall meet 29 CFR 1926.51, Sanitation Standard.

DELETE: 436.03.31 Worker Protection Compliance Program in its entirety.

INSERT: The following.

436.03.31 Worker Protection Compliance Program. The Worker Protection Compliance Program shall be on company letterhead and meet OSHA and the MOSH - Lead in Construction Standards, and other applicable toxic metal standards. The Worker Protection Compliance Program shall be reviewed and signed by the CIH or CSP and at least one copy of the submittal shall have an original CIH or CSP seal. The Worker Protection Compliance Program shall include a commitment for the CIH or CSP, or a person working under the direction of the CIH/CSP, to provide written certification each month of compliance with the Worker Protection Compliance Program, including biological monitoring. Provide a copy of the letter within 6 working days after the end of each month.

A Worker Protection Compliance Program is not required when the coatings being disturbed do not contain toxic metals.

DELETE: 436.03.33 Environmental Protection Plan of Action (EPPA) in its entirety.

INSERT: The following.

436.03.33 Environmental Protection Plan of Action (EPPA). An EPPA confirming that the environment is protected from contamination is required when the coatings are being abrasive blast cleaned (regardless of the presence of toxic metals), or the coating being disturbed contains toxic metals (regardless of the method of preparation). When an EPPA is required, it shall be reviewed and sealed by a CIH or CSP and shall include procedures for monitoring air, soil, and water.

Include a location plan showing the type and location of high volume ambient air monitors if applicable, and the procedures that will be followed for visible emissions assessments and inspections of the soil, water, surrounding property and structures, and pavement. Submit 6 copies of each plan signed and sealed by the CIH or CSP. All submittals shall be in writing and on company letterhead. At least one copy shall have an original seal. Address the proposed procedures that will be implemented for the following as defined in 436.03.34:

(a) For any paint disturbance using dry methods of preparation, address the daily visual emissions observations that will be performed and the corrective action that will be implemented in the event emissions or releases occur.

(b) When paint containing toxic metals is being disturbed, address the provisions for high volume ambient air monitoring (TSP - Monitoring); monitor citing, calibration, and

operation; filter handling and shipping; and laboratory analysis, including the name and qualifications of the laboratory. Test results shall be reviewed and summarized by the CIH or CSP. Provide copies to the engineer within 6 work days of sample collection by the CIH or CSP.

(c) For any paint disturbance, address the visual assessments for soil, water, and sediment undertaken each day throughout the Contract, together with the proposed cleanup activities. Provide to the Engineer a commitment from the CIH or CSP within 6 work days after the end of the month that certifies compliance with the EPPA.

436.03.34 Methods for Assessing Emissions.

DELETE: (b) Ambient Air Monitoring, in its entirety.

INSERT: The following.

(b) Ambient Air Monitoring. Unless otherwise directed, ambient air monitoring is required when the coatings being disturbed contain toxic metals, and whenever the paint removal operations are located within 500 ft. of houses, schools, parks, playgrounds, shopping areas, or similar areas of public exposure. Ensure monitoring starts one half hour before blast cleaning or power tool cleaning begins and continues for the entire duration of the cleaning activity or 7 hours, whichever is greater.

(1) **Abrasive Blast Cleaning.** Daily ambient air monitoring at each structure being abrasive blast cleaned shall begin one day prior to beginning work and during the first 10 days of productive abrasive blast cleaning operations. When the results indicate that the containment is controlling emissions, full-time monitoring may be discontinued unless otherwise directed. Ensure monitoring is repeated for 2 consecutive days every month thereafter during the work shift while blast cleaning or other dust producing operations are underway.

When the results of the original 10 days of monitoring or the periodic monthly tests are unacceptable, ensure that monitoring continues full-time. Monthly monitoring may be initiated or resumed only when approved, and only after the results of the testing indicates that the containment is controlling emissions.

Resume full-time monitoring when unacceptable visible emissions or residues are observed on the ground or water and as directed.

(2) **Hand and Power Tool Cleaning.** Begin daily ambient air monitoring at each structure one day prior to beginning work and during the first five days of hand tool cleaning and power tool cleaning. When the results indicate that the containment is controlling emissions, full-time monitoring may be discontinued unless otherwise directed. Resume monitoring when visible residues are observed on the ground or in the water, or visible dust is observed exceeding the visible emissions criteria established above.

(3) **Monitor Placement and Reporting.** Place total suspended particulate (TSP) monitors in areas of potential public exposure, including but not limited to adjacent to homes, businesses, parks, and pedestrian walkways, that are within 500 ft. of each project site during cleaning operations in conformance with Method D of SSPC Guide 6. The CIH or CSP shall provide for Engineer acceptance, the proposed monitoring locations in advance, together with the rationale for the selection of each site. All TSP monitoring samples shall be analyzed using Method 40 CFR 50 Appendix B and G by a laboratory approved by the American Industrial Hygiene Association.

The CIH or CSP shall use an Adjusted Daily Allowance (ADA) as described in SSPC Guide 6 (not an average daily allowance) for evaluating the TSP monitoring results. The CIH or CSP, or a person working under the direction of the CIH/CSP, shall provide a written report and analysis of monitoring results, including the relevant acceptance criteria based on the ADA, within five days of sample collection. Provide a copy of the results to the Engineer the following work day after receipt.

DELETE: 436.03.35 Field Cleaning Waste Disposal, in its entirety.

INSERT: The following.

436.03.35 Field Cleaning Waste Disposal. Store all project waste, regardless of whether or not toxic metals may be present, in sealed 55-gallon drums. Drums shall be labeled with the structure number, Contract number, Contractor's name, contents, and the date. Refer to 436.03.36 through 436.03.41.

When the waste is hazardous, comply with SSPC Guide 7. Each day, collect clothing and other waste material and seal them in 55-gallon drums. The drums shall be sealed 55-gallon open head type drums meeting I.C.C. Specification 17-H. All drums shall be in new condition.

DELETE: The first paragraph in 436.03.37. "When the project…random and representative."

INSERT: The following.

436.03.37 Waste Sampling and Analysis. When the project involves hazardous waste, the CIH or CSP, or an employee working under the direct supervision of the CIH or CSP, shall take at least four samples of the accumulated residues of each waste stream collected at each structure or a sample from every third drum, whichever is greater. All sampling shall be random and representative.

CATEGORY 400
STRUCTURES

SECTION 456 — ARCHITECTURAL TREATMENT

ADD: The following after 456.03.08

456.03.09 Architectural Treatment Type and Location. The type of architectural treatment and its location shall be as follows:

TABLE 456.00

ARCHITECTURAL TREATMENT			
STRUCTURE	**TREATMENT**	**COLOR ***	**LOCATION**
Triadelphia Road over MD 32	456.03.09(f) Rustic Coursed Ashlar Stone	**	Outside portion of parapets
	456.03.09(f) Rustic Coursed Ashlar Stone	**	Inset on face of pier columns
	456.03.09(f) Rustic Coursed Ashlar Stone	**	Face of abutments and wing walls
Retaining Walls	456.03.09(f) Rustic Coursed Ashlar Stone	**	Face of retaining walls visible from MD 32

* Color of stain shall match AMS-STD-595A.
** Final Coloration shall match that of the formliner finish for the bridges on Linden Church Road and Burntwoods Road over MD 32.

CATEGORY 400
STRUCTURES

SECTION 456 — ARCHITECTURAL TREATMENT

456.06 RUSTIC COURSED ASHLAR STONE.

456.06.01 DESCRIPTION. Construct a simulated rustic coursed ashlar stone surface on the concrete locations specified in the Contract Documents. Work includes developing, furnishing, and placing form liners and applying a color system to the finished concrete surface.

Patterns. The form liner shall replicate a real stone pattern consisting of a rustic coursed ashlar stone veneer with the following dimensional ranges for individual stones:

(a) Individual stone lengths of 12 to 36 in. and heights of 6 to 16 in.

(b) The dimension of form liner reveal from the outermost face of stone to the inside face of the grout pattern joint shall be 2 to 3 in.

(c) The width of grout pattern joints between individual stones shall be 3/8 to 3/4 in.

Provide two different form liner patterns with a minimum size of 16 ft^2. The pattern shall have the capability of being turned 180 degrees to result in a minimum of four different pattern combinations. Do not repeat the individual patterns side by side. Provide a combination of liner patterns that prohibit long continuous horizontal or vertical grout pattern joint lines occurring on the finished exposed surface.

456.06.02 MATERIALS. Refer to 456.00.

456.06.03 CONSTRUCTION. Refer to 456.00.

Concrete Stain. The concrete stain colors shall include a light gray for the base color, a darker gray for the surface color and highlight colors to achieve a finished look that will simulate natural stone. Apply the base color, which may be sprayed, to the entire surface (stones and grout pattern joints). Apply the surface color to 80 percent of the surface of simulated stones (front face and edges). Apply each highlight color to 2 to 5 percent of the surface of the simulated stones (front face only). Apply the surface and highlight colors to the front face of the simulated stones using a sponge. Apply the surface color by brush to the edges of the simulated stones. Do not apply the surface and highlight colors to the grout pattern joints.

456.06.04 MEASUREMENT AND PAYMENT. Development and preparation of working drawings, the development and furnishing of all form liners, the construction and finishing of all sample panels, the application of the rustic coursed ashlar stone form liner finish including application of colors, and all material, labor, equipment, tools, and incidentals necessary to complete the work will not be measured but the cost will be incidental to the Contract price for the pertinent Concrete or Structure item.

CATEGORY 400
STRUCTURES

SECTION 498 — PATCHING BRIDGE DECKS

DESCRIPTION. Remove unsound concrete and deteriorated reinforcing steel from the existing bridge deck, clean the area, install new in kind reinforcing steel, and place mix No. 9 concrete to the original elevations and grades. Make repairs in only one lane at a time.

MATERIALS.

Fine Aggregate	901.01
Coarse Aggregate	901.01
Cement	902.03
Concrete, mix No. 9	902.10
Epoxy Adhesive	921.04
Admixtures	902.06
Reinforcement	908
Water	921.01

CONSTRUCTION. Dispose of removed material at an approved spoil area.

Equipment. Ensure that all proposed equipment meets the requirements specified herein, and is approved.

(a) Power Driven Hand Tools. This equipment is permitted with the following restrictions:

(1) Do not use pavement breakers heavier than nominal 30 lb class.

(2) Do not operate pavement breakers or mechanical chipping tools at an angle greater than 45 degrees measured from the surface of the deck.

(3) Do not use chipping hammers heavier than a nominal 15 lb class for concrete removal beneath any reinforcing bars.

(b) Hand Tools. Use hand tools such as hammer and chisels for removal of remaining particles of unsound concrete from beneath any reinforcing bar or to achieve the required depth.

(c) Abrasive Blasting. Provide equipment capable of removing rust scale and old concrete from reinforcing bars and of removing small chips of concrete partially loosened by the removal operation.

Deck Removal and Repairs. Remove deteriorated areas of concrete deck down to the sound concrete. The Engineer will inspect the entire exposed portion of the deck and determine the type and extent of the repair. After removing all deteriorated concrete, remove all rust, oil, or other foreign materials detrimental to achieving bond, followed by abrasive blasting and air blast or vacuum as determined by the Engineer.

The Engineer will determine any extraneous damage to the existing bridge caused by the Contractor's operations, which the Contractor shall repair at no additional cost to the Administration.

Do not remove any portion of the existing bridge deck that can not be patched, cured, and open to traffic within time frame specified in MOT restrictions located elsewhere in this Invitation for Bids.

Place the concrete to the original elevations and grades unless otherwise specified in the Contract Documents.

Existing reinforcement steel to be utilized in the finished deck shall conform to 421.03.07 except all bars shall be thoroughly cleaned by abrasive blasting. Where the bond between existing concrete and reinforcement steel has been destroyed, or where more than half the diameter of the steel is exposed, remove the concrete adjacent to the bar to a depth that will permit concrete bond to the entire periphery of the exposed bar. This clearance shall be a minimum of 1 in. unless lower bar mats make it impractical. Take care to prevent cutting, stretching, or damaging any exposed reinforcement steel. Replace the reinforcing steel that is damaged or it has lost 20 percent or more of its original cross sectional area with the same diameter bars using uncoated bars for existing uncoated reinforcing steel and epoxy coated bars for existing epoxy coated reinforcing steel.

Repair spalled concrete, voids and other defects that are located within the proposed patch area to be in conformance with the methods specified herein. If necessary, remove the additional deck material strictly by handchipping.

(a) For cavities less than 1 in. deep, no additional work is required.

(b) For cavities 1 to 3 in. deep, wire fabric shall be placed as specified in 423.03.04. Wire fabric will not be required for repair areas less than 2 ft^2.

(c) For cavities over 3 in. deep but not full depth, the following provisions shall apply:

(1) If the repair crosses a proposed construction joint, a 1-1/2 x 3 in. keyway shall be provided at the vertical joint.

(2) The Contractor shall furnish and erect temporary protective shields as specified in 405.03.01 when the depth of removal reaches half of the original concrete deck thickness and deeper removal is anticipated.

(d) For areas where the depth of removal is full depth, the following provisions shall apply in addition to the requirements of (c):

(1) In large areas, forms supplied to enable placement of mix No. 9 concrete shall be supported by blocking erected from the stringers.

(2) In small areas, forms supplied to enable placement of mix No. 9 concrete may be suspended from existing reinforcement bars by wire ties.

Thoroughly clean the entire surface and abrasive blast before placing concrete. Use abrasive blasting to clean all reinforcing bars of visible rust and clinging concrete detached from the deck and all areas of concrete against which the patch is to be placed.

Further clean the surface by air blast and prior to placing the concrete wet the surface and keep it wet for at least one hour. Remove puddles of free water.

Placing and Furnishing. The concrete patch will be a part of the bridge riding surface. Place the concrete to the true as planned line and grade of the roadways. Take all necessary precautions to produce smooth riding bridge deck by placing the concrete in a manner that meets the grade of the proposed adjoining portions of the existing bridge deck. The location of longitudinal joins will be determined by the Engineer based on avoiding joints in the vehicular wheel path as much as practical.

Steel Plates for Maintenance of Traffic. Steel plates shall be available for use at any point during construction.

Curing. Refer to 522.

MEASUREMENT AND PAYMENT. The payment will be full compensation for all removal, cleaning, abrasive blasting, air blasting, wetting, forming, curing, disposal of material removed, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Removal of portions of existing concrete deck, regardless of the method or depth, will be measured and paid for at the Contract unit price per square yard for the Removal of Portions of Existing Deck item.

Repair Bar for Deck Reinforcement will be measured and paid for the Contract unit price per linear foot.

Placing, finishing, curing, and grooving of the mix No.9 concrete overlay, will be measured and paid for at the Contract unit price per square yard for the Placing Mix No.9 Concrete Overlay item.

Furnishing and installing any formwork required for full depth deck repairs will be measured and paid for at the Contract unit price per square foot for the pertinent Formwork for Full Depth Deck Repairs item. The measurement will be based upon the exposed opening at the bottom of the deck. The cost for the amount of form work extending beyond these limits will be incidental to the item.

CATEGORY 400
STRUCTURES

UNDERCLEARANCE BENEATH BRIDGE CONSTRUCTION

DESCRIPTION. Maintain appropriate minimum vertical underclearance between the underside of demolition or cleaning and painting containment shields and the State highways, including shoulders. Throughout this Special Provision the term underclearance refers to the minimum vertical undercleance at the bridge before and during the construction. All provision stated in TC-6.12 shall apply.

MATERIALS. Not applicable

CONSTRUCTION. Before beginning any erection of shields verify the existing underclearance and notify the Engineer if the measure is less than the 16 ft-6 in. The Contractor shall be allowed to install shields that reduce this underclearance to 15 ft-0 in. for the life of the project. If additional space to facilitate construction operation is needed, then this underclearance may be further reduced to 14 ft-6 in. and that the restriction only remain in place for a period of no more than 15 consecutive calendar days. At the end of the 15 day period the Contractor shall completely remove the shield to restore an underclearance of no less than 15 ft-0 in.

Erect signs alerting oncoming motorists of any reduction in underclearance less than 16 ft. These signs shall be in place prior to erecting any shields. These signs shall be changed prior to any additional reduction to the underclearance and after any increase in the underclearance such that at no time shall the underclearance be less than the amount shown on the signs. These warning signs when necessary shall be placed as shown on the Plans.

At no time during the construction will the available underclearance created by the placement of work equipment or installation of shields be permitted to be less than 14 ft-6 in.

MEASUREMENT AND PAYMENT. The maintenance of underclearance as described above will not be measured but the cost will be incidental to the pertinent items specified in the Contract Documents. The payment will be full compensation for determining the minimum underclearance, furnishing, installation, relocation, and removal of signs and for, all material, labor, equipment, tools and incidentals necessary to complete the work.

CATEGORY 500
PAVING

SECTION 500 — SAFETY EDGE

DESCRIPTION. Construct a sloped edge on the pavement shoulder of open section roadways using a paver attachment device that constrains the asphalt head, thus producing a compacted profile. The device shall adjust to accommodate varying paving thicknesses. The device shall be capable of being detached or raised when not in use.

MATERIALS.

Safety Edge	
Magnetic Protractor	Increments of 0 to 90 degrees in four quadrants, six-inch lens diameter, two level vials

CONSTRUCTION. Construct a sloped shoulder edge using the Safety Edge when the individual lift thickness is at least 1.5 in. or greater. The target range of the slope shall not be greater than 45 degrees when measured from the horizontal axis. When multiple lift construction is specified, construct the sloped edge on the top two pavement lifts. Construct the entire sloped edge on underlying pavement.

(a) Use the Safety Edge as a standard treatment for the outside edge of all open section roadways with 6’ shoulders or less.

(b) Record 10 angle readings per mile. The Engineer will witness the readings and document the results on Form OOC-91 for the project files. The performance criteria target is for 90% of the readings to fall below 45 degrees.

(c) The Safety Edge does not replace the requirements in Section 609.

MEASUREMENT AND PAYMENT. All work associated with the construction and angle measurements of the Safety Edge will not be measured but the cost will be incidental to the pertinent Asphalt Pavement item. Shoulder backup material will be measured and paid for per Section 609.

CATEGORY 500
PAVING

DELETE: SECTION 502 — SOIL-CEMENT BASE COURSE in its entirety.

INSERT: The following:

SECTION 502 – SOIL-CEMENT

502.01 DESCRIPTION. Construct soil-cement layer using a combination of soil and portland cement, uniformly mixed, moistened, compacted, shaped and sealed, to the required depth and widths specified in the Contract Documents. Unless otherwise specified, the soil, cement, and water may be either plant mixed or mixed in place.

502.02 MATERIALS.

Portland Cement	902.03
Emulsified Asphalts	904.03
Production Plant	915
Soil	916.01.01 or 916.01.02
Water	921.01

502.03 CONSTRUCTION. At least 45 days prior to the start of constructing the soil cement layer, submit the proposed production plants, location of plants with respect to project site, equipment, and material sources for approval. When placing soil-cement as a base course, protect the subgrade and base against damage from all causes. Repair or replace damaged subgrade and base, at no additional cost to the Administration.

502.03.01 Equipment. All equipment, including the production plant and on-site equipment, is subject to approval. Have the production plant ready for inspection at least 48 hours before the start of construction operations.

(a) **Reclaimer.** A self-propelled rotary machine capable of cutting through material to depths of up to 16 inches in one pass. The reclaimer shall be capable of pulverizing the material at a minimum width of 8 ft, and mix in any additional materials to the specified depth. The reclaimer shall be equipped with a computerized integral liquid proportioning system capable of regulating and monitoring the water application rate relative to depth of cut, width of cut, and speed.

The reclaimer shall have a mounted spray bar to allow the water to be injected directly into the cutting drum/mixing chamber.

The reclaimer shall be capable of mixing water, dry additives, and the pulverized unbound materials into a homogenous mixture. The cutting drum must have the ability to operate at various speeds (rpm), independent of the machine's forward speed, in order to control oversized material and gradation. Maintain the cutting drum in good condition at all time throughout the project. Inspection of the condition of the cutting teeth will be performed daily. Replace all worn and broken cutting teeth.

(b) **Grading Equipment**. A self-propelled motor grader capable of shaping the material to the line, grade, and cross section required for the project. The motor grader shall be equipped with a cross slope indicator.

(c) **Compaction Equipment**. A vibratory pad-foot roller (minimum 52,000-pounds centrifugal force), pneumatic tire roller (minimum 21 to 25 ton) or double drum vibrator roller for breakdown compaction. Use a tandem steel drum (static) roller (minimum 12 ton) for finish rolling.

(d) **Spreader/Distributor.** A non-pressurized mechanical vane-feed cyclone or screw type capable of providing a consistent, accurate and uniform distribution to apply dry powder stabilizing agents and /or additives. The spreader/Distributor shall be capable of minimizing dust during construction.

(e) Water Truck(s). For supplying water to the reclaimer or construction operations.

502.03.02 Weather Restrictions.

(a) Temperature and Surface Conditions. Place soil-cement layer when the ambient air and surface temperatures are at least 40 F and rising. Do not place material on a frozen subgrade. Do not place soil cement base course when temperatures are anticipated to be below 40 F within 7 days of the end of soil cement placement and on a frozen subgrade.

(b) Cold Weather Protection. Protect the completed soil-cement layer from freezing during the seven-day curing period.

(c) Precipitation. Do not place material during precipitation. When precipitation has occurred during the previous 24 hours, the Engineer will determine if the placement of soil cement layer is feasible for Construction. If precipitation occurs during placement, placement of material en route from the plant to the job site shall be at the Contractor's risk.

502.03.03 Subgrade Preparation. Complete the subgrade to final line and grade at least 500 ft ahead before beginning soil-cement base course construction.

Construct the foundation as specified in Sections 204 and 208. If traffic, including construction equipment, is allowed to use the subgrade foundation or preceding layer, distribute the loading over the entire width of the course to aid in obtaining uniform and thorough compaction. Remove rutting by reshaping and recompacting the affected area as specified in Section 204.

502.03.04 Design Mix. At least 45 days prior to the start of constructing the soil-cement layer, submit samples of the soil and portland cement from the proposed material sources. Sample the materials as specified in the Materials Manual and as noted below. The Engineer will determine the exact proportions of soil and portland cement, and the optimum moisture content based on these samples. Proportions may be revised during construction to provide for changing conditions as directed. Plant mixed material shall be sampled at the plant. Mixed in place material shall be sampled from a 500 ft long control strip constructed on the site. If the proposed material source for soil is onsite, then obtain representative samples of the existing soil at least every 500 lane-feet to develop the mix design in addition to the above requirements. Do not include existing material from beneath the proposed depth in mix design testing.

The samples shall be analyzed and tested by an AASHTO accredited Laboratory with experience in soil-cement. Sampled material must be properly processed and prepared to closely simulate field conditions. The laboratory shall provide the following information as part of the mix design to the Engineer:

1. Location of core samples or test pits (if material source is onsite)
2. Laboratory Testing required
    - Moisture Content……AASHTO T265
    - LL, PL, and PI of Soil……AASHTO T89 & T90
    - Unconfined Compressive Strength……AASHTO T208
    - Moisture-Density Relationship……..AASHTO T134
    - Material Finer than No. 200 Sieve……AASHTO T11
    - Sieve Analysis of Fine and Coarse Aggregate……..AASHTO T27
    - Classification of Soils and Soil Aggregate Mixtures…AASHTO M145

Design recommendations shall clearly show for each mix design: optimum moisture content, aggregate gradation and content (if additional aggregate is required), maximum dry density and the proper rate of application for portland cement necessary to achieve the seven-day compressive strength (450-700 psi for soil-cement base course and 300-450 psi for soil-cement modified subgrade). Make, cure and test unconfined compressive strength specimens in accordance with ASTM 1633, method A. Wrap the specimens in plastic wrap, seal in an airtight, moisture proof bag and cure the test specimens for a period of 7 days.

The submitted report shall include results from all tests performed to develop the recommendations. All component materials used in the mix design shall be representative of the materials proposed by the Contractor to be used on the Project.

If a change in sources of materials is made, the Contractor shall submit a revised mix design before using the new material. When unsatisfactory results or other conditions make it necessary, a new mix design shall be required.

All soil-cement placement shall proceed after the revised mix design has been reviewed and approved in writing by the Office of Materials Technology. Once the mix design is approved, then the Contractor may proceed with the control strip.

Approval of the mix design by the Office of Materials Technology is solely for monitoring quality control and in no way releases the Contractor from his responsibilities.

502.03.05 Transportation. Handle and transport mixed materials in a manner that minimizes segregation and loss of moisture. Cover all loads in accordance with State laws, unless hauling is off road and approved. Unless approved, do not dump material into piles, haul over the completed soil-cement layer, or stockpile the material on the job site. Haul time shall not exceed 30 minutes and compaction shall start as soon as possible after spreading.

502.03.06 Control Strip. During the first day of the production, the Contractor shall construct a control strip to verify that the construction process meets the specification requirements. Construct a control strip to verify that the construction process can meet the required gradation, spread rate for cement and the roller pattern needed to obtain the specified density requirement for the entire project. The soil-cement placement shall not continue unless the control strip has been approved by the Engineer. Control strips that do not meet the requirements from the approved mix design shall be reworked, re-compacted, or removed and replaced at no additional cost to the Administration. Upon acceptance of the control strip by Engineer, use the same method and procedures to construct the control strip for the entire project, unless adjustments are required to the mix design. Any adjustments to the mix design shall be approved by Office of Materials Technology and require a new control strip. The control strip shall be 500 ft long. The control strip is solely for determining the mix design acceptance for placement of the job. Meeting the requirements on the control strip does not relieve the Contractor from meeting the requirements on the entire project. Acceptance of the control strip will be based on obtaining the required strength validated using the Falling Weight Deflectometer (FWD) testing. A minimum resilient modulus of 4,500 psi for soil-cement modified subgrade or a minimum elastic modulus of 650,000 psi for soil-cement base course shall be achieved. The achieved resilient modulus for soil-cement modified subgrade or the elastic modulus for soil-cement base course must be equal to or higher than the values used for design.

502.03.07 Pulverization/Shaping/Stabilization. Pulverize the existing unbound material to the depth and width as specified. Add water as necessary to control dust.

(a) Pulverize the unbound material to ensure that, at the completion of moist mixing, 100 percent passes a 1 in. sieve and at least 80 percent passes a No. 4 sieve. Limit any variation in the moisture content of the soil at the time of cement application to 2 percent from optimum. Then spread portland cement on the soil at the approved spread rate. In the presence of the Engineer, use an accurate scale to verify the spread rate. Then thoroughly mix the pulverized soil and cement. Immediately after completing the mixing operation, use a pressurized distributor to spray water on the mixture at the approved rate. Mix the soil/cement/water combination until it is uniform.

(b) Compact and smooth the surface over its full width. Correct any unstable areas with Graded Aggregate Base (GAB). Remediate unstable soils encountered below the depth of pulverization as directed. Remediation may consist of greater depths of cement treatment, excavation of unstable soils and backfilling with cement stabilized material or aggregate, and/or incorporation of drainage measures. Perform remediation work as extra work on a unit cost basis.

(c) Water may be added to the pulverized material to adjust the moisture content to at least Optimum Moisture Content (OMC) if necessary. Add water using the machines liquid additive system and through top watering.

(d) Do not pulverize more than 1/2 mile in front of the pulverizing operation if there is a chance that precipitation or traffic will result in instability of the pulverized material. Maintain a uniform driving surface free of ruts and surface irregularities. Repair any ruts and surface irregularities at no additional cost to the Administration.

(e) Protect any buried structures such as bridges, culverts, utilities, drainage pipes, etc. during pulverization and stabilization; including stopping or raising the mixing drum at these obstructions. Any damages to these structures will be replaced at no additional cost to the Administration.

(f) Apply the stabilizing additives at the established application rate in accordance with the approved mix design using an approved spreader/distributor after shaping and compaction. The time from stabilizing additive placement to the start of mixing shall not exceed 30 minutes.

(g) Thoroughly mix the additives and the pulverized pavement together at the specified design depth while simultaneously injecting any additional water needed through the machines liquid proportioning system. The moisture content before compaction must not exceed 2% over OMC.

502.03.08 Grade or Finished Surface Control. Shape the surface of the soil-cement layer to the specified line, grade, and cross section. Set grades longitudinally and transversely with fixed controls spaced no more than 25 ft. Compact and smooth the surface over its full width using a smooth faced steel-wheeled roller, or if rolling is not feasible, by mechanical tampers and vibratory compactors, as approved. Maintain the finished grade within 1/2 in. from the established grade.

502.03.09 Finishing. Complete the soil-cement layer placement during daylight hours and within 4 hours of initial mixing. Material that is not fine graded and final rolled with 4 hours of initial mixing shall be reclaimed again with fresh cement at no additional cost.

502.03.10 Compaction. Immediately after placement, compact the soil-cement base to a density of at least 100 percent of the maximum density, and soil-cement modified subgrade to a density of at least 97 percent of the maximum density as determined by AASHTO T 134. Measure the in-place density per MSMT 350. Furnish a compaction block as specified in 204.03.04.

At the start of compaction, maintain the moisture in the mixture to within 2 percent of the specified optimum moisture. Compaction shall begin no more than 20 minutes after mixing. Complete all compaction operations within 2 hours from the start of the mixing operation.

Begin compaction operations, except on superelevated curves, at the sides of the course. Overlap the shoulder or berm at least 1 ft and progress toward the center parallel to the center line of the roadway. On superelevated curves, begin compaction at the low side and progress toward the high side. Continue compaction operations until all compaction marks are removed.

A nuclear density gauge will be used in direct transmission mode to determine the field density of the soil cement layer. If the density of an area is less than the required percentage of the Target Density, perform additional compaction. If additional compaction does not achieve the required percentage of the Target Density, adjust the moisture content and re-compact. Moisture correction on the nuclear gauge is required for validation of field density.

If the density is still below the required percentage of the Target Density but the soil-cement layer is otherwise acceptable, define the area as a new test strip to establish a new Target Density. A minimum of 5 density tests will be taken at random locations to determine the average in-place density and to define the new Target Density. Repeat the test strip and Target Density development process if the uniformity of the mixture changes significantly, as determined by the Engineer.

502.03.11 Construction Joints. At the end of each day's construction, create a straight transverse construction joint by cutting back into the completed work to form a vertical face. Build the base for large, wide areas as a series of parallel lanes of convenient length and width, complete with longitudinal joints, as approved. Longitudinal joints between successive cuts shall overlap a minimum of 6 in. and transverse joints shall overlap a minimum of 2 ft.

502.03.12 Protection and Curing. Complete all spreading, compacting, and shaping within three hours after the mixing water, cement, and soil come in contact. Reconstruct any section not meeting these requirements. Maintain the surface of the soil cement layer in a moist condition until the emulsified asphalt is applied or by being kept continuously moist for a period of 7 days with a water spray that will not erode the surface of soil cement. If emulsified asphalt is used for curing, it shall be applied no later than 24 hours after completion of the finishing operations. Use distributing equipment conforming to 503.03.01 to apply the emulsified asphalt at the rate of 0.2 gal/yd^2. Avoid ponding of the emulsified asphalt. If ponding occurs, use a sand blotter or an equivalent method as approved.

Allow the soil cement layer to cure for a period of 7 days. During this period, close soil cement layer to all traffic, unless otherwise approved by OMT. Repair damaged areas.

502.03.13 Maintenance. During construction and after completion of the base course, maintain the base course until the surface course is placed. When unacceptable work cannot be repaired, replace it for the full depth of the base.

502.03.14 Subsequent pavement layers. Subsequent pavement layers can be placed any time after curing if soil-cement layer is sufficiently stable (proof rolled) to support the required construction equipment without rutting or shoving.

502.03.15 Quality Control Plan (QCP). Inspections and testing will be performed as necessary to ensure the quality and conformance of the work. The Contractor shall submit a Quality Control Plan (QCP) that contains the field testing frequency and procedure for cement content, density and moisture content and compaction, provide qualifications of the Inspector, Calibration Report of the cement spreader to check the application rate of the cement (lbs/SY), depth checks to ensure proper mixing and remediation plan for areas that did not meet the requirements, at least 30 days prior to construction. Construction shall not begin until the QC plan is approved by Office of Materials Technology (OMT).

A Certified Field Technician shall be present at the job site unless otherwise approved in the Field QCP. The technician shall be responsible for the required field quality control sampling and testing. Deviations from the QCP shall be cause for immediate suspension of production and paving operations. The Certified Field Technicians shall perform sampling for quality control, acceptance, split sampling, and verification. Submit quality control test results to the Engineer. Maintain complete records of sampling, testing, corrective actions and quality control inspection results. Provide copies of the reports upon request.

502.03.16 Quality Assurance (QA). The Administration will perform independent QA sampling, testing and inspections as per Administration's Material Quality Assurance Processes.

502.04 MEASUREMENT AND PAYMENT. The payment will be full compensation for control strip, FWD testing, pulverization, shaping, compaction, spreading stabilization additive, mixing, graded aggregate base, emulsified Asphalt, remediation of unstable areas, water, testing, hauling, setting of lines and grades where specified, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

502.04.01 Soil-Cement Base Course will be measured and paid for at the Contract unit price per square yard. Surface area measurements will be based on the specified width of the base and the actual length measured along the center line of the base surface.

502.04.02 Soil-Cement Modified Subgrade will be measured and paid for at the Contract unit price per square yard. Surface area measurements will be based on the specified width of the subgrade and the actual length measured along the center line of the subgrade layer.

502.04.03 Portland Cement for Soil-Cement Base Course will be measured and paid for at the Contract unit price per ton.

502.04.04 Portland Cement for Soil-Cement Modified Subgrade will be measured and paid for at the Contract unit price per ton.

CATEGORY 500
PAVING

DELETE: Section 508 in its entirety.

INSERT: The following:

SECTION 508 — MILLING ASPHALT PAVEMENT

508.01 DESCRIPTION. Mill asphalt pavement.

508.02 MATERIALS. Not Applicable.

508.03 CONSTRUCTION. Perform roadway patching per Section 505 prior to milling. Additional roadway patching may be required after milling.

Quality Control Plan (QCP). Submit a Quality Control Plan for Milling to the District Engineer for approval at least 30 days prior to milling per the Field Quality Control Plan (QCP) in 504.03. The QCP shall show methods proposed to control and maintain the milling equipment, materials, and daily milling operations. Discuss the Milling QCP requirements in the pre-construction, pre-pave, and progress meetings.

508.03.01 Equipment.

(a) Milling Machine. Provide all equipment necessary for approval prior to beginning work. Use a power operated milling machine capable of removing asphalt pavement to the specified depth in one pass and at least half the lane width. The machine shall be equipped with automatic control devices capable of controlling grade, elevation, and cross slope at a given rate. The machine shall be capable of establishing profile grades along each edge of the machine, within plus or minus 1/4 in., by referencing from the existing pavement or independent grade control. The milling machine shall have a system capable of side, rear or front offloading of the milled material into a transfer vehicle for off-site disposal. The machine shall meet NIOSH standards for emission control. Continuously monitor the cutting head to ensure and maintain a uniform textured surface after milling. Provide supplemental equipment as necessary to remove material in areas that the milling machine cannot reached.

(b) Measurement Devices. An approved 10 ft. straightedge for testing the transverse and longitudinal surface during and after milling. Use MSMT 413 for Volumetric Pavement Macrotexture Depth (Sand Patch) Testing.

(c) Street Sweeper. Provide a vacuum equipped or mechanical street sweeper to follow behind the milling machine. The sweeper shall be capable of removing all loose material from the roadway to minimize dust escaping into the atmosphere.

508.03.02 Control Strip. Mill a control strip at least 500 ft. in length with a uniformly textured surface and cross section as approved. The resulting surface shall be true to the established grade and verified every 50 ft. with a 10ft. straightedge to test the transverse and longitudinal surface tolerance at ±1/4 in. The Contractor has the option to choose either Sand Patch Test (MSMT 413) or the Straightedge Test as shown in Table 1 - Texture Requirements.

Table 1 – Texture Requirements

Milling Type	Minimum Average Diameter Per Sand Patch Option (in.)	Maximum Ridge to Ridge Distance and Ridge to Bottom Height Per Straightedge Option (in.)
Standard	9	5/8
Fine	11	3/8
Micro	14	1/4

Do not perform pavement macrotexture measurements in areas where there is rutting, exposed delamination, within several feet of any structure, in areas that will not hold the pattern, or where the previously milled surface texture is exposed.

508.03.03 Pavement Milling. Mill one lane at a time using all automatic control devices. If the milling depth exceeds 2.5 in., mill the abutting lane or shoulder on roadways carrying traffic on the same day. Mill the abutting lanes and shoulder prior to weekends or temporary shutdowns, regardless of depth. The abutting lane or shoulder may be milled on alternate days if the milling depth is 2.5 in. or less. Provide adequate advance warning devices where uneven pavement joints exist as specified. Provide positive drainage to prevent accumulation of water on the milled pavement as directed.

Straightedge Testing. Verify surface tolerances with a 10ft. straightedge at a minimum of five random locations daily. The variation of the top of two ridges from the testing edge of the straightedge, between two ridge contact points, shall not exceed values in Table 1. The variation from the top of the ridge to the bottom of the groove adjacent to that ridge shall not exceed values in Table 1. Correct unsatisfactory surfaces at no additional cost. Report test information per the QCP.

Sand Patch Testing. Verify surface texture requirements in Table 1 by performing random daily visual checks. Ensure the milling continues to exhibit a uniformly textured surface and cross section as produced in the Control Strip, as determined.

Fill all depressions, potholes, and other irregularities using an asphalt mix after the milling is complete. Construct an asphalt wedge at existing water valves, meters, manhole covers, etc. per Section 106. Where sound pavement has been gouged, torn, or otherwise damaged during the milling operations or damage is done to other property including utility frames, grates and covers, make repairs at no additional cost.

Areas varying from a true surface more than the tolerance stated in 508.03.02 may be accepted without correction if the Engineer determines that they were caused by a pre-existing condition that the milling operation cannot repair.

The Engineer may require milling of any area where a surface delamination causes a non-uniform texture to occur, at the contract unit price. Where a surface delamination between asphalt layers or a surface delamination between asphalt on Portland cement concrete causes a non-uniform texture to occur, the depth of milling shall be adjusted in small increments to a maximum of + ½ inch. Tie into curb and gutter as directed.

The finished milled surface shall provide a smooth surface with straight longitudinal striations, free from scallops, scabs, gouges, ridges and have a uniform texture suitable as a temporary riding surface.

Monitor milled surface after opening to traffic. Immediately notify the Administration of any defective areas. Correct all unsatisfactory surface conditions as directed at no cost to the Contractor

508.03.04 Temporary Tie-ins. Construct temporary tie-ins before allowing traffic to cross the transverse joint. Temporary tie-ins shall be at least 4 ft. in length for each 1 in. of pavement milling depth when milling roadways carrying traffic with a posted speed ≤ 40 mph, and at least 10 ft. in length for each 1 in. of pavement milling depth when milling roadways carrying traffic with a posted speed >40 mph. If the tie-in length is 10 ft. or greater, a paver meeting 504.03.01 shall be used for compaction.

508.03.05 Cleanup. Use a vacuum equipped or mechanical street sweeper, in addition to any other equipment required, to remove dust and debris after milling and prior to allowing traffic on the milled surface.

508.03.06 Delay Penalty. Do not open traffic on the milled surface for more than 10 calendar days, beginning at the first day of milling until the start of paving. A deduction of $1,500 per day for interstates and $750 per day for all other roadways will be assessed for each additional day the milled surface remains open to traffic. The delay penalty will be deducted from the next progress payment and is a permanent deduction.

508.04 MEASUREMENT AND PAYMENT. Milling Asphalt Pavement will be measured and paid for at the Contract unit price per square yard for the pertinent depth of milling asphalt pavement. The amount will be computed from the width and length measurements of the actual milled areas. The payment will be full compensation for milling, measurement, testing, disposal of milled material, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

(a) Standard Milling Asphalt Pavement (0-1 in. depth)

(b) Standard Milling Asphalt Pavement (Over 1-2.5 in. depth)

(c) Standard Milling Asphalt Pavement (Over 2.5-4 in. depth)

(d) Standard Milling Asphalt Pavement (Over 4 in. depth)

(e) Fine Milling Asphalt Pavement (0-1 in. depth)

(f) Fine Milling Asphalt Pavement (1-2.5 in. depth)

(g) Micro Milling Asphalt Pavement (0-0.5 in. depth)

(h) Micro Milling Asphalt Pavement (0.5-1 in. depth)

(i) Micro Milling Asphalt Pavement (1-2 in. depth)

Asphalt mixes for filling depressions and potholes, and for wedging manholes, valve boxes, inlets, temporary tie-ins and other structures will be measured and paid per 106.04.

Asphalt patches will be measured and paid for per 505.04.

CATEGORY 500
PAVING

SECTION 509 — DIAMOND GRINDING

DELETE: SECTION 509 — Grinding Hot Mix Asphalt in its entirety.

INSERT: The following.

SECTION 509 — DIAMOND GRINDING

509.01 DESCRIPTION. Grind Portland cement concrete or asphalt pavement with diamond tipped saw blades to restore proper drainage and ride quality.

509.02 MATERIALS. Not applicable.

509.03 CONSTRUCTION. Prepare and submit a traffic control plan for approval per 104.01. Patch the pavement as specified and remove all pavement markings prior to grinding. Seal joints after grinding as specified.

509.03.01 Equipment. Use a power-driven, self-propelled machine capable of grinding the pavement surface to the specified smoothness and texture using diamond tipped saw blades. Do not use equipment that damages the underlying pavement, causes raveling, aggregate fractures, or spalls at joints or cracks. The grinding unit shall:

(a) Weigh at least 35,000 lb., including the grinding head.

(b) Have a grinding head that will grind a strip at least three feet wide.

(c) Have a wheel base of at least 12 ft.

(d) Have a vacuum system that removes all grinding slurry from the pavement surface and leaves the surface in a clean, near-dry condition.

(e) Be maintained to ensure it is in proper working order with attention paid to the roundness of the match and depth control wheels. Replace any wheels found to be out of round.

509.03.02 Grinding. Grind the pavement in the longitudinal direction, beginning and ending at lines normal to the pavement centerline.

(a) Do allow any unground surface area between passes, and do not overlap passes of the grinding head more than two inches.

(b) Eliminate faults to result in a maximum of 1/16 in. differential between adjacent sides of joints or cracks, except that under no circumstances shall the maximum overall grinding depth exceed 1/2 in.

(c) Grind into adjacent lanes or shoulders as directed to transition from the edge of the travel lane to provide lateral surface drainage leaving no more than a 1/8 in. ridge and an acceptable riding surface.

509.03.03 Final Cross Slope. Achieve lateral drainage by maintaining a constant cross slope between grinding extremities in each lane. Have an approved 10 ft. straightedge available at all times. The finished surface shall be sufficiently smooth so that when tested with a straightedge placed upon the surface parallel with the center line, the surface does not deviate more than 1/8 in. The transverse slope of the finished surface shall not deviate more than 1/8 in. Straightedge requirements do not apply across longitudinal joints or outside the ground area. Regrind areas of deviation as directed.

509.03.04 Final Finished Surface. Produce a neat, uniform finished surface with a longitudinal line-type texture with corrugations parallel to the outside pavement edge. The peaks of the ridges shall be 1/16 in. ± 1/16 in. higher than the bottom of the grooves with evenly spaced ridges having a land area width ranging from 0.080 to 0.110 in. It may be necessary to adjust the blade spacing to achieve the specified texture. Ensure a minimum of 95 percent of any 100 ft section of pavement surface is textured.

509.03.05 Slurry Handling and Removal. Continuously remove the grinding slurry residue from the pavement. Do not allow the slurry to flow across lanes occupied by traffic or to flow into gutters or other drainage facilities. Collect the slurry into water-tight haul units and transport and properly dispose of all slurry and residues from the pavement surface off-site.

509.03.06 Pavement Surface Profile. Refer to Section 535.

509.04 MEASUREMENT AND PAYMENT. Payment will be measured and paid for at the Contract unit price per square yard. The payment will be full compensation for grinding, cleaning the pavement and shoulders, slurry removal and disposal, surface profile testing, corrective action, technicians, and for all material, labor, equipment, and incidentals necessary to complete the work.

Traffic control will be measured and paid for under separate pay items for this project. Traffic control will include all devices and requirements as stated in the traffic control plan.

CATEGORY 500
PAVING

SECTION 535 — PAVEMENT SURFACE PROFILE

535.01 DESCRIPTION. Measure the roughness of the final surface of Superpave Asphalt Mix (SAM) or Portland Cement Concrete (PCC) pavements using an International Roughness Index (IRI) Inertial Profiler to collect Quality Control (QC) data. The IRI Inertial Profiler shall conform to E 950 and MSMT 563. The Administration will use an IRI Inertial Profiler to perform all Quality Assurance (QA) testing and acceptance. Measure all final roadway surfaces unless otherwise indicated.

535.01.01 Existing Conditions. Following are the IRI values for this project:

MD 32 Existing Mainline

IRI INDICATOR	REPORTED VALUES FOR BOTH WHEEL PATHS (in./mile)	REPORTED STATEWIDE RURAL OTHER PRENCIPAL ARTERIAL VALUES (2016) (in./mile)
Average	67	96
Maximum	189	635
Minimum	33	23
Standard Deviation	25	57

NOTE 1: IRI is an abbreviation for the International Roughness Index developed under World Bank Technical Report No. 46.
NOTE 2: IRI values were generated from the most recent pavement longitudinal profile data available, measured in the outside travel lane.
NOTE 3: The average, maximum, minimum, and standard deviation IRI values are based on intervals of 1/10 of a mile in length.

A definition of ride quality based on IRI (as defined by The Federal Highway Administration) is given below:

IRI RANGE (in./mile)	RIDE QUALITY
< 60	Very Good
≥ 60 to < 95	Good
≥ 95 to ≤ 170	Fair
>170 to ≤ 220	Mediocre
> 220 to ≤ 640	Poor

535.02 MATERIALS. Not applicable.

535.03 CONSTRUCTION.

535.03.01 Equipment Standardization Testing. MSMT 563. Perform standardization testing on Administration specified sites at regular intervals. Additional testing may be required for a device that may be out of conformance between regular standardization tests. Send a copy of the completed standardization test results to the Administration's Office of Materials Technology (OMT). QC test data obtained with a profiler that has not completed standardization testing will not be accepted.

535.03.02 Quality Control Testing for Pavement Profile. E 950 and MSMT 563. Measure the pavement profiles in the direction of travel in both wheel paths simultaneously and parallel to the right edge of the lane. Document a regular schedule of pavement profiling in the SAM Field Quality Control Plan (504.03) or the PCC Proposed Paving Plan (520.03). Notify the Engineer prior to performing any QC measurements. Submit the results to the Engineer per the approved QC plan within 72 hours of completion of the paving operations.

Data Submittal. Submit all data to the Engineer and OMT (in electronic format) via one of the following:

(a) E-mail: ridespec@sha.state.md.us

(b) Delivered: Office of Materials Technology
7450 Traffic Drive
Hanover, MD 21076
Attention: Paving Quality Assurance Team Leader

Profile measurements and data submission that has not been completed for all sections on the project as specified will not be eligible for incentive payment per 535.04.03(a). QC data is required for materials clearance.

(a) Measure and report the QC IRI in sections equal to 25 ft in length and one lane in width. Sections measured that are shorter than 25 ft due to exempt areas or the project end are required to be reported but not used in the pay calculation.
(b) Measure a full 25 ft section after each exempt area.
(c) Perform three measurement runs per MSMT 563. The coefficient of variation of the overall average IRIs shall be less than or equal to 4 percent for three runs.
(d) When the first three runs do not meet the above criteria, perform additional runs until three measured runs meet the criteria. Submit the acceptable three runs to the Administration. Only the median run (based on average IRI) will be considered for the QC IRI data, and will be used to compute any pay adjustments.

(a) Areas Not Profiled. The following pavement areas are exempt from profiling and reporting for pay adjustment:

(1) Shoulder areas.

(2) Parking areas of ride sharing facilities or park and ride lots.

(3) Pavements of ramps, side street tie-ins, acceleration lanes, or deceleration lanes less than 1,000 ft in length.

(4) Bridge decks, railroad crossings, stop signs and pavement within 50 ft thereof.

(5) Pavement within 50 ft of transverse joints that separate it from existing pavement. This does not apply when a transverse joint is paved on both sides as part of one contract.

(6) Pavements on projects with less than 1,000 center lane feet, after elimination of areas not to be profiled under items 1 through 5.

(7) Ramps greater than 1,000 centerline feet with radius less than 2,000 feet.

Perform Pavement Surface Checks on areas listed above per 504.03.14.

(b) Defects. 535.04. When any section IRI is greater than or equal to IRI_e per the table, take one of the following corrective actions as directed and at no additional cost:

(1) Remove and replace the pavement that is greater than or equal to IRI_e, or

(2) Grind the section to bring the section IRI into conformance, or

(3) Accept the Defect Cost per 535.04 for any defective section where corrective action is not performed.

Perform the above corrective actions to each defective section as determined. Approval to waive (1) or (2) does not constitute a waiver of (3) unless explicitly stated.

(1) Re-profile all affected pavement sections after any corrective work, including any additional transverse paving joints created, to determine if the sections are within specification.
(2) The re-profiled data shall include the section prior to the corrected sections and the four sections after the corrected sections.
(3) The re-profiled data shall be used for final pay calculations; however, the minimum IRI value for any corrected section shall be limited to IRI_c.

Defects Not Due to Workmanship. When it is determined that a defect is not the result of substandard workmanship, a written justification for removing the defect from final pay calculations will be provided to OMT's Asphalt Technology Division. The Engineer will discuss this matter with OMT's Asphalt Technology Division before making the final pay adjustment determination.

535.03.03 Paving Quality Assurance Testing for Pavement Profile (IRI). The Administration may measure sections of the pavement to verify the QC data. The QC data will be used for any pay adjustments on the project if the QA measurements have not been performed within

14 calendar days from the date that the completed QC data was submitted. Perform QA testing per 535.03. The initial QA test will consist of one run on all 25 ft sections. The initial QA run and the median QC run will be compared to determine QC data acceptance. The average IRI, the number of defects, and the number of tested sections will be compared as follows:

STATISTIC	UNIT	QC DATA TOLERANCE WITH RESPECT TO QA DATA
Average IRI	in./mile	± (2 % + 2)
Number of Defects	Sections	± (10 % + 2)
Number of Tested Sections	Sections	± (1 % + 1)

The QC data will be used for all pay adjustments when it falls within the above tolerances.

(a) Perform a minimum of two additional QA runs when the QC data does not agree with the initial QA data and a cause cannot be determined.
(b) The initial and two additional QA runs will then be evaluated to determine if the coefficient of variation of the overall average IRIs is less than or equal to 4 percent for the three runs.
(c) When the three QA runs do not meet the above criteria, additional runs will be performed until three measured QA runs meet the criteria.
(d) The median run (based on average IRI) of the three QA runs will then be re-compared with the QC data in conformance with the above tolerances.

Corrective Actions. If the QC and QA data are still not within the tolerances described above for Average IRI or Number of Defects, both profilers shall be retested on a standardization test site per MSMT 563 to determine their conformance and recalibrated or repaired as necessary.

(a) If the QC profiler is not brought into compliance within three paving days, cease paving operation or use another standardized profiler to collect QC data.
(b) Once the QC profiler is brought into compliance, previously tested sections may be retested for comparison with the QA data or the QA data can be accepted as the basis for any pay adjustment on all sections.
(c) If the QA profiler is out of compliance, then the QC data for all sections tested will be accepted.
(d) If both profilers are found to be in noncompliance, they shall be repaired or recalibrated as necessary and all QC and QA testing since the previous comparison repeated.

When the QC and QA data for Number of Tested Sections are not within tolerance, the respective Distance Measuring Instruments (DMIs) shall be recalibrated and additional QC testing performed until the QC data meets the tolerance criteria.

535.04 MEASUREMENT AND PAYMENT. Pavement surface profile testing costs will be incidental to the SAM surface material or PCC material as specified. Payment will be full compensation for all set up, technicians, traffic control, any type of corrective work to bring the pavement into conformance, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

The Administration will perform the pay adjustment calculations for the Overall IRI per 535.04.01 and for Defect Cost per 535.04.02 and then will calculate the Total Pay Adjustment per 535.04.03.

535.04.01 Overall IRI. The overall average IRI for the project (IRI_{AVG}) will be calculated as the average IRI value of all tested 25 ft sections on the project. The pay adjustment for Overall IRI will then be calculated based on the factors below.

Incentive. $PF = P_{max}$, when IRI_{AVG} is less than or equal to IRI_a
$PF = P_{max} \times (IRI_b - IRI_{AVG})/(IRI_b - IRI_a)$, when IRI_{AVG} is greater than IRI_a and less than IRI_b

INCENTIVE = PF x NS x (25/5280 lane miles per section)
DISINCENTIVE = 0

Full Pay. When IRI_{AVG} is greater than or equal to IRI_b and less than or equal to IRI_c

INCENTIVE = 0
DISINCENTIVE = 0

Disincentive. $PF = P_{min} \times (IRI_{AVG} - IRI_c)/(IRI_d - IRI_c)$, when IRI_{AVG} is greater than IRI_c and less than IRI_d,
$PF = P_{min}$, when IRI_{AVG} is greater than or equal to IRI_d

INCENTIVE = 0
DISINCENTIVE = PF x NS x (25/5280 lane miles per section)

535.04.02 Defect Cost. The IRI for each individual section will be used to calculate any cost to be applied for defects on the project. This pay adjustment applies only to the pavement within the tested sections. The pay adjustment for defects will be calculated based on the factors shown below.

DEFECT COST = Sum of the defect costs ($P_{defect,i)}$ for all defect sections

Where:

	DESCRIPTION	VALUE	UNITS
P_{max}	Maximum Incentive for Overall IRI	6,150	Dollars per lane-mile
P_{min}	Maximum Disincentive for Overall IRI	6,150	Dollars per lane-mile
$P_{defect,i}$	Defect Cost for a given 25' section	*	Dollars per section
PF	Pay Factor for Overall IRI	*	Dollars per lane-mile
INCENTIVE	Incentive for Overall IRI	*	Dollars
DISINCENTIVE	Disincentive for Overall IRI	*	Dollars
DEFECT COST	Sum of the defect costs ($P_{defect,i)}$ for all defect sections	*	Dollars
IRI_a	IRI for Maximum Incentive	41	Inches per mile
IRI_b	Minimum IRI for Full Pay	47	Inches per mile
IRI_c	Maximum IRI for Full Pay	66	Inches per mile

IRI_d	IRI for Maximum Disincentive	74	Inches per mile
IRI_e	IRI threshold for Defects	180	Inches per mile
IRI_{AVG}	Overall average IRI for the project	*	Inches per mile
IRI_{defect}	IRI for a given 25' defect section	*	Inches per mile
NS	Number of tested 25 foot Sections	*	Sections

* Value to be determined on the project.

The defect cost ($P_{defect,i}$) for each defect section will be computed using the following formula:

$$P_{defect,\,i} = 100 + \left(\frac{190 * (IRI_{defect} - IRI_e)}{(600 - IRI_e)} \right)$$

535.04.03 Total Pay Adjustment. A total pay adjustment (TPA) will be made based on the total of any incentive and disincentive for Overall IRI minus any defects. TPA resulting in increased payment will be paid under the item Pavement Surface Profile Pay Adjustment. This item amount has been established by the Administration and shall not be revised. TPA resulting in decreased payment will be deducted from monies owed. The TPA shall be subject to conditions (a) and (b) below.

Total Pay Adjustment = INCENTIVE - DISINCENTIVE - DEFECT COST

(a) Regardless of the measured profile of any test section, incentive payment will not be permitted for the project when the Contractor's QC data was not submitted on time in conformance with 535.03.02.

Total Pay Adjustment = 0 - DISINCENTIVE - DEFECT COST

(b) The total value of Overall IRI disincentive and Defect Cost shall not be more than the Maximum Disincentive pay adjustment for all of the profiled 25 foot sections.

If DISINCENTIVE + DEFECT COST is greater than P_{min} x NS x (25/5280 lane miles per section) then Total Pay Adjustment = - P_{min} x NS x (25/5280 lane miles per section)

CATEGORY 500
PAVING

DELETE: SECTION 557 – SNOWPLOWABLE RAISED PAVEMENT MARKERS in its entirety.

INSERT: The following.

SECTION 557 — SNOWPLOWABLE RAISED PAVEMENT MARKERS

557.01 DESCRIPTION. Furnish and install new snowplowable raised pavement markers (SRPM) and replacement components for existing markers as specified and as directed, and in conformance with the Maryland Manual on Uniform Traffic Control Devices. Snowplowable Raised Pavement Markers are durable materials. Select SRPMs from the Qualified Products List (QPL).

557.02 MATERIALS.

Holders	951.07
Pavement Marker Reflector Lenses	951.07
Epoxy Holder Adhesive	951.07
Lens Adhesive	951.07

557.03 CONSTRUCTION. Per 549.03.

557.03.01 Quality Control. Per 549.03.01.

557.03.02 Quality Assurance. Per 549.03.02.

557.03.03 Quality Control Test Strip. Per 549.03.09. Install a minimum of 10 groove cuts spaced as specified to verify the accuracy and ability of the equipment and personnel. Replace any incorrect groove cuts and any incorrect casting placements within the test strip at no additional cost.

557.03.04 Pavement Marker Reflector Lenses. Reflector lenses for pavement markers shall be the same color as the adjacent pavement marking except the back side shall be as follows.

(a) One-Way Applications: The backside for one-way markers shall be red or blank as specified or as directed.

(b) Two-Way Applications: The backside for two-way markers shall be the same color as the adjacent pavement marking.

557.03.05 General Installation Requirements.

(a) Ensure all materials and equipment needed to perform the installation are on site.

(b) Ensure the road surface and ambient temperatures meet the manufacturer's recommendations for installation. Do not install markers on wet pavement surfaces.

(c) Replace any incorrect groove cut, incorrect holder placement, or incorrect lens replacement at no additional cost. An additional test strip may be required in the event of incorrect installations.

557.03.06 New Installation. Install SRPMs no later than 2 weeks after the completion of the final surface or as directed.

557.03.06.01 SRPMs with Steel Holders

(a) Install new steel holders with lenses affixed per D 4383 and the manufacturer's recommendations. The installed height shall not exceed ¼ in. above the road surface. Do not install new steel holders that have damaged holders or lenses.

(b) Install steel holders free of dirt, dust, oil, grease, rust, moisture, or any substances that may impair adhesion to the pavement. Remove any material that inhibits retroreflectivity of the reflector lens without damage to the lens surface. Clean each contaminated casting by sand blasting, wire brushing or other approved procedure to remove all substances prior to installation. Do not use chemicals to remove rust.

(c) Cut the groove for the holder to the appropriate dimensions to allow 1/8 in. side to side movement. The leading and trailing edges of the holders shall lie below the pavement surface and the holders shall seat properly.

(d) Use lenses that are specifically manufactured and approved for use as steel holder reflector lenses. Do not use lenses that are manufactured exclusively for direct application to pavements as substitutes.

557.03.06.02 Recessed SRPMs with Plastic Polycarbonate Holders

(a) Install SRPM per D 4383 and manufacturer's recommendations.

(b) Install plastic holders that are free of dirt, dust, oil, grease, moisture, gloss or any substances that may impair adhesion to the pavement. Remove any material that inhibits retroreflectivity of the reflector lens without damage to the lens surface. Clean holders to remove all substances prior to installation. Do not damage the holder.

(c) Cut the groove for the holder to the appropriate dimensions to allow ¼ in. side to side movement. All leveling lugs on the holder shall overlap and contact the pavement and the holders shall seat properly.

(d) Use lenses that are specifically manufactured and approved for use as plastic holder reflector lenses. Do not use markers that are manufactured exclusively for direct application to pavements as substitutes.

557.03.06.03 Recessed Direct SRPMs without Holders

(a) Install direct SRPM lenses per D 4383 and manufacturer's recommendations. Use lenses manufactured and approved for use as recessed pavement markers. Installed height of marker shall be 1/4 in. below the pavement surface.

(b) Install direct lenses that are free of dirt, dust, oil, grease, moisture, or any substances that may impair adhesion to the pavement. Remove any material that inhibits retroreflectivity of the reflector lens without damage to the lens surface.

(c) Cut the groove for the direct one-way recessed marker reflectors lenses to the appropriate dimensions for properly seating the reflector lens per D 4383 and the manufacturer's recommendations.

(d) Cut the groove for direct two-way recessed marker reflectors lenses to the appropriate dimensions for properly seating both reflectors per D 4383 and the manufacturer's recommendations.

(e) Do not use lenses manufactured for use with holders as substitutes for direct lenses unless recommended by manufacturer.

557.03.07 Holder Replacement

(a) Steel Holder Replacement. Do not replace with damaged or used steel holders. Do not reuse existing steel holder cuts. The location of the replacement cut shall be within 10 percent longitudinally ahead (with the direction of traffic) and with no lateral deviation exceeding 1.5 in. Permanently patch previously used cuts per Sections 504, 505, and 522.

(b) Polycarbonate Replacement. Do not replace with damaged or used polycarbonate holders. Existing grooves may be recut for replacement. Repair damaged groove cuts per Section 504, 505, and 522. Locate the replacement groove cut within one longitudinal foot ahead of the damaged cut in the direction of traffic with no lateral deviation exceeding 1.5 in

557.03.08 Direct Replacement.

(a) Remove and dispose of any damaged reflector lenses and replace with lenses that conform to the original lens requirements unless otherwise specified or as directed. Install replacement lenses per the manufacturer's recommendations.

(b) Existing grooves may be recut to comply with D 4383.

(c) Repair damaged groove cuts per Section 504, 505, and 522. Locate the replacement groove cut within one longitudinal foot ahead of the damaged cut (with the direction of traffic) with no lateral deviation exceeding 1.5 in.

557.05.09 Reflector Lens Replacement. Remove from holder and dispose of any damaged reflector lens and replace with a new lens on undamaged steel castings or plastic holders that have missing or damaged lenses. Install replacement lenses per the manufacturer's recommendations.

557.03.10 Observation Period. Replace damaged, non-retroreflective or missing Pavement Marker Reflector Lenses within 180 days after opening to traffic at no additional cost.

557.03.11 Submittals. Submit product data sheets including instructions for installation, MSDS and a Quality Control Plan for review and approval.

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557.04 MEASUREMENT AND PAYMENT. The payment will be full compensation for all pavement preparation, furnishing and placement of SRPM's, testing, removal, groove cutting, repair and all materials, labor, equipment, tools and all incidentals necessary to complete the work.

Snowplowable Raised Pavement Markers will be measured and paid for at the Contract unit price per each. The payment includes furnishing and installing SRPM including the holder, reflector, adhesive and grooving.

(a) SRPMs with Steel Holders will be measured and paid for as specified.

(b) Recessed SRPMs with Plastic Polycarbonate Holders will be measured and paid for as specified.

(c) Recessed Direct SRPMs without Holders will be measured and paid for as specified.

Removal of Existing Holders or lenses in groove cuts will be measured and paid for at the Contract unit price per each, excluding any incorrect installations or repairs of groove cuts

Replacement of Pavement Marker Reflector Lenses will be measured and paid for at the Contract unit price per each.

CATEGORY 700
LANDSCAPING

BIORETENTION MEADOW ESTABLISHMENT

DESCRIPTION. Establish meadow in bioretention soil mix (BSM) to provide permanent vegetation groundcover. When it is not possible to perform Bioretention Meadow Establishment, refer to Section 704 and install Temporary Matting Mulch using Type A Soil Stabilization Matting, or as directed. Performance of Bioretention Meadow Establishment as specified herein complies with all requirements of the Maryland Department of the Environment for permanent seeding.

MATERIALS.

Limestone	920.02.01
Sulfur	920.02.02
Compost	920.02.05
Fertilizer	920.03.01
Soil Stabilization Matting (SSM)	920.05.01
Fasteners	920.05.02
Tall Fescue, Hard Fescue	920.06.06(a)
Common Oat	920.06.06(b)
Meadow Forb Seed	920.06.06(c)
Meadow Grass, Sedge and Rush Seed	920.06.06(d)
Wildflower Seed	920.06.06(e)
Water	920.09.01
Seed Carrier	920.09.02

CONSTRUCTION.

(a) Regions. Maryland is divided into Regions by counties as follows.

Region 1. Garrett, Allegany, and Washington, west of Clear Spring MD.

Region 2. Washington, east of Clear Spring, MD, Frederick, Carroll, Baltimore, Harford, Cecil, Howard, Montgomery, and Baltimore City.

Region 3. Anne Arundel, Prince George's, Calvert, Charles, St. Mary's, Kent, Queen Anne's, Talbot, Caroline, Dorchester, Wicomico, Worcester, and Somerset.

(b) Seeding Seasons. Perform operations according to Table 1 when soil moisture and weather conditions are suitable, when the temperature is above 32 F, and the soil is not frozen. Cease operations when conditions are unsuitable.

(c) Pesticide Application. The Contractor shall possess a Maryland Department of Agriculture Commercial Pesticide Business License and a Pesticide Applicator Certificate for the

pertinent pesticide application Category: (2) Forest; (3A) Ornamental Plant Exterior; (3-C) Turf; (5) Aquatic; (6) Right-of-Way and Weed.

Apply pesticides in conformance with the Maryland Pesticide Applicator's Law, OSHA and MOSH regulations, and the manufacturer's label and Safety Data Sheets (SDS).

Ensure that pesticides are applied by a Maryland Certified Pesticide Applicator, or by a Registered Pesticide Applicator under the supervision of a Certified Pesticide Applicator.

(d) Pesticide Application Reporting. Record the location and details of pesticide applications on the Pesticide Application Reporting Form. Submit the Form within 24 hours after applying pesticides.

(e) IPM Program and Establishment Schedule. Refer to 701.03.01(c) and 920.01.01. Develop an IPM Program to control Prohibited Weeds that includes methods of pest monitoring for weed control, pesticide selection, application rates, and scheduling. Submit the IPM Program and Establishment Schedule when seeding operations are completed. The Program and Schedule will be forwarded to the Landscape Operations Division for review and comment before approval is granted.

(f) Seeding Schedule. Develop a Schedule that provides dates for completing seeding operations. Submit the written Schedule at least 14 days before beginning operations. The Schedule will be reviewed by the Engineer and Landscape Operations Division for completeness and feasibility, and will be approved or returned for correction.

BIORETENTION MEADOW ESTABLISHMENT
TABLE 1 - SEEDING SEASONS AND SEED ADDITIVES

REGION	SEEDING SEASON - MONTH/DAY				
	Spring	**Summer**	**Fall**	**Late Fall**	**Winter**
	SHA Bioretention Meadow Seed				
1	3/1 to 6/14	6/15 to 7/31	8/1 to 9/30	10/1 to 11/30	12/1 to 2/29
2	2/1 to 5/14	5/15 to 7/31	8/1 to 10/14	10/15 to 11/30	12/1 to 2/29
3	2/1 to 4/30	5/1 to 7/31	8/1 to 10/31	11/1 to 11/30	12/1 to 2/29
All Regions	Plus Additive A*	Plus Additive B*	Plus Additive B*	Plus Additive D*	Plus Additive A*
	Plus Additive B*	Plus Additive C*	Plus Additive D*	Plus Additive E*	Plus Additive E*

Seed Additive Notes *

Additive A = Garden Cosmos
Additive B = Plains Coreopsis
Additive C = Tall Fescue
Additive D = Corn Poppy
Additive E = Common Oat

(g) Nutrient Management Plan (NMP). Soil testing will be performed and a NMP will be developed by the Administration. Conform to the application rates of the NMP and replace

application rates of Table 2 in 707.03.03 as required by the NMP. When no NMP has been developed, apply 200 lb. per acre of 20-16-12 (83% UF with MAP & SOP) fertilizer as the NMP rate for initial fertilizer for Meadow Establishment.

(h) Nutrient Management Reporting. Record the location and details of soil amendment and fertilizer applications on the Nutrient Management Reporting Form. Submit the Form within 24 hours after applying soil amendments and fertilizer.

(i) Modification Request. Submit a written Modification Request to install other species; or to adjust seeding rates. The Engineer in consultation with the Landscape Operations Division will evaluate the Request. If granted, a notice of approved modification will be returned within 14 days after the request is received.

(j) Application Rates. Apply seed and other materials as specified in Table 1 - Seeding Seasons and Seed Additives, Table 2 - Application Rates, and Table 3 - Meadow Seed Species and Application Rates.

BIORETENTION MEADOW ESTABLISHMENT
TABLE 2 - APPLICATION RATES

MATERIAL	**RATE**	
	LB PER SY	**LB PER ACRE**
SOIL AMENDMENTS per Nutrient Management Plan for Bioretention Soil Mix [a, b]		
Compost	0 to 1.033	0 to 5,000
Gypsum	0 to 0.455	0 to 2,200
Limestone	0 to 0.930	0 to 4,500
Sulfur	0 to 0.052	0 to 250
FERTILIZER per Nutrient Management Plan [b, c, d]	**RATE**	
	LB PER SY	**LB PER ACRE**
20-16-12 (83% UF with MAP & SOP) or one or more of the following [c, d]	0 to 0.041	0 to 200
38-0-0 (UF)	0 to 0.021	0 to 100
11-52-0 (MAP)	0 to 0.036	0 to 175
0-0-50 (SOP)	0 to 0.041	0 to 200
MEADOW SEED SPECIES Bioretention Meadow Establishment	**RATE**	
	GRAM PER SY	**LB PER ACRE**
	Refer to Table 3 of this Specification	
ADDITIVE SEED Per Table 1 of this Specification	**RATE**	
	GRAM PER SY	**LB PER ACRE**
A = Garden Cosmos	0.028	0.3

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B = Plains Coreopsis	0.028	0.3
C = Tall Fescue	2.345	25.0
D = Corn Poppy	0.028	0.3
E = Common Oat	4.690	50.0
OVERSEEDING	**RATE**	
	GRAM PER SY	**LB PER ACRE**
Tall Fescue per (p) of this Specification	18.76	200.0
TYPE D SOIL STABILIZATION MATTING	Apply over the seeded area	

Notes:

[a] Apply compost, gypsum, limestone, sulfur, and fertilizer at rates specified in the NMP.

[b] For Bioretention Soil Mix (BSM) the application rates will be developed for the approved source of supply.

[c] When no NMP has been developed, apply 200 lb per acre of 20-16-12 fertilizer, and do not apply any soil amendments.

[d] UF = Ureaform; MAP = Monoammonium Phosphate; SOP = Sulfate of Potash. When application rate of 20-16-12 fertilizer is below 200 lb. per acre, apply UF, MAP, and SOP per NMP.

BIORETENTION MEADOW ESTABLISHMENT

TABLE 3 - MEADOW SEED SPECIES AND APPLICATION RATES

FORBS Include All	**PURE LIVE SEED ***		**GRASSES** Include All	**PURE LIVE SEED ***	
	GRAM PER SY	**LB PER ACRE**		**GRAM PER SY**	**LB PER ACRE**
Blackeyed Susan	0.094	1.0	Switchgrass	0.188	2.0
Partridge Pea	0.188	2.0	Deertongue	0.188	2.0
Red Clover	0.188	2.0	Hard Fescue	0.938	10.0
Note: The rate shown is Pure Live Seed. Use germination and purity data from the seed tag to calculate the actual seeding rate needed to obtain the seeding rate in Pure Live Seed.			Alkaligrass	0.188	2.0
			Purpletop	0.188	2.0
			Virginia Wildrye	0.094	1.0

(k) Preparing Soil. Use rakes, soil rollers, and similar tools and equipment as necessary to ensure a firm and uniform soil surface in preparation for seeding.

(l) Seed Delivery, Weighing, and Mixing. Use spreaders, drills, or other approved machinery. Seeders shall be capable of uniformly placing seed and fertilizer at the specified rate. Calibrate equipment before application. Hydroseeders shall not be used to apply seed or fertilizer. Apply fertilizer and seed to the surface of Bioretention Soil Mix. Apply materials accurately and uniformly to avoid misses and overlaps. Do not operate machinery during windy weather that may interfere with uniform application.

(m) Matting. Apply Type D Soil Stabilization Matting and water over the seeded area according to 709.

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(n) Seeding Phase Acceptance. Submit a request for Seeding Phase Acceptance when operations are completed. Inspection will be conducted to verify completion, and Seeding Phase Acceptance will be granted at that time.

(o) Establishment Phase. The Establishment Phase will begin upon Seeding Phase Acceptance.

Period of Maintenance. Maintain seeded areas for 12 months after Seeding Phase Acceptance.

Required Maintenance. Perform the following during the Establishment Phase.

Watering. Apply water to ensure survival of the seeded species as needed. Apply water to seeded and mulched areas with approved machinery. Do not allow water to cause erosion or to displace the mulch.

Weed Control. Refer to (e) of this Specification. Monitor and promptly implement the IPM Program to control weeds in conformance with the IPM Program as needed or as directed. Remove weeds over 18 in. tall. Remove noxious weeds such as Canada Thistle and Johnsongrass as needed or as directed.

(p) Overseeding. When living seedling groundcover is less than 70 percent, perform overseeding as directed. Overseeding consists of lifting or loosening soil stabilization matting, applying Tall Fescue seed at the rate of 200 pounds per acre, and restoring soil stabilization matting and applying water according to 709.

(q) Partial Establishment Phase Inspection. Seeded areas will be inspected 6 months after Seeding Phase Acceptance. The Inspection Report will include actions to perform before Partial Establishment Phase Acceptance is granted.

(r) Final Acceptance. The Engineer and the Landscape Operations Division will complete an Inspection Report of seedling height, color, and percent coverage. When it is not possible to perform the Inspection, Final Acceptance will be delayed until Inspection is possible. The Inspection Report will be included in the Punch List requirements for the project. Complete the Punch List requirements as directed. Final Acceptance will be granted after all operations have been completed, and when meadow seedlings and other permanent seeded species have grown at least 4 in. tall, exhibit dark green color, and are least 95 percent groundcover.

MEASUREMENT AND PAYMENT. Bioretention Meadow Establishment will be measured and paid for at the Contract unit price for one or more of the Specified items. The payment will be full compensation for all material, labor, equipment, tools, disposal fees and incidentals necessary to complete the work.

(a) Payment Schedule. Payments will be made according to Table 4 when construction requirements are met.

BIORETENTION MEADOW ESTABLISHMENT **TABLE 4 - PAYMENT SCHEDULE**		
CONSTRUCTION REQUIREMENTS	**PERCENT OF TOTAL CONTRACT PRICE**	**PAYMENT FOR COMPLETED WORK**
(a) thru General thru (n) Seeding Phase Acceptance	70	At Seeding Phase Acceptance
(o) Establishment Phase thru (q) Partial Establishment Phase Inspection	15	At Partial Establishment Phase Acceptance
(o) Establishment Phase and (p) Overseeding and (r) Final Acceptance	15	At Final Acceptance
Total Payment	**100%**	

(b) Forfeiture. Failure to complete operations as required or directed according to the Payment Schedule will result in forfeiture of that percentage of payment.

Bioretention Meadow Establishment. Bioretention Meadow Establishment, including preparing soil, applying fertilizer, soil amendments, meadow seed, seed additives, watering, weed control, and overseeding will be measured and paid for at the Contract unit price per square yard. The use of other materials in conformance with an approved Modification Request is incidental to the Contract unit price, and will not be measured or paid for.

Bioretention Soil Mix will be measured and paid for at the Contract unit price per cubic yard.

Temporary Mulch, including any Type A Soil Stabilization Matting used as Temporary Matting Mulch according to Section 704, will be measured and paid for at the Contract unit price per square yard.

Type D Soil Stabilization Matting will be measured and paid for at the Contract unit price per square yard.

CATEGORY 700
LANDSCAPING

SECTION 709 — SOIL STABILIZATION MATTING

DELETE: Section 709 — Soil Stabilization Matting, in its entirety.

INSERT: The following.

SECTION 709 — SOIL STABILIZATION MATTING

709.01 DESCRIPTION. For areas that are at final grade, install soil stabilization matting (SSM) in conjunction with permanent vegetation groundcover per Section 705, 706, 707, or as specified.

For areas that are not at final grade or that will be redisturbed at least 6 months after seeding operations are completed, install SSM in conjunction with Section 704 or 705.

Performance of Soil Stabilization Matting as specified herein complies with all requirements of the Maryland Department of the Environment for permanent seeding.

709.02 MATERIALS. Refer to 701, 704, 705, 708 and the following.

Soil Stabilization Matting	920.05.01
Fasteners	920.05.02
Water	920.09.01
Wood Matting Stakes	Untreated wood, 1 in. by 2 in. by 18 in. minimum length, free from knots over ½ in. diameter, with point at one end.

709.03 CONSTRUCTION.

709.03.01 Modification Request. Certain types of matting may be substituted for other matting when the substitution will provide improved erosion protection.

Submit a written Modification Request to substitute one type of SSM for another type in areas where specific types of matting have been specified.

The Engineer in consultation with the Landscape Operations Division will evaluate the Request. If granted, a notice of approved modification will be returned within 14 days after the request is received.

The following modifications are pre-approved and others may be approved.

(a) Turfgrass Establishment: Type D SSM in lieu of Type A SSM.

(b) Turfgrass Establishment: Type A SSM in lieu of Type E SSM.

(c) Meadow Establishment: Type D SSM in lieu of Type E SSM.

(d) Shrub Seeding Establishment: Type D SSM in lieu of Type E SSM.

709.03.02 Soil Preparation. Perform operations when soil moisture and weather conditions are suitable. Cease operations when soil is frozen, saturated, or when conditions are otherwise unsuitable. Firm soil with an approved roller that weighs approximately 40 lb per ft of width to ensure uniform soil surface and firmness when specified. Perform operations for the SSM type as follows.

(a) Type A. Prepare soil and seedbed for Turfgrass Establishment per Section 705, or for other specified vegetation, but do not apply mulch. Install SSM as specified in 709.03.03 through .06 immediately after seeding and fertilizing.

(b) Type B. Prepare soil and seedbed for Turfgrass Establishment per Section 705, or for other specified vegetation, but do not apply mulch. Firm soil with approved roller and install SSM as specified in 709.03.03 through .06 immediately after seeding, fertilizing and rolling are completed.

(c) Type C. Prepare soil and firm with an approved roller to ensure uniform soil surface and firmness. Install Type C SSM as specified in 709.03.03 through .06 and infill with soil per 709.03.07.

(1) Immediately perform Turfgrass Sod Establishment per Section 708, but do not till; or

(2) Immediately perform Turfgrass Establishment per Section 705, but do not till or apply mulch, and then cover with Type B SSM; or

(3) Immediately install other specified material and vegetation.

(d) Type D. Prepare soil and seedbed for Meadow Establishment per Section 707, or for other specified vegetation, but do not apply mulch. Install SSM as specified in 709.03.02 through .05 immediately after seeding and fertilizing.

(e) Type E. Prepare soil and seedbed for Turfgrass Establishment per Section 705, or for other specified vegetation, but do not apply mulch. Install SSM as specified in 709.03.03 through .06 immediately after seeding and fertilizing.

709.03.03 Unrolling. Unroll SSM in the direction of the flow of water. Lay matting smoothly in firm, uniform contact with the soil surface, without stretching or tenting.

709.03.04 Overlapping. Overlap SSM with the upslope portion on top. Overlap edges at least 2 in., and ends at least 6 in. Do not install longitudinal overlaps in channel bottoms.

709.03.05 Keying-in. Key-in matting by digging a trench, fastening and backfilling one or more edges of the matting into the bottom of the trench.

(a) Type of Matting. Key-in the areas described in Table 1 for each type of matting.

SOIL STABILIZATION MATTING

TABLE 1 - AREAS OF MATTING TO KEY-IN

MATTING TYPE	AREA OF MATTING
A, B	Uppermost or leading-edge.
A, B, D	Edges adjacent to pavement, catch basins, and structures.
B	Lowermost or toe-edge.
	Check trenches; folds of matting perpendicular to water flow every 40-45 ft.
C	All edges.
	Check trenches; folds of matting perpendicular to water flow every 20-25 ft.
D	Edges exposed to flow in BSM, ponds, swales, channels, slopes.
	All edges when installed in streams and floodplains.
E	As directed.

(b) Trenching. Trench into the soil perpendicular to the flow of water to at least 6 in. depth.

(c) Fastening. Install fasteners per 709.03.06 through SSM into the bottom of the trench.

(d) Backfilling. Backfill the trench with firmly tamped soil, and secure the matting over the backfilled area.

709.03.06 Fastening. Secure SSM with fasteners driven perpendicular to the soil grade, and flush with the surface of the matting.

(a) Fastener Selection. Refer to 920.05.02 and use fasteners of the shape and length approved for the matting type according to Table 2.

When more than one fastener is acceptable for a type of matting per Table 2, install the fastener type and length best suited to the installation conditions to ensure that the matting is securely installed, or as directed.

(b) Placement of Fasteners and Stakes.

Metal and Plastic Fasteners. Install fasteners vertically into the soil at the specified distance apart as required for the matting type and the area of matting according to Table 3.

Wood Matting Stakes. Drive Wood Matting Stakes through a hole cut into Type D Matting at approximately 30 degree angle into soil so that exposed ends of stakes point downstream in the direction of flow.

When more than 3 in. of stake protrudes above soil, cut the protruding stake at 3 in. above the soil. When more than 6 in. are cut from a stake, drive another stake nearby to ensure that matting is securely staked to the soil, and cut additional stakes at 3 in. above the soil.

SOIL STABILIZATION MATTING

TABLE 2 - FASTENER SELECTION

MATTING TYPE	METAL AND PLASTIC FASTENERS	FASTENER LENGTH *			
		6 in. Length	8 in. Length	12 in. Length	18 in. Length
A & E	U-Shaped Staple	X	X		
	Circle-Top Pin	X	X		
	Round Head Pin	X	X		
	T-Head Pin	X	X		
B	U-Shaped Staple		X	X	
	Fabric Pin			X	X
C	U-Shaped Staple			X	X
	Fabric Pin			X	X
D	U-Shaped Staple in BSM, Ponds, Swales, Slopes	X	X	X	
	U-Shaped Staple or Fabric Pin in Channels, Streams and Floodplains unless Wood Matting Stake is specified on plans.		X	X	X
MATTING TYPE	**WOOD MATTING STAKE**	**STAKE LENGTH**			
					18 in. Length
D	Wood Matting Stake in Channels, Streams and Floodplains in areas where specified in plans.				X

Note: * X = Denotes fasteners acceptable for the matting type. Refer to 709.03.06(a)

SOIL STABILIZATION MATTING

TABLE 3 - FASTENER PLACEMENT

AREA OF MATTING	MATTING TYPE	MAXIMUM DISTANCE BETWEEN FASTENERS In.
When Installed with Metal or Plastic Fasteners		
Uppermost or Leading-Edge of Matting	A, B, C, D, E	6
Overlapping Edges of Matting	A, B, C, D, E	18
Center of Ditch	A, B, C, D, E	18
Lowermost or Toe-Edge of Matting	A, B, C, D, E	18

Throughout Matting	A, B, C, D, E	24
Check Trenches in Folds Every 40-45 ft. Do not install check trenches in Type B SSM installed over Type C SSM	B	12
Check Trenches in Folds Every 20-25 ft.	C	12
When Installed with Wood Matting Stakes		
Refer to 709.03.06(b) and install stakes as necessary to secure all matting edges, overlaps and throughout matting.	D	24

709.03.07 Infilling Type C SSM. Infill the matting with approved topsoil to fill matting voids and to cover the matting with topsoil to a depth of 1/8 in. to 1/4 in. Immediately install sod, or seed and cover with Type B SSM, or as specified.

709.03.08 Watering. Gently apply water with a sprinkler or water-breaker nozzle immediately after installation is completed as follows.

(a) For Type E SSM, apply water over the surface of the matting as needed to settle the matting and soil.

(b) For Types A, B, and D SSM, apply water over the surface of the matting to wet the soil at least 2 in. depth.

(c) For Type C SSM, apply water over the sod, over the Type B SSM, or over other specified material, to wet the soil at least 2 in. depth.

709.03.09 Installation Phase Acceptance. Inspection will be conducted to verify that matting and vegetation installation operations were completed as specified. Installation Phase Acceptance will be granted at that time.

709.03.10 Establishment Phase. The Establishment Phase will begin upon Installation Phase Acceptance. Perform the following during the Establishment Phase.

(a) Period of Maintenance. Maintain areas of soil stabilization matting until Final Acceptance.

(b) Required Maintenance. Perform the following during the Establishment Phase.

Watering. Apply water to ensure survival of the seeded species or sod as needed. Apply water with approved machinery. Do not allow water to cause erosion or to displace the matting, seed, or sod.

Reset Matting. When matting is not firmly fastened to the soil, or if keyed-in areas or check trenches are not secure, repair the unsecured areas using fasteners as needed or as directed.

Seeding Repair. When Turfgrass Establishment has not met acceptance standards, remove Type A, B, D, or E SSM and refer to 705.03.09 and perform overseeding or reseeding as directed. Remove Type C matting only if directed. Install new matting unless the original matting is approved for reuse.

When Shrub Seeding Establishment or Meadow Establishment has not met acceptance standards, remove Type D or E SSM and refer to 706.03.10(b) and perform overseeding in conformance with specifications for the pertinent vegetation. Install new matting unless the original matting is approved for reuse.

Sod Replacement. When Turfgrass Sod Establishment does not meet acceptance standards, refer to 708.03.12 and remove the unacceptable sod and install new sod.

709.03.11 Final Acceptance. The Engineer and the Landscape Operations Division will complete an Inspection Report of the installed soil stabilization matting and vegetation establishment in conformance with the pertinent specifications. When it is not possible to perform the Inspection, Final Acceptance will be delayed until Inspection is possible.

The Inspection Report will be included in the Punch List requirements for the project. Complete the Punch List requirements as directed. Final Acceptance will be granted when the SSM is secure, and when the specified vegetation has met acceptance standards.

709.04 MEASUREMENT AND PAYMENT. Soil stabilization matting will be measured and paid for at the Contract unit price per square yard for one or more of the pertinent items. The payment will be full compensation for all material, fasteners, wood matting stakes, water, labor, equipment, tools, disposal fees and incidentals necessary to complete the work.

(a) Payment Schedule. Payments will be made according to Table 4 when construction requirements are met.

SOIL STABILIZATION MATTING
TABLE 4- PAYMENT SCHEDULE

CONSTRUCTION REQUIREMENTS	PERCENT OF TOTAL CONTRACT PRICE	PAYMENT FOR COMPLETED WORK
709.03.01 through .09	80	At Installation Phase Acceptance
709.03.10 and .11	20	At Final Acceptance
Total Payment	**100**	

(b) Forfeiture. Failure to complete operations as required in conformance with the Payment Schedule will result in forfeiture of that percentage of payment.

709.04.01 Type A Soil Stabilization Matting. The measurement will be the area actually covered by matting, per square yard. Payment for Turfgrass Establishment or other specified vegetation will be measured and paid for separately.

709.04.02 Type B Soil Stabilization Matting. The measurement will be the area actually covered by matting, per square yard. Payment for Turfgrass Establishment or other specified vegetation will be measured and paid for separately.

709.04.03 Type C Soil Stabilization Matting. The measurement will be the area actually covered by matting, per square yard. Topsoil used for infilling will be incidental to the Contract price. Payment for Type B Soil Stabilization Matting, Turfgrass Sod Establishment, Turfgrass Establishment, or other specified vegetation will be measured and paid for separately.

709.04.04 Type D Soil Stabilization Matting. The measurement will be the area actually covered by matting, per square yard. Payment for Meadow Establishment or other specified vegetation will be measured and paid for separately.

709.04.05 Type E Soil Stabilization Matting. The measurement will be the area actually covered by matting, per square yard. Payment for Turfgrass Establishment or other specified vegetation will be measured and paid for separately.

709.04.06 Temporary Mulch and Temporary Seed will be measured and paid for at the pertinent Contract unit price per square yard. Any soil stabilization matting which may be installed with Temporary Mulch or Temporary Seed will be incidental to the pertinent Contract unit price of those items in conformance with 704.04.01 or 704.04.02.

CATEGORY 800
TRAFFIC

AS-BUILT ITS PLANS

DESCRIPTION. Provide As-Built construction plans as specified in the Contract Documents or as directed by the Engineer.

MATERIALS. Submit the As-Built plans and construction details on CD-ROM(s) utilizing the latest Microstation format used by the Administration's Office of Traffic & Safety. In addition, provide a hard copy of the As-Built plan(s).

CONSTRUCTION. As-Built construction information shall indicate the exact location and size of all conduits, poles, pedestals, handholes, detectors, cameras, signals, and other equipment, and the routing and destination of all wiring to within 6 in. of actual location as dimensioned and referenced to physical features. A construction-details listing shall also be provided.

(a) Submit As-Built information in latest Microstation format used by the Administration's Office of Traffic & Safety and also, adhering to the latest standard features table developed by the Office of Traffic and Safety. The standard features table and current Microstation format can be obtained by contacting the Chief, Traffic Engineering Design Division. If available, the Administration will furnish the contractor with existing design plans in Microstation format. Create the base plans for the As-Builts in Microstation as required in the Contract Documents using one of the following methods:

(1) If neither electronic files nor hardcopies of the plans are available, the contractor shall re-survey to create the As-Built plans.

(2) If a hard copy only of the plan(s) is/are available, digitize existing plans to create the As-Built plans.

(3) If electronic files are available, the contractor shall use existing plan on disk to create the As-Built plans.

(b) As-Built for traffic signal plans shall have a 1"=20' scale.

(c) As-Built for ITS systems shall have a 1"=50' scale showing all system equipment. Provide all necessary detail as it relates to the system, including connection diagrams for the ITS components.

MEASUREMENT AND PAYMENT. As-Built plans will be measured and paid for at the contract Lump Sum price bid. The payment will be full compensation for all consulting and survey fees, materials and other equipment necessary to complete the work, including submitting the final product in hard copy and Microstation format on CD-Rom.

CATEGORY 800
TRAFFIC

AS-BUILT LIGHTING INVENTORY

DESCRIPTION. Provide as-built lighting inventory information to the Administration for use in the Asset Data Warehouse. Data provided shall be in the appropriate format as described below.

MATERIALS. Mapping Grade Global Positioning System (GPS) receiver and software capable of providing the output as described herein.

A data dictionary including input fields will be provided by the Administration to be used with the GPS receiver. GPS receiver shall be compatible with Terra Sync and Pathfinder Office software currently being used by the Administration.

CONSTRUCTION. Collect as-built lighting inventory data for all new and relocated light poles, manholes/handholes, lighting panels and structures (sign structures with lighting) including the data fields described below. Existing equipment which is to remain at a new or reconstructed interchange shall be captured as part of the inventory.

Collect as-built lighting inventory data for all modified light poles and structures (sign structures with lighting) including the data fields described below.

Provide data in hard copy and digital spreadsheet formats. The following fields shall be included and used as Column Headings. The order in which they are shown below shall be matched from left to right in the spreadsheet provided by the contractor.

Light Poles:

EASTING (X) COORDINATE LOCATION DATA
NORTHING (Y) COORDINATE LOCATION DATA
NUMBER OF LIGHTS (Per Pole)
POLE HEIGHT
ARM LENGTH
WATTAGE
COMMENTS
ON/OFF
LIGHT_POLES_ID
BASE TYPE
BULB TYPE
EXIT NUM
INTERCHANGE/INTERSECTION NAME
DATE COLLECTED

Lighting Panels:

EASTING (X) COORDINATE LOCATION DATA
NORTHING (Y) COORDINATE LOCATION DATA
AMPERAGE
COMMENTS
METER NUM UNMETERED
LIGHT_PANELS_ID
DATE COLLECTED
COMMENTS

Structures (Sign structures with lighting):

EASTING (X) COORDINATE LOCATION DATA
NORTHING (Y) COORDINATE LOCATION DATA
NUMBER OF LIGHTS
LUMITRACK
LIGHTING_STRUCTURES_ID
STRUCTURE TYPE
LED
DATE COLLECTED
COMMENTS

Manholes/Handholes:

EASTING (X) COORDINATE LOCATION DATA
NORTHING (Y) COORDINATE LOCATION DATA
DATE COLLECTED
COMMENTS

GPS location information shall conform to the following requirements:

(a) Mapping grade GPS receivers shall be used which have sub-meter accuracy.

(b) The data provided must be able to be post-processed as necessary after data gathering has taken place using Terra Sync and Pathfinder office software suites

(1) Projection - NAD_1983_HARN_StatePlane_Maryland_FIPS_1900_Feet
(2) Geographic Coordinate System - GCS_North_American_1983_HARN
(3) Datum - D_North_American_1983_HARN_Feet

(c) Units of distance shall be published in US Survey Feet.

(d) All horizontal location information shall be Easting (X) and Northing (Y).

As-Built lighting inventory data shall be submitted to the Assistant District Engineer for Maintenance at the following locations:

District 1:	P.O. Box 2679, 660 West road, Salisbury MD 21802	410-677-4010
District 2:	615 Morgnec Rd, Chestertown MD 21620	410-810-3250
District 3:	9300 Kenilworth Ave, Greenbelt MD 20770	301-513-7304
District 4:	320 West Warren Road, Hunt Valley MD 21030	410-229-2361
District 5:	138 Defense Highway, Annapolis MD 21401	410-841-1013
District 6:	1251 Vocke Road, LaVale MD 21502	301-729-8457
District 7:	5111 Buckeystown Pike, Frederick MD 21704	301-624-8105

MEASUREMENT AND PAYMENT. As-Built Lighting Inventory Data will not be measured but the cost will be incidental to other pertinent items in the Contract Documents and will include GPS receivers, software and for all material, labor, equipment, tools and incidentals necessary to complete the work.

As-Built Lighting Inventory data shall be collected for all new and relocated light poles, manholes/handholes, lighting panels and structures (sign structures with lighting). Lighting systems will not be taken over for maintenance by the Administration until As-Built Lighting Inventory Data is received and accepted as correct by the Administration.

CATEGORY 800
TRAFFIC

AUDIBLE/TACTILE PEDESTRIAN PUSHBUTTON STATION AND SIGNS

DESCRIPTION. Furnish and install self-contained audible/tactile pedestrian pushbutton station and signs, as specified in the Contract Documents or as directed by the Engineer.

MATERIALS. Provide audible/tactile pedestrian pushbutton station and signs and all component parts that meet the latest edition of the National Electrical Manufacturers Association (NEMA) Standards and Underwriters Laboratory (UL) standards, as applicable

If available, permanently engrave serial numbers and model numbers on all removable components and hardware. The serial number and model number shall be etched, stamped, molded, or attached using metallic self-adhesive labels. The use of adhesive backed paper labels is not acceptable.

CONSTRUCTION. Design audible/tactile pedestrian pushbutton station and signs to mount near or at the bottom of the pedestrian display mounting post. The pushbutton assembly for the audible signal may replace or supplement an existing pedestrian signal pushbutton.

Design audible/tactile pedestrian pushbutton station and signs as follows.

(a) A single base unit at the traffic control cabinet shall be able to control 2 to 12 (maximum of 3 per phase) push button stations.

(b) Only a single 2 conductor cable will be required from traffic controller cabinet per each pushbutton to operate all pushbutton features.

(c) Each station will have a 2 in. button with a tactile raised directional arrow on the button.

(1) It shall be possible to change the arrow direction to one of four directions.

(2) Arrow/button shall vibrate during the walk period following a push of the button.

(d) The push button station frame shall be cast aluminum with mounting holes for a 5 in. by 7.75 in. or larger pedestrian sign.

Provide audible/tactile pedestrian pushbutton station and signs that have the following features:

(a) Locating tone

(b) 5 walk sound choices that shall be field selectable.

(c) 3 pedestrian clearance sound choices that shall be field selectable.

(d) A direction of travel message shall be standard with extended push.

(e) An information message shall be optional with extended push.

The audible sounds emitted by the **a**udible/tactile pedestrian pushbutton station and signs shall have the following properties.

(a) All audible sounds shall emanate from the push button station.

(b) All audible sounds for all push button stations shall be synchronized.

(c) Each audible feature shall have independently-adjustable minimum and maximum volume limits.

(d) All sounds shall automatically adjust over a 60 dB range to compensate for ambient noise levels.

(e) All volumes and optional features shall be settable using a handheld infrared device with password security. The infrared device shall be capable of updating/setting all push button stations, or the intersection from a single pushbutton station (Global updating).

(f) The ability to mute sounds at all crosswalks except activated crosswalks.

The system shall have user-selectable multiple language capability.

The system shall be able to play an emergency preemption message.

The system shall be able to self-test its buttons and to report any faults to the traffic controller.

Warranty. Audible/Tactile pushbutton station and signs shall be warranted by the manufacturer for a period of 24 months from the date of delivery.

Compatibility Testing. Audible/Tactile pushbutton station and signs manufacturers shall certify that their modules meet the load switch and signal conflict monitor compatibility testing requirements found in the most recent, formally-adopted version of the specification titled "Pedestrian Traffic Control Signal Indications – Part 2: Light Emitting Diode (LED) Pedestrian Traffic Signal Modules," published by the Institute for Transportation Engineers (ITE).

MEASUREMENT AND PAYMENT. Audible/Tactile Pedestrian Pushbutton Station and Signs will be measured and paid for at the contract unit price each. The payment will be full compensation for furnishing, programming, delivery to the specified signal shop for testing, pick up, and installing the push button stations, signs, all cables, labor, equipment, tools, and incidentals necessary to complete this work.

Audible/Tactile Pedestrian 2 Wire Central Control unit will be measured and paid for at the contract unit price per each. The payment will be full compensation for furnishing, programming delivery to the specified signal shop for testing, pick up, and installing the audible/tactile pedestrian base unit and all cables, labor, equipment, tools, and incidentals necessary to complete this work.

CATEGORY 800
TRAFFIC

CATALOG CUTS AND WORKING DRAWINGS

DESCRIPTION. Prepare and transmit submittals to demonstrate the performance of the work in accordance with the Contract Documents. Submittal schedules, catalog cuts, shop drawings, installation methods, manufacturer's certifications, photometric data and working drawings shall be furnished on all Contractor furnished items for highway signing, sign lighting, highway lighting and traffic signals. Submit stakeouts of the sign locations for all sign structure locations, as specified in the Contract Documents.

MATERIALS. Not Applicable.

CONSTRUCTION.

Submittal Requirements. Schedule and Coordinate submittals with the Contractors construction schedule. Submit a complete submittal schedule and list of required submittals with the first submittal, but no later than three days after the pre-construction conference. Arrange the schedule for submission of submittals so that related equipment items are submitted concurrently.

The Engineer may require changes to the submittal schedule to permit concurrent review of related equipment. Submit shop drawings for closely related items such as a sign and ITS support structures together.

Submittal Documents. Provide drawings neat in appearance, legible and explicit to enable proper review. D size plans shall still be legible when reduced to one half size. They shall be complete and detailed to show fabrication, assembly and installation details, wiring and control diagrams, catalog data, pamphlets, descriptive literature, and performance and test data. They shall be accompanied by calculations or other sufficient information to provide a comprehensive description of the structure, machine or system provided and its intended manner of use. If drawings deviate from the Contract Documents, advise the Engineer in writing with the submittal and state the reason for the deviation.

No portion of the work requiring a Contractors drawing shall be started nor shall any materials be fabricated, delivered to the site, or installed prior to the approval or qualified approval of the drawings. Fabrication performed, materials purchased or on-site construction accomplished which does not conform to approved Contractors drawings shall be at the Contractors risk. The Administration will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity.

Shop drawings shall show types, sizes, accessories, layouts including plans, elevations and sectional views, component, assembly and installation details, and all other information required to illustrate how applicable portions of the Contract requirements will be fabricated and

installed. In case of fixed mechanical and electrical equipment, submit layout drawings drawn to scale, to show required clearances for operation, maintenance and replacement of parts. Provide manufacturers certified performance curves, catalog cuts, pamphlets, descriptive literature, installation and application recommendations, and indicate conformance to the Contract Documents. Certifications shall be originals. Certification shall also be sent to the Office of Materials and Technology (OMT) as required in the Contract Documents.

Provide manufacturer's catalog, product and equipment data that includes materials type, performance characteristics, voltage, phase, capacity, and similar data along with wiring diagrams, when applicable. Indicate catalog, model and serial numbers representing specified equipment. Provide complete component information to verify all specified required items. Installation recommendations and instructions shall provide written Manufacturer's detail step by step preparation and installation of the materials, and products including recommended tolerances and space for maintenance and operation.

Provide catalog cuts for sign luminaires with photometric data attached for each sign to be illuminated. Photometric printouts shall include the sign number, the illumination on a one foot square grid covering the entire sign face, the average illumination, the maximum to minimum uniformity ratio, and a working drawing for the sign face attached.

Catalog cuts for roadway luminaires shall have photometric data attached as specified in the Contract Documents.

Submit working drawings as required for changes, substitutions, contractor design items, and Contractor designed methods of construction. Requirements for working drawings will be listed in appropriate Specification Sections and in Special Provisions. Drawings shall be accompanied by calculations or other information to completely explain the structure, machine or system described and its intended use. Review and approval of such drawings by the Engineer shall not relieve the Contractor from his responsibility with regard to the fulfillment of the terms of the Contract.

Working drawings and calculations as submitted shall be sealed, dated and signed by a Professional Engineer registered in the State of Maryland.

The review and approval of Contractor's drawings by the Administration shall not relieve the Contractor from his responsibility with regard to the fulfillment of the terms of the Contract. The Contractor shall be responsible for the verification and accuracy of all dimensions and insuring that all Contractor furnished items are compatible, and conform to all design and performance criteria.

All risks of error and omission are assumed by the Contractor and the Engineer will have no responsibility therefor.

Submittal Process. Each drawing submitted shall have affixed to it the following Certification Statement, signed by the Contractor:

"By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and pertinent data and I have checked and coordinated each item with other applicable approved drawings and Contract requirements."

With the first submittal, include a submittal schedule, listing by Specification Section number, all submittals required and approximate date submittal will be forwarded.

Each submittal having catalog descriptions, shop drawings, working drawings, photometric data, manufacturer's certifications, method of construction and manufacturer's installation recommendations shall be submitted to:

Chief, Traffic Operations Division
Maryland State Highway Administration
7491 Connelley Drive
Hanover, Maryland 21076

Each submittal shall have a transmittal page that indicates the Contractor's and Subcontractor's address and phone numbers. Submittals containing multiple items need the transmittal only on the exterior of each package. For original submittals, and each subsequent resubmittal that may be required, 9 copies will be submitted for projects administered by the District, and 6 copies will be submitted for projects administered by Office of Traffic and Safety. A separate copy shall be forwarded to the Engineer.

All submittals for approval shall have the following identification data, as applicable, contained thereon or permanently adhered thereto.

(a) Drawing title, drawing number, TIMS number, TOD number, revision number, and date of drawing and revision.

(b) Applicable Contract Drawing Numbers and Specification Section and Paragraph Numbers.

The first page of every catalog description, working drawing and material certification shall be stamped in red with the following. All pertinent Contract Document information shall be filled in the spaces provided.

MARYLAND STATE HIGHWAY ADMINISTRATION
SUBMITTAL PACKAGE #_____ DATED CONTRACT # _____ LOCATION PROJECT DESC. ITEM # _____ THIS ITEM CONTAINS_____ PAGES ITEM DESCRIPTION
☐ ACCEPTED ☐ ACCEPTED AS NOTED ☐ REJECTED - REVISE & RESUBMIT
REVIEWERS NAME DATE

Indicate the submittal package by sequential numbering and date of submittal. Catalog, product data or brochure submittals containing various products, sizes and materials shall be underscored or highlighted to indicate the salient features required to meet the specifications. Likewise, items not applicable to the Contract shall be marked "not applicable" or crossed out.

If one or more of the items in a submittal are not approved, resubmittal of only the unapproved items is required, highlighted to show the particular item being resubmitted. Resubmittals shall bear original submittal number and be lettered sequentially.

Three copies of all Contractors drawings will be returned to the Contractor.

Each submittal shall be in accordance with the submission schedule. Allow thirty days for checking and appropriate action by the Engineer.

Contractors submittals will be returned, marked with one of the following classifications:

ACCEPTED: no corrections, no marks

ACCEPTED AS NOTED: a few minor corrections. Item shall be installed in accordance with the corrected drawings.

REJECTED - REVISE & RESUBMIT: requires corrections or is otherwise not in accordance with the Contract Documents. No items shall be fabricated. Correct and resubmit drawings as per original submission. Allow thirty days for checking and appropriate action by the Engineer.

MEASUREMENT AND PAYMENT. Catalog Cuts, Manufacturers Certifications, Photometric Data and Working Drawings will not be measured but the cost will be incidental to the pertinent items specified in the Contract Documents.

CATEGORY 800
TRAFFIC

CLOSED CIRCUIT TELEVISION CAMERA ASSEMBLIES

DESCRIPTION. Furnish and install automatic/manual switching color/monochrome (day/night) closed circuit television (CCTV) Digital Signal Processing (DSP) camera assemblies with integrated zoom lenses and pan & tilt units, as specified in the Contract Documents, or as directed by the Engineer. The camera assemblies shall feature 360 degree pan and 180 degree tilt capability, image stabilization, 64 preset positions, video preset "touring," and an 8 or 16 point compass annotation system. In addition, the camera shall be capable of presenting a right side-up image when it is mounted upside-down.

Each camera assembly shall consist of the following.

(a) A solid-state, auto-switching color/monochrome camera with an integrated 35x optical zoom lens, mounted inside a small, pressurized barrel-style camera enclosure that is permanently attached to a larger pan unit. The camera portion of the assembly shall be capable of tilting vertically in the forward direction a full 180 degrees ($\pm$ 90 deg.).

(b) An integral pan unit (hereinafter referred to as the "Positioner") with 360 degree rotation capability and internal wiring. The positioner shall be a permanent part of the camera assembly.

(c) A Local Control Unit (LCU) that accepts control protocols from most major CCTV camera manufacturers (legacy), as well as NTCIP protocols.

MATERIALS. Color/monochrome camera assemblies, cabinets, and all component parts shall meet the latest edition of the National Electrical Manufacturers Association (NEMA) Standards, Underwriters Laboratory (UL), and Military Standards (MIL), as applicable. The advertising date of this Contract shall be used to determine the date of the applicable standards.

Serial numbers and model numbers shall be permanently engraved on all removable components and hardware. The serial number and model number shall be etched, stamped, or molded. The use of adhesive backed paper labels is not acceptable.

CONSTRUCTION. Furnish and install all hardware, tools, equipment, materials, supplies, and manufactured articles, and shall perform all operations and equipment testing necessary to construct fully operational CCTV color/monochrome camera assemblies that meet the features, functions, and parameters as shown in the Contract Documents.

Camera Assemblies. Mount camera assemblies on previously installed steel poles or other structures as shown on the Plans. Connect each camera assembly to control equipment in a field equipment cabinet, or in a central "hub," as shown on the Plans.

(a) The entire camera assembly shall be assembled and tested in accordance with the Contract Documents prior to delivery to the site.

(b) The assemblies shall be delivered to the site as complete units, and installed as specified in the Contract Documents.

(c) The total weight of the camera, lens, enclosure, and pan and tilt unit shall not exceed 19 lbs.

(d) Individual components of the camera assembly shall conform to the requirements specified in the following sections.

Solid State Color/monochrome Camera. The camera units shall be of solid-state design, and shall meet or exceed the following requirements.

(a) Imager. Interline Progressive Scan CCD with Mosaic-type color compensating filter.
(b) Image Area. 1/4 in. Format , 3.6mm (H) x 2.7mm (V).
(c) Electronic Stabilization. Two-motion-frequency selectable stabilization method.
(d) Horizontal Resolution. 540 TV lines.
(e) Picture Elements. 811 (H) x 508 (V).
(f) Video Output. NTSC, 1 V p-p @ 75 ohms, unbalanced.
(g) Maximum Lens Aperture. f/1.4 (wide) to f/4.2 (telephoto).
(h) Optical Zoom Range. 35X, 3.4mm to 119mm.
(i) Digital Zoom Range. 1X (Off) through 12X, smooth transition from Optical to Digital Zoom.
(j) Effective Digital Focal Length. 119mm to 1190mm.
(k) Optical Zoom Speed. Two speeds, from approximately 2.9 seconds to 5.8 seconds full range.
(l) Horizontal Angle of View. Optical: 54° to 2.5°; At 10X Digital: 54° to 0.25°.
(m) Minimum Focus Distance. 40 in. in tele, 0.4 in. in wide angle.
(n) Auto Focus: Selectable Auto/Manual. Minimum scene illumination for reliable auto focus, 30 percent video.
(o) Manual Focus Speed. One speed, approximately 2.0 seconds to full range
(p) Zoom & Focus Presets. 64 preset positions, focus is auto, if programmed, shall display the Preset ID.
(q) Flash Memory. Firmware and new features shall be remotely upgradeable via serial communications.
(r) Long Term Integration Range: (Short Shutter). Shall provide manual selection of integration duration for enhanced sensitivity. Integration times are **,** 1/4 second**,** 1/2 second, 1/8 second, 1/15 second, 1/30 second. Frame Store video output provides continuous video output, updated at the integration rate.
(s) Manual Shutter. Selectable shutter speeds of 1/60; 1/120; 1/180; 1/250; 1/500; 1/1,000; 1/2,000; 1/4,000; 1/10,000; 1/30,000 second shall be available**.**
(t) Auto Iris. The iris shall automatically adjust to compensate for changes in scene illumination to maintain a constant video level output within the sensitivity specifications.

(u) Manual Iris. The effect of opening and closing the iris shall be created by changing the video level. A decrease in the video level value shall have the effect of opening the iris, and an increase in the video level shall have the effect of closing the iris.

(v) Gamma. 0.45 .

(w) AGC. 0 to 28 dB.

(x) Color/monochrome Balance. Auto Tracking Color Balance/Manual with adjustable Red and Blue Levels shall be provided.

(y) Signal to Noise Ratio. >50 dB .

(z) Synchronization. NTSC, Crystal or Phase-Adjust Line Lock on 60Hz.

(aa) Sensitivity. (3200K): Scene Illumination @ F1.4, Wide Angle.

(1) 0.5 Lux @ 1/60Sec.,F1.4, Shutter, Color I.R Cut On.

(2) 0.05 Lux @ 1/2Sec., F1.4, Shutter, Color I.R.Cut On.

(3) 0.2 Lux@ 1/60Sec. F1.4, Shutter, monochrome mode I.R. Cut Off.

(4) 0.01 Lux@ 1/4Sec., F1.4, Shutter, monochrome mode I.R. Cut Off.

(bb) Character Generator.

(1) ID Characters shall be white with a black border.

(2) A maximum of six (6) lines of user programmable alphanumeric text shall be displayed, plus 2 fixed lines for low-pressure indicator and Privacy Zones.

(3) Text shall only be displayed in uppercase characters.

(4) Camera ID: Up to 2 lines, each up to 24 characters long. If both lines are programmed, line 1 of the Camera ID shall always appear above line 2.

(5) Preset ID: 1 line, up to 24 characters long, user programmable for each of the 64 preset positions. When a preset position is recalled the corresponding preset ID shall be displayed. The preset ID shall remain until a pan, tilt, zoom, manual focus, auto focus select, or another command is received.

(6) Low Pressure Indicator: "Low Pressure", messages can be displayed on one line in "blinking" or "non-blinking" mode and be displayed when activated by low internal pressure.

Adjustable set points by altitude shall be provided via the serial port to activate a low-pressure alarm.

Message may be enabled or disabled.

In maintenance mode, readings of the internal pressure in the camera housing shall be displayed from 5 PSI down to 1 PSI, in 0.1 PSI increments.

(7) Internal Temperature Indicator: 1 line, in degrees C numeric messages can be displayed in "blinking" or "non-blinking" mode. Message may be enabled or disabled.

(8) Sector Message: Up to 16 sectors in 360° may be defined with up to 24 characters long. Message shall be programmable via the RS422 serial communications.

(cc) Azimuth and Elevation. The camera position shall be displayed in 0-359 degree increments for azimuth, and +95 to -95 degrees for elevation. This feature shall be user-selectable for:

(1) 3-second time out or permanent display, and

(2) enabled/disabled.

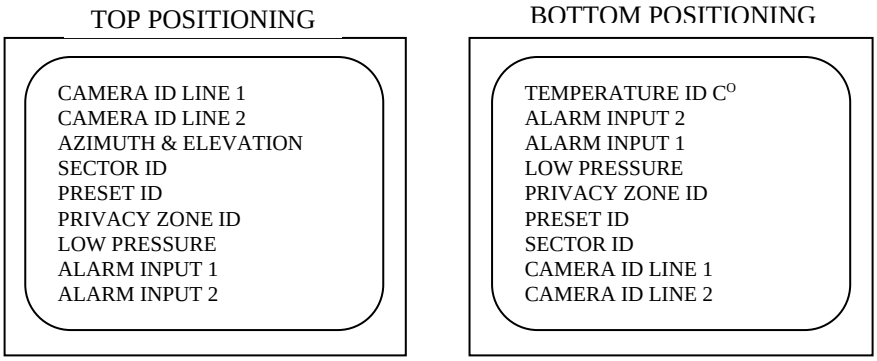
(dd) Message Positioning.

(1) The right side is positioned by inserting spaces into the left side of the message.

(2) Messages can be positioned at either the top or the bottom of display.

(3) Blank lines are not displayed. Any programmed line being displayed shall fill in toward the top if top positioning is selected, or toward the bottom if bottom position is selected.

(4) Display Order.



(5) Privacy Zones. Video blanking for up to 8 Privacy zones shall be provided:

(a) One line, numeric messages can be displayed.

(b) Message shall be displayed in "blinking" or "non-blinking" mode and shall be enabled or disabled.

(c) Privacy Zones shall be programmed via RS422 serial communications.

(ee) Camera Housing. The camera housing shall be a corrosion resistant and tamperproof sealed and pressurized housing with five psi dry nitrogen with Schrader purge fitting and 20 psi relief valve for each camera. The size of the housing shall be Rated IP67, NEMA 4X.

(1) Loss of Pressure Sensor. The camera housing shall include a loss of pressure sensor that will trigger an alarm message that will be inserted in the video output signal.

(2) Heater. The housing shall be furnished with a 6-watt internal heater with window defroster and defogger.

(3) Mechanical. The enclosure shall be constructed from 6061-T6 standard aluminum tubing with a wall thickness of 0.25 in. +/- 0.03 in.

(a) Internal components shall be mounted to a rail assembly.

(b) A copper plated spring-steel ring shall be used to ensure electrical bonding of the rail assembly and components to the camera housing.

(c) The housing exterior shall be finished by pre-treatment with conversion coating and baked enamel paint.

(d) The camera enclosure shall be designed to withstand the effects of sand.dust, and hose-directed water.

(e) The internal humidity of the housing shall be less than 10 percent, when sealed and pressurized. Desiccant packs shall be securely placed inside the housing to absorb any residual moisture and maintain internal humidity at 10 percent or less.

(f) An extended sun shield shall be provided to shield the camera portion of the housing from direct sunlight.

Communication and camera addressing protocol.

(a) Control and addressing shall be via optically-isolated RS422/rs232 serial communications.

(b) The Camera Positioning System protocol shall be public domain.

(c) The Camera Positioning System shall not take longer than 1.0 second to respond to command.

(d) All programmable functions shall be stored in non-volatile memory and shall not be lost if a power failure occurs. System configurations such as video privacy zones, preset text and sector I.D. shall be able to be stored in a computer file and a camera personality can be cloned or uploaded into a camera in the event that camera replacement is necessary.

Pan and tilt positioning specifications.

(a) Continuous rotation capability in either direction (360°).

(b) 180° of tilt movement, + 90° to – 90° unobstructed.

(c) Pan Speed (Manual): Variable from 0.1°/sec. to 80 °/sec.

(d) Pan Speed (Preset): 160°/sec.

(e) Tilt Speed (Operator Control): Variable from 0.1°/sec. to 40 °/sec.

(f) Tilt Speed (Preset Control): 40°/sec.

(g) 64 Pan & Tilt preset positions with repeatability within ± 0.5°.

(h) Preset Accuracy: >0.1°.

Digital Compass. 8-point compass annotation with primary direction indicated and intermediate directions abbreviated with two letters.

Video Touring. The camera shall offer a feature that permits "touring" through a pre-determined sequence of up to 32 preset positions. The tour is programmed by selecting the preset position by number, and then selecting a dwell time.

(a) The presets can be used in any order, and the same preset may be used more than once as long as the total number of preset positions used does not exceed 32.

(b) The dwell time, which defines the length of time paused at each preset position, can be from 1 second to 60 seconds. The dwell time is can be changed individually for all stops on the tour.

(c) If programmed, the appropriate preset ID shall be displayed for each preset position used on the tour.

(d) The tour shall stop upon receipt of a pan command.

(e) All programmable functions shall be stored in non-volatile memory.

Power Requirements.

(a) Operating Voltage: 89 VAC to 135VAC, 120VAC Nominal 60 Hz, per NEMA 2.1.2.

(b) Power consumption shall not exceed a total of 50 Watts.
(c) 30 Watts for camera/receiver/P&T driver (pan & tilt in motion).
(d) 20 Watts for heater (heater on).

Environmental.
(a) Ambient Temperature Limits (Operating): -34°C to +74°C (-30°F to 165°F), (NEMA 2.1.5.1 Standard TS-2, 1998)
(b) Ambient Temperature Limits (Storage): - 45°C to +85°C (-50°F to 185°F), (NEMA 2.1.5.1 Standard TS-2, 1998)
(c) Humidity: Up to 100 percent relative humidity (per MIL-E-5400T, paragraph 3.2.24.4) IP 67 Rating.
(d) Contaminants: Withstands exposure to sand, dust, fungus, and salt atmosphere per MIL-E-5400T, paragraph 3.2.24.7, 3.2.24.8, and 3.2.24.9.
(e) Shock: Up to 10 g, 11 ms, in any axis under non-operating conditions.
(f) Vibration (less lens): Sine vibration from 5 to 30 Hz, 1/2 g, 3 axis, one hour
(g) Wind Loading: Operability to 70 mph, survivability to 150 mph.

Mechanical.
(a) Weight: < 20 lbs.
(b) Dimensions : 12" (h) x 13.3" (w)
(c) Mounting plate: 8.50 in. diameter, with a 7.0 in. bolt pattern.

Mounting. Pole-top or structure mount to pole-top plate (see Plans).

Main interface connector. The main interface connector shall be a male, 18-pin, circular Military Specification connector (MIL-C-26482), with pins arranged as shown in the camera connector detail shown in the Contract Documents. The matching female plug on the end of the camera control cable shall conform to the same specification, and shall have a right-angle shell.

Backward compatibility. The Camera Assembly and Positioning System shall be backward-compatible, from a software, firmware, and hardware standpoint, with existing hub controllers and cable assemblies currently in use by Maryland's CHART system.

Inverted Operation. The camera shall be able to operate normally (meet these specifications) when mounted in an inverted position. Software, provided by the manufacturer, shall compensate for image correction and control when the unit is inverted.

Local Camera Control Unit (LCU). Furnish and install a local control unit in a field equipment cabinet to facilitate service by maintenance technicians.
(a) The LCU shall provide on-site camera control of the specified camera assembly.
(b) The control functions shall include pan/tilt positioning, zoom control, auto/manual focus, and auto/manual iris.
(c) The LCU shall accept control protocols used by most major CCTV camera manufacturers, as well as NTCIP protocols.

(1) Control and addressing shall be via RS422/RS232 optically isolated serial communications.
(2) Additional protocols shall consist of Cohu, American Dynamics, Javelin, Philips/Bosch, Vicon and Pelco D & P.
(3) The National Transportation Communications for ITS Protocol (NTCIP) 1205 protocol communications protocol shall be included. Refer to NTCIP 1205 protocol for detailed description. This allows for migration to the NTCIP standard, while maintaining operation of existing CCTV system protocols.

(d) The LCU shall include a local/remote switch that transfers control from the central system to the LCU. This shall allow the central control system and the LCU to remain connected eliminating any disconnection of the camera site equipment.
(e) LED indicators on the LCU shall provide positive feedback of the automatic and manual mode status of the cameras focus and iris functions.
(f) The local control unit shall be provided in rack-mount configuration, and shall be:
(1) of the same manufacturer as the camera, or recommended by the camera manufacturer.
(2) 100 percent compatible with the camera assemblies and the camera control units specified herein.
(g) The LCU shall permit maintenance technicians to view the camera image on a laptop computer or analog monitor TV.

Camera Control Cables. Control and video cable shall be specified by the camera manufacturer and shall be purchased from the manufacturer or a manufacturer-approved distributor.

Technical Assistance. The equipment supplier shall provide the Contractor with an authorized manufacturer's representative or technical personnel to assist the with the installation of all equipment at each site.

Training. See "TRAINING".

Testing. All equipment furnished by the Contractor shall be subject to monitoring and testing to determine conformance with all applicable requirements and to ensure proper operation of the equipment and system.

(a) All equipment required for testing shall be supplied by the Contractor.
(b) No separate payment will be made for the monitoring, testing, test equipment, and documentation of test results, but shall be included in the amount bid for each camera assembly.
(c) If any material used in the construction of the system is defective or otherwise unsuitable, or the workmanship does not conform with the accepted standards, replace such defective parts and material at no cost to the Administration.
(d) Each camera site shall be tested and accepted on-location by a representative of the Office of Maintenance, Communications Division (410-747-8590). The tests shall be conducted at the field equipment cabinets, and shall include, as a minimum:

(1) Local operation of all CCTV equipment: exercising the pan, tilt, zoom, focus, iris opening, and power on/off functions, while observing the video picture on a portable monitor or laptop computer.
(2) Demonstration of camera sensitivity at low light levels to meet the specified requirements.
(3) Demonstration of pan/tilt speed and extent of movement to meet the specified requirements.
(4) Measurement of analog video signal level(s) at the output of the central control receiver with oscilloscope or scope meter to verify NTSC Standards.
(5) Random test of at least one installed camera to verify camera enclosure pressurization.
(6) Operation of all camera assemblies from the central camera controller: exercising the pan, tilt, zoom, focus, and iris opening functions, while observing the video picture on the local monitor.
(7) Setup, selection, and demonstration of pre-programmed preset positions for each camera.

Documentation. The camera system supplier shall provide three sets of operating manuals, service manuals, and maintenance instructions for all components of the system.

Service Agreement. The equipment manufacturer shall be capable of providing an extended maintenance contract at the State Highway Administration's expense after all warranties expire.

MEASUREMENT AND PAYMENT. Closed-circuit television camera assemblies will be measured and paid for at the contract unit price bid for each assembly. The payment will be full compensation for the color/monochrome camera assembly with integrated zoom lens, mounting hardware, local control unit (LCU), pan & tilt unit, materials, labor, testing and test equipment rental fees (if applicable), and all other incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

CLOSED CIRCUIT TELEVISION CAMERA CABLE ASSEMBLIES

DESCRIPTION. Furnish and install closed circuit television (CCTV) camera cable assemblies, as specified in the Contract Documents, or as directed by the Engineer. The camera assemblies shall consist of the control and video cables, and all necessary connectors.

MATERIALS. Camera cable assemblies and all component parts shall meet the latest edition of the National Electrical Manufacturers Association (NEMA) Standards, Underwriters Laboratory (UL), and Military Standards (MIL), as applicable. The advertising date of this Contract shall be used to determine the date of the applicable standards.

CONSTRUCTION. Furnish and install all cable, connectors, materials, supplies, and manufactured articles, and perform all operations and equipment testing necessary to connect CCTV camera assemblies to their respective field equipment cabinets to create fully operational CCTV camera sites. Camera control and video cables and connectors shall be specified by the camera manufacturer and shall be purchased from the manufacturer or a manufacturer-approved distributor. CCTV camera cables may be furnished and installed three ways:

(a) Factory cut lengths with pre-installed connectors,

(b) Factory cut lengths with a pre-installed connector at the camera end, and a separate camera controller connector that the Contractor must install on-site, and

(c) 500-foot spools of camera control cable, with loose connectors that the Contractor must install on-site at both ends.

Choose any of the three options above, or any combination thereof. However, the Contractor shall be responsible for any mistakes in measuring or ordering the camera control cables.

MEASUREMENT AND PAYMENT. Closed-circuit television camera assemblies will be measured and paid for at the contract unit price bid per Linear Feet of cable actually installed. The payment will be full compensation for the cable, connectors, materials, labor, testing and test equipment rental fees (if applicable), and all other incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

BACKUP UPS SYSTEM FOR CCTV CAMERAS

DESCRIPTION. Furnish and install rack-mounted, commercial-grade, software-driven microprocessor-controlled, double-conversion battery-backup UPS power systems, battery systems, and rack-mounted outlet strips for Closed-Circuit Television (CCTV) traffic cameras and other CHART devices as shown in the Contract Documents or as directed by the Engineer.

MATERIALS. The backup system shall meet the following requirements.

UL1778-Fourth Edition (File # E226092)
FCC Part15 Subpart B Class A
CE

CONSTRUCTION.

UPS System. The UPS system shall be a digital, true sine wave, always on-line (double-conversion), solid state, microprocessor controlled power conditioner and controlled high-frequency inverter and battery backup system, utilizing insulated-gate bipolar transistor (IGBT) technology.

(a) Capacity: 2.0 kVA (1400 watts).

(b) The system shall continuously regenerate and condition the AC output sine wave to insure that 100 percent of the power supplies all connected loads, whether the system is operating on the public utility or on batteries.

(c) The UPS system shall be capable of operating at its rated power level with all equipment that is connected to the output outlets, regardless of the composition of the load. The UPS shall be produce all digital fully regenerated, conditioned and true sine wave power that is fully compatible with CCTV cameras and control equipment, including:

(1) CCTV camera assemblies, including pan/tilt/zoom mechanisms.

(2) Heaters that are an integral part of the CCTV camera or lens assembly.

(3) CCTV Local Control Units (LCU's).

(4) Routers and other pieces of equipment that employ plug-in transformers or power packs as a power source.

(d) The normal operating mode shall be continuous regenerated power (double-conversion).

(e) The UPS shall be SNMP ready and include local and remote communication capabilities.

(f) The UPS shall be equipped with an Ethernet RJ-45 communication port. The UPS shall be Ethernet ready, regardless of user readiness to deploy system Ethernet capability.

(g) The UPS shall be equipped with a back-lit programmable LCD front panel display to allow for monitoring of the UPS and batteries.

(h) Overcurrent capacity. 110% for 10 minutes.
200% for .05 seconds.
150% for 10 seconds (45 second interval).

(i) Output voltage range. 85V to 135VAC.

(j) Voltage regulation. ±2% Max.

(k) Frequency: 60Hz.

(l) Frequency range.

(1) Normal (Utility Power) Operation: ±1% Max.

(2) Battery Operation: ±0.5% Max.

(m) Voltage distortion.

(1) Linear load 3% Max.

(2) Non-linear load 7% Max.

(n) Transient voltage regulation.

(1) Input Voltage step: ±5% Max.

(2) 100% step load: ±5% Max.

(o) Power Factors.

(1) Input: 5 percent.

(2) Output: 5 percent.

(p) Input protection: 30A breaker.

(q) The UPS System shall have the capability of:

(1) Accepting an NTCIP-ready adapter, or

(2) Accepting a Spread-Spectrum Radio modem.

(3) Local and remote communications capabilities.

(4) Local or remote UPS control.

Battery System.

(a) The maximum battery voltage shall be 48 VDC, supplied by four (4) deep-cycle gel or lead-acid 12 VDC batteries connected in series. The maximum battery size shall be Group 27.

(1) All batteries shall have a polypropylene case and a built-in handle with finger grips or similar design to allow carrying the batteries without undue discomfort.

(2) Batteries shall have a nominal capacity of 100 amp-hours at 100 C, and a minimum capacity of 90 amp-hours at 20 C.

(3) Batteries shall be valve-regulated to prevent electrolyte spillage.

(b) The battery charging system shall be a 3-stage system designed for extended life of the battery system by temperature compensated as well pulse charging in addition to automatically regulated current levels.

(c) Battery charging shall be as required regardless whether the UPS is running on utility power or an auxiliary power source such as a generator.

(d) The UPS shall continue to supply clean regulated power even if the batteries are depleted and the system is on utility or auxiliary (generator) power.

(e) The battery system shall be certified to meet or exceed NEMA temperature standards for deep-cycle lead-acid or gel batteries.

(f) Hydrogen gas emissions shall meet Mil-Spec #MIL-B-8565J.

Cabling.

(a) The UPS System shall utilize #8 AWG cables and dedicated harnesses to connect the UPS to the Battery System. The harnesses shall use keyed, locking quick release connectors that plug into the front panel of the UPS. Braided nylon jacketing shall be used over all conductors. The connectors shall feature:

(1) A flat wiping contact system.

(2) An interchangeable, genderless design.

(3) Colored, modular housings.

(4) Polarized housings.

(5) UL94 V-0 housing material.

Rack-Mounted Outlet Strip.

(a) 19-inch Rack Mount.

(b) 1 Rack Unit in Height.

(c) UL 1363, 1449 (Pending) SVR = 330.

(d) 15-Amp, 6-outlet (NEMA 5-15).

(e) 8-Ft. NEMA 5-15 cord.

(f) 3-Color LED Indication.

(g) 18-Guage Steel housing.

(h) Black Powder-Coated finish.

(i) External 1/4-20 Grounding Stud.

(j) Voltage Protection Level (Vpl):

(1) 8 x 20 uS @ 500A = 275V.

(2) 8 x 20 uS @ 3kAA = 440V.

(3) 10 x 1000 uS @ 250A = 290V.

Mechanical: UPS Unit.

(a) Dimensions: Width = 19" rack mount, Height = 3 rack units.

(b) Weight: UPS: Less than 35 lbs.

Environmental.

(a) The UPS System shall meet or exceed NEMA temperature standards from –40°C to +74°C.

(b) The UPS shall be shall be certified and field proven to meet or exceed NEMA temperature standards. A certificate of compliance shall be made available upon request.

Communications, Controls & Diagnostics.

(a) Alarm Monitoring: The UPS system shall come standard with alarm monitoring, indicating:

(1) Loss of Utility Power,

(2) Inverter Failure, and

(c) Low Battery.

(b) An Ethernet port shall be provided via an RJ-45 connector allowing full, interactive, remote computer monitoring and control of the UPS functions.

(c) The UPS shall be SNMP ready and include local and remote communication capabilities. If the unit requires an add-on card to achieve SNMP capability, the card shall be included with each unit at no additional cost to the Administration. The SNMP version shall be the latest, non-Beta release in effect as of the date of this contract advertisement. The following alarm "traps" shall be user-programmable from the front panel:

(1) Loss of AC power
(2) Restoration of AC Power
(3) Battery temperature
(4) Battery Voltage

(d) Front Panel controls: Power ON/Input breaker, Cold (DC) Start, Alarm Silence, Battery Test, Bypass Breaker, and DC/Battery Breaker.

(e) A front panel connector with a PCB-style terminal strip with setscrews for Alarms and Timers. The outputs shall include:

(1) On/Batt.

(2) Timer.

(3) Low Battery.

(4) Battery Temperature.

(5) UPS Status.

Reliability. Calculated MTBF shall be 100,000 hours based on component ratings.

Warranty. The UPS system shall carry a standard manufacturer's 2-year warrantee from the date of delivery against any imperfections in workmanship and material.

Training. See "TRAINING".

Documentation. The UPS system supplier shall provide three sets of operating manuals, service manuals, wiring diagrams, schematics, and maintenance instructions for all components of the UPS system. In addition, the UPS System supplier shall provide a fourth set of schematics and wiring diagrams which shall be furnished in the wiring diagram holder in the controller cabinet.

Experience. The manufacturer shall provide the names, addresses, and telephone numbers of at least three transportation agencies in the U.S. currently using the manufacturer's UPS System.

The agencies so named shall confirm that the manufacturer's systems have operated as specified in their contract documents and any applicable revisions for a period of at least one year, and that all maintenance agreements and/or warranties have been honored.

MEASUREMENT AND PAYMENT. Backup UPS Systems shall be measured and paid for at the contract unit price each, which shall include the complete UPS System including one complete set of batteries, the outlet strip, installation, electrical work, grounding, and all other incidentals needed to provide a working system. The payment shall be full compensation for all materials, labor, equipment and all other incidentals necessary to complete this work.

In the event that the Contract Documents contain a bid item for UPS batteries, that item shall be for the purpose of establishing a unit price for spare batteries.

CATEGORY 800
TRAFFIC

BAND SIGN TO SUPPORT

DESCRIPTION. Band signs to signal, lighting or sign structures as specified in the contract documents or as directed by the Engineer.

MATERIALS.

Universal Channel Clamp	Type 304 16 Gauge Stainless Steel
Medium Channel	6061 – T6 Aluminum Alloy
Banding (0.75 in. by 0.03 in. thick)	Type 201 Stainless Steel
Blind Rivet	5154A Aluminum Alloy & Stainless Steel Mandrel

CONSTRUCTION. Attach universal channel clamp to signal, lighting or sign structure using stainless steel bands. Attach sign to channel with blind rivets every 6 in. on center. Attach universal channel clamp to medium channel. Refer to Standard MD 813.08 for details.

Install sign with minimum undersign clearance of 7 ft. to top of road grade or top of sidewalk grade.

MEASUREMENT AND PAYMENT. Band Sign to Support will be measured and paid for at the contract price per each sign panel banded to a lighting, signal or sign structure. The payment will be full compensation for stainless steel bands, clamps, rivets and for all materials, labor, equipment, tools, and incidentals necessary to complete the work.

Signs will be measured and paid for as specified in Section 813.

CATEGORY 800
TRAFFIC

COATING NEW GALVANIZED STRUCTURES

DESCRIPTION. Coat new galvanized steel structures, including exposed anchor bolts, flange bolts, nuts, and washers, as specified in the contract documents or as directed by the Engineer. Color will be as specified in the contract documents.

MATERIALS. Materials shall conform to one of the systems described below. All coatings in the system shall come from the same manufacturer. The Manufacturer shall be on the "Approved List of Manufacturers" maintained by the Office of Materials and Technology, Metals, Coatings and Structural Materials Team.

Colors shall conform to the following Federal Standards, or as specified in the contract documents.

Brown	Federal Standard Number 595a-20040
Black	Federal Standard Number 595a-27038
Green	Federal Standard Number 595a-24108

Paint System.

(a) Primer. Shall be an Epoxy Polyamide meeting the requirements of Section 912.03.02 and must have a dry film thickness of 2 to 5 mils (50 to 125 μm).

(b) Finish Coat. Shall be an Aliphatic Polyurethane meeting the requirements of Section 912.04.02 and must have a dry film thickness of 2 to 4 mils (50 to 100 μm).

Fusion Bonded Polyester Powder System (all Signal & Lighting Structures).

Polyester Powder. Polyester Powder shall meet the requirements of Section 917.

CONSTRUCTION.

Paint System.

Surface Preparation. Galvanized steel shall not be permitted to have been water or chromate quenched. The surface shall be solvent cleaned per SSPC SP-1 using a non-residue solvent and a lint free cloth. The surface shall also be brush off blasted per SSPC SP-7 using Grit. Any damaged areas shall be repaired according to ASTM A-780. If repair is made using an Organic Zinc Rich primer, the primer shall conform to Section 912.02.03.

Paint Application. Following the brush off blasting and prior to the application of the prime coat, store each item in an environment free of moisture and dust. Apply the primer within twelve (12) hours of brush off blasting and in accordance with the manufactures recommendation.

Once the primer has properly cured, apply the finish coat in accordance with the manufacturers recommendations.

The finished painted surface shall be holiday free when tested with a low voltage holiday detector (minimum 30 volts) similar to a K – D Bird Dog, using regular tap water. If holidays are detected, the coatings could be repaired with additional coatings or they may be stripped and repainted at the Contractor's expense.

Fusion Bonded Polyester Powder System.

Surface Preparation. Prepare **t**he galvanized surface by solvent cleaning conforming to SSPC SP-1, followed by brush off blast cleaning conforming to SSPC SP-7 using grit. The blast profile shall be 2 to 3 mills as determined in conformance with D 4417, method C. When blast cleaning exposes bare steel, spot prime the bare steel with an Organic Zinc Rich Coating in conformance with A 780. Apply the polyester powder within 24 hours of surface preparation.

Application. Apply fusion bonded polyester powder per manufacturers recommendations.

MEASUREMENT AND PAYMENT. Coating New Galvanized Structures will not be measured and paid, but the cost will be incidental to the contract item. The payment will be full compensation for all material, labor, equipment, tools and incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

DISCONNECT, PULLBACK AND REROUTE EXISTING CABLE

DESCRIPTION. Disconnect existing cable(s) from traffic control device(s), pullback and reroute through new or existing conduit systems, handholes, span wires, mast arms and/or structures for reconnecting the traffic control device(s) as specified in the contract documents, or as directed by the Engineer.

MATERIALS. Not Applicable

CONSTRUCTION. Notify the Engineer and Traffic Operations Division representatives at least 5 working days before intended work is to be completed. Plan the work to minimize interference and/or down time of any existing traffic control device.

Disconnect specified cable(s) from the traffic control device and pullback to the point noted or as directed, reroute the cables through the specified raceway(s) and back to the device specified.

MEASUREMENT AND PAYMENT. Disconnect, Pullback & Reroute Cable will be measured and paid for at the contract price per linear foot and shall apply for one or as many cables as are disconnected from a specified device and rerouted back to a device (not per cable). The payment will be full compensation for all materials, labor, equipment, tools, and incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

FIBER OPTIC BLANKOUT SIGN WITH SINGLE MESSAGE

DESCRIPTION. Furnish and install fiber optic blankout signs with a single message as specified in the Contract Documents or as directed by the Engineer. There are two types of fiber optic displays, as described herein. Provide signs capable of displaying the message as described, or appearing blank.

MATERIALS. Provide UL rated components for the fiber optic blankout sign. The sign enclosure shall be NEMA 3R.

CONSTRUCTION.

General. The fiber optic blankout sign shall operate continuously under all weather conditions, in an ambient temperature range of -35 F to +120 F with a relative humidity of up to 100 percent.

Design the fiber optic blankout sign so as to preclude the intrusion of water.

Provide fiber optic blankout signs compliant with MdMUTCD requirements, and the Contract Documents.

The fiber optic blankout signs shall be easily accessible, and all parts removable with a screwdriver as the only required tool.

The fiber optic blankout sign shall be designed for a life cycle of 15 years minimum, exclusive of lamps.

Symbols. The Fiber Optic Blankout Sign shall display the one of the two following illuminated messages: The first type of message shall be a Left Only Symbol with an "ONLY" word message in white as shown on MD Standard R3-5L sized to Standard size. The border as shown in these referenced standards shall be eliminated with the symbolic message centered within the face of the sign. The second type of message shall be a "LANE ENDS MERGE RIGHT" word message in white as shown on MD. Standard W9-2(4) sized to Standard size. The border and horizontal divider as shown in these referenced standards shall be eliminated with the message centered within the face of the sign.

Each letter or symbol shall be outlined by light points.

Message Control. The Fiber Optic Blankout Sign shall be equipped with one set of terminals for each message which can be displayed.

Message turn on of the Fiber Optic Blankout Sign shall be accomplished with a relay or solid-state device, so that the current required at the control terminals for Fiber Optic Blankout Sign

operation is 100 milliamperes or less at 120 VAC. Message switching shall be arranged so that the entire message shall be activated from when one set of terminals is energized.

Connection to the controller shall consist of hardwired connections using 5 conductor No. 14 AWG cables.

Visibility. The symbol displayed shall be clearly discernible for a minimum of 500 ft under all natural and manmade lighting conditions.

The Fiber Optic Blankout Sign shall not display a symbol, which is not illuminated regardless of lighting conditions.

Multiple lamps will be used for each symbol. In the event of a single lamp failure, the fiber optic blankout sign shall still be fully discernible.

The light output will not vary more than 50 percent of maximum for a beam angle of 20 degrees centered around the optical axis.

Each light point shall be at least 0.039 in. in diameter.

White light points shall have a maintained luminance greater then 14,000 Cd./(M^2) on the optical axis.

Optical.

The Fiber Optic system shall consist of glass fiber bundles assembled on a flat black matrix panel. Matrix panel shall have a flat black non-reflective finish.

The Light sources shall consist of quartz halogen lamps, operating at 12 volts, 50 watts with a 6000 hour rated life. Each lamp shall be easily replaceable without the use of tools.

Two fiber optic bundles, or one bifurcated bundle, will be used so that in the event of failure of one light source the other shall continue to provide a discernible message.

The glass fibers at the input and output ends shall be ground smooth and optically polished to a minimum of an 8 micron finish.

The common end assemblies and lamp assemblies shall be mounted on a shock absorbing platform.

Each fiber optic bundle shall contain a convergence cone at the output end to increase light output.

A minimum of 5 percent spare bundles shall be provided with reject bundles clearly labeled.

The Fiber Optic harnesses shall be easily field replaceable with individual bundles

mechanically held in place on the Fiber Optic Blankout Sign face. The Fiber Optic bundles shall be removable and replaceable without the use of any tools. Glass lenses epoxied to a faceplate are not acceptable.

A PVC jacket extruded over the bundle to preclude damage to them in the process of relamping, cleaning or routine maintenance shall protect each individual optical fiber bundle. Raw glass bundles or sprayed on coatings are not acceptable.

The lenses shall be protected by a clear sheet of polycarbonate. The sheeting shall be 1/8 in. thickness U/V stabilized Lexan. The interface shall exhibit a high gloss finish. Voids and scratches shall not be permitted.

Electrical.

For each Fiber Optic Blankout Sign, 3 complete sets of schematic wiring diagrams, descriptive parts lists with generic part numbers where applicable, instruction and maintenance manuals, and connection diagrams shall be supplied.

No moving parts are permitted.

All schematics shall include numbered test points with operating voltages, waveforms and amplitude indicated.

Message switching at the fiber optic blankout sign shall be accomplished with a solid state device, so that the current required at the control terminals is 100 milliamperes or less at 120 VAC.

All wire termination's are to be made at terminal blocks (Marathon 1500 or equivalent).

Supply voltage to the fiber optic blankout sign will be 120 VAC. The transformers reducing supply voltages to that required by the internal components of the fiber optic blankout sign shall be integral to the fiber optic blankout sign.

Hardware.

The housing shall be aluminum alloy (tempered) with a minimum thickness of 0.125 in and meet NEMA 3R. All exterior seams shall be continuously welded and made smooth. The sides of the housing shall be formed of extrusions, while the front and back will be formed from plate. Sufficient internal stiffeners shall be installed to insure the housing, and face shall not deform under wind loads when mounted as designed.

The outside of the housing shall measure approximately 36 in x 36 in x 9 in. (Face dimensions may be increased slightly, if necessary, to avoid interference with the side flanges of the housing when centering the symbols.)

The entire housing shall be weatherproof.

The Fiber Optic Blankout Sign shall be designed to be securely mounted on a signal mast arm, a 1½-inch hub shall be installed on top and bottom of the housing, and connected to the internal stiffeners. Mounting hardware assembly shall be as detailed for rigid mount signal heads on MD 814.01.

The exterior housing finish shall be high quality clear anodized. Painted housings are not acceptable.

Drainage shall be provided by a minimum of two ¾ in. diameter drainage holes located at the bottom of the housing. Drainage holes shall be made insect proof by use of screens.

The fiber optic blankout sign face shall be hinged to the top of the housing and serve as the access door. The face shall have 2 stainless steel pressure snaps to tightly secure the door to the housing. The fiber optic blankout sign door shall be held in the open position by one gas strut at each end. All hinge pins, nuts, bolts, lockwashers, cotter pins and washers shall be stainless steel.

The door shall have a neoprene gasket to provide a weather tight seal. The seal shall be treated with a silicone spray to prevent the seal from sticking to the sign housing when the door is closed.

Written certification that the enclosure meets NEMA 3R after modification shall be furnished by the contractor from a laboratory, recognized by the State Fire Marshal for Specific Consumer Products.

MEASUREMENT AND PAYMENT. Fiber Optic Blankout Signs will be measured and paid for at the contract unit price per each for each type of sign as follows: Fiber Optic Sign with Single Message “LEFT ONLY” or Fiber Optic Sign with Single Message “Lane Ends Merge Right”. The payment will be full compensation for all materials, labor, mounting equipment, tools and incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

FIELD EQUIPMENT CABINETS FOR CCTV UPS SYSTEMS

DESCRIPTION. Furnish and install base-mounted, NEMA size 5 cabinet for CCTV camera UPS system batteries, as specified in the Contract Documents or as directed by the Engineer. This work shall include all necessary hardware and electrical connections.

MATERIALS. Electrical/electronic equipment, cabinets, and all component parts shall meet the requirements as specified in 820.02 and the standards as set forth in these special provisions.

Anchor bolts/Bolts/Nuts/Washers
Cabinets and doors
Mounting hardware
Conduit
Power service conditioning and distribution equipment
Electrical wires, harnesses and connectors
Environmental control equipment

CONSTRUCTION.

(a) General.

(1) Serial numbers and model numbers, if available, shall be permanently engraved on all removable components and hardware.

(2) The serial number and model number shall be etched, stamped, or molded.

The use of adhesive backed labels is not acceptable.

Mainframe serial numbers and model numbers shall be readable without disassembly or removal of any part of the cabinet or components located within the cabinet and located on the front face of the mainframe unit.

(3) All cabinets shall meet or exceed the requirements of a NEMA 3R rating and shall be UL listed.

(4) All cabinets and doors shall be fabricated from 5052-H32 sheet aluminum alloy with a minimum one eighth of an inch (1/8 in.) thickness.

(5) All mounting hardware and cabinet bracing shall also be made from aluminum.

(6) All external welds shall be made using the Tungsten Inert Gas (TIG) welding method.

(7) Electronic equipment (controllers, multiplexers, etc.) to be installed in the field cabinets shall be as specified in the Contract Documents or as directed by the Engineer, and shall be paid for separately.

(b) Electrical. Electrical power for the battery cabinet shall be obtained from a 20-ampere breaker from the electrical panel inside the CCTV equipment cabinet.

(1) The battery cabinet shall be equipped with a commercial-grade terminal block for connecting the breaker in the host cabinet load center to the fan and heater circuits.

(2) All wiring between the conduit entry point and the terminal block shall be encased in flexible metal sheathing.

(a) All conductor wire runs shall be continuous with no splices.

(b) All wiring harnesses shall be encased in a continuous sheath. The use of cable ties to arrange wiring harnesses is not acceptable. The use of adhesive backed wire holders is also not acceptable.

(c) All cabinet back and panel harness wiring shall be soldered at its destination point as specified.

(d) All conductors shall be labeled. Labels shall be either attached to each end of the conductor and indicate the destination of the other end of the conductor, or shall be a continuous, permanent identification of the conductor's function and located every six inches along the conductor.

(e) All conductors used in the controller cabinet wiring shall conform to the following color code requirements.

AC Neutral conductors shall be identified by a continuous white color.

AC Ground conductors shall be identified by a continuous green color.

AC Positive conductors shall be identified by a continuous black color.

All other conductors shall be identified by any color not previously specified.

(3) All bolts used for electrical connections shall be fabricated from stainless steel.

(4) All hardware used for electrical connections and terminal facilities shall be fabricated using cadmium plated brass.

(5) All fuse holders shall be of the encased type 3 of 8.

(6) All switches shall be encased, environmentally sealed, and rated for one hundred and twenty-five percent of capacity. Switches and thermostats shall break the "hot" side of the line

(7) All welds shall be neatly formed and free of cracks, blow holes and other irregularities.

(8) All inside and outside edges of the cabinet shall be free of burrs.

(9) All access door openings shall have a double flange on all four sides.

(c) Mechanical.

(1) Size. NEMA TS-2, size 5, unless shown otherwise on the Plans. Size 5 cabinets shall be forty-eight inches in height by thirty inches in width by sixteen inches in depth (48 in. H x 30 in. W x 16 in. D).

(2) Shelving. Battery shelves shall be reinforced, and spaced at heights of 12 and 25 inches, as shown in the details.

If the Contractor or UPS system supplier believes that a conflict between these shelf heights and the batteries or battery cabling might occur, the Engineer shall be notified before the shelves are fixed at those positions.

The back vertical support rails shall stop flush with the surface of the top shelf.

(3) Fan-Forced Ventilation. Two thermostatically controlled cooling fans shall be provided for all cabinets.

The fans and thermostat shall be mounted at the top of the cabinet.

The fans and thermostat shall be rated for one hundred and twenty-five percent of capacity.

The thermostat shall be manually adjustable, within a ten degree range, from seventy degrees Fahrenheit to one hundred and sixty degrees Fahrenheit.

The fan bearing mechanisms shall be of ball bearing design.

Each fan shall have a minimum rated capacity of one hundred cubic feet per minute (100 CFM) air flow.

Each fan shall have a minimum rated design life of one hundred thousand hours (100 000 hrs).

(4) Natural Ventilation. The cabinets shall be designed for continuous operation over an outside temperature range of -13 degrees F to +113 degrees F (-25 C to +45 C) without requiring fans, in the event the cabinet cooling system fails.

All cabinets shall be provided with louvered vents in the front door with a removable air filter. Louvers shall satisfy the NEMA Rod Entry Test for a 3R rated ventilated enclosure.

Three extra filters shall be supplied for each cabinet installed.

The filter shall cover the vents and be held firmly in place with top and bottom brackets and a spring loaded upper clamp.

Exhaust air shall be vented out of the cabinet between the top of cabinet and the main access door.

The exhaust area shall be screened with a material having a maximum hole diameter of 1/8 in.

(5) Water Runoff. All cabinets shall have a sloped top surface to prevent the accumulation of water on the cabinet.

(6) Finish. All outside surfaces of the cabinets shall have a smooth, uniform, natural aluminum finish.

(7) Access Door. All cabinets shall have a single access door located on the front of the cabinet.

The door opening shall be a minimum of 80 percent of the front surface area of the cabinet.

All doors shall be provided with a gasket conforming to the physical properties listing in UL508 Table 21.1 and be such that the gasket forms a weather tight seal between the door and the cabinet.

All doors shall be hinged on the right side as viewed facing the cabinet.

Hinges shall be of a single, continuous design utilizing a fixed hinge pin.

All hinging shall be bolted to the cabinet and door utilizing 1/4-20 stainless steel carriage bolts and nylon lock nuts.

All hinge pins shall be capped at the top and bottom by weld to render the pin tamper proof.

All cabinets shall have hinges fabricated from 0.093 in. stainless steel using a 0.250 in. diameter stainless steel hinge pin and shall provide a three inch open width.

All cabinets shall include a door restraint to restrict the door to a maximum one hundred and thirty-five degrees of swing. The restraint mechanism shall provide latching positions at ninety degrees and at one hundred and thirty-five degrees. All cabinets shall be equipped with a lock compatible with the State's existing cabinet locks, (dead bolt type) and key hole cover and be keyed for a number 1 key. The Contractor shall provide the State with a minimum of one key each per cabinet.

All cabinets shall have a weather-resistant, 12 x 16 in. or larger, clear plastic folder on the inside of the door for schematic and wiring diagrams, and other maintenance information.

(8) Interior Lighting. Each cabinet shall be supplied with modular LED traffic cabinet light assemblies, located vertically on either side of both front and rear doors to provide uniform illumination of the cabinet and rack assembly.

(a) Cool White: 5000 K
(b) Operating Temperature: -10C to +40 C Free air or cabinet mounted.
(c) 24 Volt
(d) 280 lumens per single module.
(e) Class 2 Power supply included.
(f) Switched to activate whenever either door is opened.
(g) UL-2108 Approved

(9) Internal Heating. A heater rated for traffic cabinet use shall be installed in the bottom, and conforming to the following requirements:

(a) The heating element shall be rated at 500 watts and have a minimum output of 1700 BTU/hr.

(b) The heating element shall have a built-in quick response thermostat with sealed contacts with a temperature control range of 40 F to 100 F, and a built-in thermal cut-off to automatically turn off the heater in case of overheating.

(c) The heating element shall have a protective cover with vent holes to prevent damage to adjacent wires or burns to service personnel.

(10) Cabinet Installation. Securely fasten Detector Cabinets-Type 332/334 on new or modified concrete bases, in pole-mounted configurations as shown on the Plans, or asdirected by the Engineer. New foundations shall be incidental to the cabinet item.

(a) Bolted stainless steel connections shall be provided with lockwashers, locking nuts, or other approved means to prevent the connection nuts from loosening.

(b) Dissimilar materials shall be isolated from one another by stainless steel fittings.

(c) Cabinets shall have a continuous neoprene gasket between the base and the foundation

(11) Certification. The following must accompany all electrical and mechanical components supplied:

(a) Instruction manuals.

(b) Maintenance manuals.

(c) Descriptive parts list with industry standard part numbers where applicable.

(d) Three complete sets of wiring and schematic diagrams. Schematics shall include a list of tests points with the following information provided for each point: Nominal operating voltage, Wave form and all pertinent information regarding the wave form at each test point, Integrated circuit schematics, Connection and I/O diagrams.

MEASUREMENT AND PAYMENT. Furnish and Install base-mounted, NEMA size 5 cabinets for CCTV camera UPS system batteries will be measured and paid for at the contract unit price for each type specified. The payment will be full compensation for the cabinets, battery shelves, terminal blocks and cabling, material, labor, and all incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

GALVANIZED TRAFFIC SIGNAL PEDESTAL POLES AND TRANSFORMER BASES

DESCRIPTION. Furnish and install galvanized traffic signal pedestal poles and transformer bases at locations specified in the Contract Document or as directed by the Engineer.

MATERIALS. Design shall meet 2001 edition of AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, except as noted. All welding shall conform to American Welding Society (AWS) Structural Welding Code D1.1 Steel, Tubular Structures.

Determine each pedestal pole's height by the total height of the pedestal pole including the transformer base.

(a) 10 ft pole height consists of a 103 in. steel shaft with a steel base plate plus a 17 in. transformer base.

(b) 14 ft pole height consists of a 151 in. steel shaft with a steel base plate plus a 17 in. transformer base.

(c) 20 ft pole height consists of a 240 in. steel shaft with a steel base plate plus a 17 in. transformer base.

Each pedestal pole furnished shall consist of a design from a steel shaft with a steel base plate, transformer base and all miscellaneous hardware.

(a) The pedestal pole shaft shall be fabricated of one length and shall have one longitudinal weld, parallel to the long axis of the pedestal pole shaft, with no transverse welds. The longitudinal weld shall be finished to form a smooth outside surface and the wall of the pedestal pole shaft shall be uniform in thickness including the welded area. The pedestal pole shaft shall be round or multi-sided (less than eight sides not acceptable) in cross section. 14 ft units shall be uniformly tapered from butt to tip with a 1 in. reduction in diameter for each 7 ft in length (0.14 in./ ft). 10 ft unit shall not be tapered.

(1) 10 ft pedestal pole shaft shall be 4-1/2 in. outside diameter, Schedule 40 pipe, and conform to A 501.

(2) All 14 ft pedestal poles shall be 7-1/2 in. outside diameter at the base and shall be made of 11 gauge (0.119 in.) thickness steel conforming to A 595, Grade A or equivalent.

(3) All 20 ft pedestal poles shall be 7-1/2 in. outside diameter at the base and shall be

made of 3 gauge (0.25 in.) thickness steel conforming to A 595, Grade A or equivalent.

(b) The base plate material shall meet the requirements of A 709, Grade 36. Secure the base plate to the lower end of the pedestal pole shaft by two continuous electric arc welds. The base plate shall telescope the pedestal pole shaft with one weld on the inside of the base plate at the end of the pedestal pole shaft. The remaining weld shall be located on the outside of the base plate at the top of the pedestal pole shaft. The weld connection shall develop the full strength of the adjacent pedestal pole shaft to resist bending action. All bases plate shall be fabricated with the holes for anchor bolts to the size and location dimensions as shown in MD-818.16 and 818.17.

(c) Furnish 14 ft pedestal poles with entrance ways for cable as noted in the contract documents. These holes shall be factory drilled and a straight tapped coupling, conforming to Underwriters Laboratory's UL-6 Specification, for 2 in. rigid conduits, shall be installed for each hole. A nipple with a unitized hexagonal fitting and integral inside radius on one end shall then be installed and fully seated on the interior side of the coupling. Location and installation of the coupling shall be as shown in MD-818.17.

(d) All pedestal poles and hardware, except materials manufactured from stainless steel or cast aluminum, shall be hot dipped galvanized. The galvanized coating shall conform to the thickness, adherence and quality requirements of A 123 and A 153 for hardware. Threaded components shall be chased and cleaned after galvanizing. All internally threaded components shall be tapped oversize the minimum amount required to permit assembly on the coated externally threaded fastener. Internally threaded components shall be provided with a lubricant which shall be clean and dry to the touch.

(e) Furnish each pedestal pole with a removable domed cap, fabricated from cast aluminum, circumferentially attached to the side of the pole with three hex head type 304 stainless steel bolts (1/4 in. – 20 UNC).

(f) Each pedestal pole shall have an identification plate mechanically attached 6 in. above the pedestal pole base plate and oriented so that the identification plate may be read from a ground observation position.

(g) Recessed hub type, galvanized malleable iron plugs shall be inserted flush into all couplings.

Transformer Bases.

(a) All transformer bases shall be approved by FHWA as meeting breakaway under NCHRP 350.

(b) Furnish each transformer base with four hex head bolts, four hex head nuts and all

associated hardware as shown on the appropriate detail for fastening the pedestal pole base plate to the top of the transformer base. All bolts shall conform to A 325 specifications and shall be galvanized.

Anchor Bolts.

(a) Each pedestal pole anchor bolt shall be made of steel conforming to M 314, Grade 55 S1

(b) Anchor bolt threads shall be of cut thread design with a minimum 6 in. of threads at the top.

(c) The template and anchor plates shall be as shown on MD 801.01.

(d) The diameter of the anchor bolt shall be stamped into the top of the threaded end of each anchor bolt.

(e) Each anchor bolt shall be provided with two attached heavy hex nuts and two attached flat washers.

(1) Anchor bolt nuts shall conform to A 194, grade 2 or 2H, or A 563, D or DH.

(2) All nuts shall be tapped oversize the minimum amount required to permit assembly on the coated externally threaded fastener.

(3) Washers shall conform to F 436.

(f) All nuts, washers, and the top 12 in. of all anchor bolts shall be hot dipped or mechanically galvanized. The galvanized coating shall conform to the thickness, adherence and quality requirements of A 123 or A 153 for hardware.

All high strength bolts (of a given length), nuts (of a given size) and washers (of a given diameter) shall be from the same manufacturing lot per each requisition of materials. The use of foreign made fasteners is prohibited.

CONSTRUCTION. Refer to 818.03

MEASUREMENT AND PAYMENT. Galvanized Traffic Signal Pedestal Poles and Transformer Bases will be measured and paid for at the Contract unit price per each type of pole and base furnished and installed. The payment will be full compensation for furnishing and installing pedestal poles, breakaway base and all materials, labor, equipment, tools and incidentals necessary to complete work.

Anchor bolts will be measured and paid for as specified in Section 801.

Tag Detail.

Mfg: [1] Contract #: [2]
Pole Diameter: [3] Height: [4] Gauge: [5]
Anchor Bolts: [6] Bolt Circle: [7]

Tag Reference.

[1] Name of the manufacturer of the pedestal pole.

[2] Administration Contract Number of the pedestal pole.

[3] Pole outside diameter at the base: 4-½ in. O.D. or 7-½ in. O.D.

[4] Pole height[1]: 10ft' , 14ft, 20 ft

[5] Pole gauge: Schedule 40 or 11 GA

[6] Anchor bolt size: 1 in. Dia. x 40 in. Length

[7] Bolt circle diameter: 11 in. Dia.

[1]Pole height includes the height of the pedestal pole and transformer base. Typically, the transformer base is 17 in. in height which corresponds to 10 ft pole having a height of 103 in.; and a 14 ft having a height of 151 in.

CATEGORY 800
TRAFFIC

20 FOOT GALVANIZED STEEL DETECTOR POLE WITH BREAKAWAY BASE

DESCRIPTION. Furnish and install 20 ft. galvanized steel detector pole with breakaway base suitable for use with this pole when specified.

MATERIALS. Will comply with the standard drawings 818.17-10 and 821.01-01 and the following criteria:

(a) 20 FOOT STEEL POLE
- **(1)** 3 gauge (0.3125 in.) wall thickness
- **(2)** 7½ in. Diameter at the base
- **(3)** Tapered 0.14 in. per foot.
- **(4)** Steel Pipe (A 595, Grade A)
- **(5)** Hot Dip Galvanized

(b) BREAKAWAY TRANSFORMER BASE (when specified)
- **(1)** Breakaway pole bases will be in accordance with section 821 of the Standard Specifications for Construction and Materials dated July 2008.
- **(2)** All breakaway transformer bases must be certified by the FHWA as meeting the crashworthiness criteria of NCHRP report 350.
- **(3)** Top and bottom bolt holes will accommodate 1 in. diameter bolts.
- **(4)** The hinged inspection door will be provided with a stainless steel hex head bolt and chime.
- **(5)** Overall height 17 in.
- **(6)** Top bolt circle slotted to accept patterns from 10-1/2 in. to 13-1/3 in.
- **(7)** Bottom bolt circle slotted to accept patterns from 10-1/2 in. to 12-15/16 in.

CONSTRUCTION.

(a) 20 FOOT STEEL POLE
- **(1)** Welded 2 in. conduit couplings will be placed at the top of the pole as shown on the standard detail 818.17-10 the welded coupling shown at the bottom of the pole will be increased to 4 in.
- **(2)** ID plates containing "SHA" will be installed 6 inches from the bottom of the pole.
- **(3)** Pole caps will be provided and installed.
- **(4)** Base plate will be 1 in. thick
- **(5)** Anchor bolt circle 11 in. in diameter
- **(6)** Bolt holes 1-1/8 in.

MEASUREMENT AND PAYMENT. 20 ft. galvanized steel detector poles will be measured and paid for at the Contract unit price per each pole. The payment will be full compensation for all materials, labor, equipment, tools, concrete and incidentals necessary to complete the work.

(a) Concrete foundation will not be measured and will be incidental to 20 ft or 40 ft galvanized steel detector poles.

(b) Breakaway Base Support Systems, when specified in the Contract Documents, will be measured and paid for at the contract unit price per each pedestal.

(c) Conduit bends will not be paid and are considered incidental to the detector pole.

CATEGORY 800
TRAFFIC

GALVANIZED STEEL HINGED CCTV CAMERA POLES

DESCRIPTION. Furnish and install galvanized steel, hinged CCTV camera poles in sizes and at locations specified in the Contract Document or as directed.

MATERIALS. Construct each shaft from ASTM A572 or A1011 high carbon steel or approved equal. The minimum yield strength shall be greater than 50,000 psi and the ultimate tensile strength shall be greater than 70,000 psi.

CONSTRUCTION. Hinged CCTV camera poles shall have the hinge located at a height that is 40 percent of the overall pole height, $\pm$ 10 percent. When in the fully vertical position, hinged poles shall be locked using a bolt, and shall resemble fixed poles, like those used for roadway lighting. There shall be no external mechanisms, cables, or cable guides on the outside surface of the pole. The pole and its mechanisms shall not be patented or proprietary in nature.

Foundation. See 818.03

Pole Shaft: Each pole shaft shall be constructed from ASTM A572 or A1011 high carbon steel or approved equal.

- **(a)** The minimum yield strength shall be greater than 50,000 psi and the ultimate tensile strength shall be greater than 70,000 psi.
- **(b)** The shaft shall be a two section octagonal tapered structure with a counterweight and hinge.
- **(c)** Each shaft section shall be constructed with only one longitudinal weld.

Hinge & Counterweight. The counterweight shall be a five sided section of the same material as the shaft, one gauge thicker.

- **(a)** The top section of the shaft and the counterweight shall be overlapped and attached with circumferential welds top & bottom as well as longitudinal fillet welds the length of the overlap.
- **(b)** The top section/counterweight combination shall be attached to the bottom section utilizing a hinge which shall rotate on a 1 ¼ in. diameter stainless steel rod.
- **(c)** The hinge shall be spring loaded with a heavy-duty 1 ½ in. x ¾ in. x 12 in. compression spring to prevent winch cable spooling.
- **(d)** A wire guide shall be provided at the hinge joint to protect internal wiring during operation of the mechanism.

Base. Each pole shall have a tapered 27 in. tall "H" base housing which shall contain the winch assembly and ground lugs.

(a) The "H" base shall be fabricated from the same material and gauge as the bottom section of the shaft and will be securely welded to the shaft with a full penetration circumferential weld utilizing a back-up ring.
(b) The base plate shall be 23 sq. in., and shall be 2-in. thick ASTM A709, plate with slotted holes to accommodate the Administration's standard CCTV pole foundation, with 2.25 in. anchor bolts on a 22.0 to 23.0 in. bolt circle.
(c) A large flush mounted access door with a reinforced frame shall be provided and securely held in place by tamperproof screws.

Winch Assembly. The winch assembly shall be manually operated with an automatic brake and rated for 1,500 lb minimum pull capacity.

(a) A 3/16 inch diameter stainless steel aircraft cable shall be wound on the winch drum and attached to the counterweight to raise and lower the upper portion of the pole.
(b) Two 1 inch diameter nylon rollers shall be used in the bottom of the shaft to contain and guide the cable during operation of the pole.

Mounting flanges. Each pole shall have mounting flanges as follows:

(a) At the top on either side for attaching antennas or other equipment. The flanges shall measure approximately 3 in. x 6 in. x 0.50 in.
(b) At a height of 17 ft – 0 in, measured from the bottom of the mounting flange. One 16 in. x 3 in. x 0.50 in. shall be welded to the side opposite the counterweight for mounting traffic detectors and other devices (see CCTV pole detail sheet 2).

Leveling and Alignment. Install the pole so that it is vertical and no binding exists between the counterweight section and the main support (lower weldment).

(a) The space (gap) between each side of the counterweight and the lower weldment shall be approximately equal.
(b) If a bubble level indicates that the pole is "plumb" or vertical, but the counterweight binds against the lower weldment on either side, the leveling nuts on the anchor bolts shall be adjusted until the binding is relieved.
(c) If this adjustment succeeds in relieving the binding but the pole is no longer plumb, or if the adjustment fails to relieve the binding, the Contractor shall contact the pole manufacturer for a solution.
(d) If solution cannot be reached, the Contractor shall replace the pole at no cost to the Administration.

Deflection at Top of Pole – 40 MPH Windload.

(a)	No load:	0.45 Percent of the total pole length
(b)	One CHART camera and all fixtures:	0.50 Percent of the total pole length
(c)	Two CHART cameras and all fixtures:	0.60 Percent of the total pole length

MEASUREMENT AND PAYMENT. Hinged CCTV Camera Poles will be measured and paid for at the contract unit price per each length pole furnished and installed. The payment will be full compensation for furnishing & installing all materials including labor, equipment, tools and incidentals necessary to complete the work.

Anchor bolts will be measured and paid for as specified in section 801.

CATEGORY 800
TRAFFIC

GALVANIZED TRAFFIC SIGNAL STRAIN POLES

DESCRIPTION. Furnish and install galvanized traffic signal strain poles at locations specified in the Contract Document or as directed by the Engineer.

MATERIALS. Provide pole design that meets the 2001 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, except as noted. All welding shall be in accordance with the American Welding Society (AWS) Structural Welding Code D1.1 - Steel, Tubular Structures.

Each strain pole furnished shall consist of a design from a steel shaft with a steel base plate, four anchor bolts and miscellaneous hardware.

(a) Manufacture the strain pole shaft from steel tubing conforming to A 595 Grade A or equal. Each strain pole shaft shall be fabricated of one length and shall have one longitudinal weld, parallel to the long axis of the strain pole shaft, with no transverse welds. Finish longitudinal welds to form a smooth outside surface and the wall of the strain pole shaft shall be uniform in thickness including the welded area. The strain pole shaft shall be round or multi-sided (eight sides or more) in cross section and be uniformly tapered from butt to tip with approximately a 1 in. reduction in diameter for each 7 ft. in length (0.14 in./ft).

(1) All 30 ft. strain poles shall be 12 in. outside diameter at the base plate and made of zero gauge (0.312 in.) thickness steel.

(2) All 32 ft. strain poles shall be either 12 in. or 14 in. outside diameter at the base plate and made of double zero gauge (0.625 in.) thickness steel.

(b) Furnish all strain poles with a base plate with a minimum 10 in. opening. The material shall meet the requirements of A 709, Grade 36 and be of sufficient size and strength. Secure the base plate the lower end of the strain pole shaft by two continuous electric arc welds. The base plate shall telescope the strain pole shaft with one weld on the inside of the base plate at the end of the strain pole shaft. The remaining weld shall be located on the outside of the base plate around the circumference of the strain pole shaft. The weld connection shall develop the full strength of the adjacent strain pole shaft to resist bending action. Fabricate all base plates with the holes for anchor bolts to the size and location dimensions as shown on the appropriate detail.

(c) Weld access hole frames into the strain pole as detailed in MD 818.11. Cover the access hole frame with a galvanized steel cover, conforming to A 709, Grade 36. Secure the access hole covers top to the access hole frame by a hinge fabricated from 0.063 in. stainless steel using a 0.120 in. diameter stainless steel hinge pin. Secure the hinge to the

access hole frame by two 1/4 in.- 20 UNC hex head stainless steel bolts. Secure the hinge to the access hole cover by two 1/4 in.- 20 UNC hex head stainless steel bolts and lock nuts. Provide a slotted opening at the bottom of the access hole cover to allow for attachment of a furnished 1/4 in.- 20 UNC hex head stainless steel bolt into the access hole frame face.

(d) A 3/8 in. diameter x 1 in. stud copper servit post for two #6 AWG stranded wire shall be furnished into the bottom of the access hole frame.

(e) Furnish strain poles with entrance ways for cable as detailed in MD 818.15. These holes shall be factory drilled and a straight tapped coupling, conforming to Underwriters Laboratory's UL-6 Specification, for 3 in. rigid conduits, shall be installed for each hole. A nipple with a unitized hexagonal fitting and integral inside radius on one end shall then be installed and fully seated on the interior side of the coupling. Location and installation of the coupling shall be as shown in the details.

(f) Weld a "J" hook near the top of the strain pole shaft for cable support.

(g) All strain poles, access hole frame and hardware, except materials manufactured from stainless steel or cast aluminum, shall be hot dipped galvanized. The galvanized coating shall conform to the thickness, adherence and quality requirements of A 123 or A 153 for hardware. Clean and chase all threaded components after galvanizing. Tap all internally threaded components oversize the minimum amount required to permit assembly on the coated externally threaded fastener. Provide internally threaded components with a lubricant which shall be clean and dry to the touch.

(h) Furnish each strain pole with four removable ornamental anchor bolt covers made of cast aluminum. Bolt holes for attaching the bolt covers to the base plate shall be drilled at the location obtained by following the diagonal line of the base plate until it intersects the bolt circle diameter, then proceeding tangentially from the bolt circle diameter a distance equal to the Anchor Bolt Center to Bolt Slot Center Distance as detailed in MD 818.14. Attach to the base using hex head stainless steel bolts (1/4 in.- 20 UNC).

(i) Furnish each strain pole with a removable domed cap, fabricated from cast aluminum, circumferentially attached to the inside or outside of the pole shaft with three hex head stainless steel bolts (1/4 in. – 20 UNC).

(j) Each strain pole shall have an identification plate mechanically attached, oriented such that the identification plate may be read from a ground observation position.

(k) Insert recessed hub type, galvanized malleable iron plugs flush into all strain pole couplings.

Anchor Bolts.

(a) Make each strain pole anchor bolt of steel and conforming to F1554, Grade 55 S1.

(b) Anchor bolt threads shall be of cut thread design with a minimum 9 in. of threads at the top and bottom.

(c) The template and anchor plates shall be as shown on MD 801.01.

(d) Stamp the diameter of the anchor bolt into the top of the threaded end of each anchor bolt.

(e) Provide each anchor bolt with two anchor bolt nuts and two flat washers.

(f) Anchor bolt nuts shall conform to A 194 grade 2 or 2H or A 563 D or DH.

(g) Tap all nuts oversize the minimum amount required to permit assembly on the coated externally threaded fastener.

(h) Washers shall conform to F436.

(i) Hot dip or mechanically galvanize all nuts, washers and the top 12 in. of all anchor bolts. The galvanized coating shall conform to the thickness, adherence and quality requirements of A123 or A153 for hardware.

All high strength bolts (of a given length), nuts (of a given size) and washers (of a given diameter) shall be from the same manufacturing lot per each requisition of materials. The use of foreign made fasteners is prohibited.

Alternate Design. Alternate strain pole designs will be considered provided the following qualifications are observed:

(a) Alternate strain pole designs shall be of two piece construction.

(b) Two piece construction shall have a minimum of 18 in. of overlap with 1 watertight transverse weld, smoothed to be inconspicuous.

(c) Bolt circle diameters shall be followed.

(d) Alternate strain pole designs shall have a base plate diameter equal to those values shown on the typicals.

(e) Single straight pipe sections are not acceptable.

(f) All alternate designs shall be structurally equivalent to the physical requirements of this specification and as approved by the Engineer.

CONSTRUCTION. Refer to 818.03

MEASUREMENT AND PAYMENT. Galvanized Traffic Signal Strain poles will be measured and paid for at the contract unit price per each type of pole furnished and installed. The payment will be full compensation for furnishing & installing all materials including labor, equipment, tools and incidentals necessary to complete the work.

Anchor Bolts will be measured and paid for as specified in section 801.

Tag Detail.

Mfg: [1]		**contract #** [2]
Pole Diameter: [3]	**Height:** [4]	**Gauge:** [5]
Anchor Bolts: [6]	**Bolt Circle:** [7]	

Tag Reference.

[1] Name of the manufacturer of the strain pole.

[2] Administration Contract Number of the strain pole.

[3] Pole outside diameter at the base:

12" O.D. or 14" O.D.

[4] Pole height: 30' or 32'

[5] Pole gauge: 0 GA or 00 GA

[6] Anchor bolt size: 1-¾" Dia. x 66" Length or 2-¼" Dia. x 72" Length

[7] Bolt circle diameter: 16" Dia. or 22" Dia.

CATEGORY 800
TRAFFIC

INSTALL CELLULAR ANTENNA AND LEAD-IN CABLE

DESCRIPTION. Install Administration furnished cellular antenna and lead-in cable as specified in the contract documents or as directed by the Engineer.

MATERIALS.

Cellular antenna and lead in cable	As approved by OIT and OOTS

CONSTRUCTION. Install Administration furnished cellular antenna and antenna lead in cable.

MEASUREMENT AND PAYMENT. Installing Administration furnished cellular antenna and lead in cable will be paid at the contract unit price per each. The payment will be full compensation for pickup, transportation and installation of the antenna and the antenna cable and for mounting hardware, material, labor, equipment, tools, and incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

INTERCEPT EXISTING ELECTRICAL SERVICES

DESCRIPTION. Intercept up to three existing electrical or communications services within a 10 foot radius of a common point, and install a field equipment cabinet or the appropriate power or communications pedestals, as specified in the Contract Documents or as directed by the Engineer.

MATERIALS. All materials and equipment shall be new and approved by the Engineer.

CONSTRUCTION. Intercept up to three existing communications or electrical services at a common location, and install either a field equipment cabinet or the appropriate service pedestals. Foundations, cabinets or service pedestals installed will measured and paid for separately under their respective contract items.

(a) The conduit installed under this item shall match the existing conduits that are intercepted in both diameter and schedule.

(b) The existing conduits may be galvanized steel, or PVC.

(1) If the existing conduits are steel, properly-coupled Schedule 80 PVC may be used, as long as the PVC conduit is below grade.

(2) Power risers to an exposed disconnect switch shall be galvanized steel.

MEASUREMENT AND PAYMENT. Intercepting existing electrical or communications services and installing field equipment cabinets or service pedestals will be paid for at the Contract Unit price bid for this work. The payment will be full compensation for test pitting to find the conduits, conduit and conduit stubs, material, labor, and equipment, including all incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

IP BASED VIDEO TRAFFIC DETECTION CAMERAS

DESCRIPTION. Furnish and install self contained internet protocol (IP) based video detection cameras that monitor vehicles on a roadway via the machine vision processing of color video images, and provide outputs to a traffic controller or similar device, as well as streaming MPEG-4 video over a common ethernet connection, as specified in the Contract Documents or as directed by the Engineer.

MATERIALS. Provide video traffic detection cameras, mounting hardware, cabinets, and all component parts that meet the latest edition of the National Electrical Manufacturers Association (NEMA) Standards and Underwriters Laboratory (UL), as applicable. Provide ISO 9002 and CE certified camera components. Use the advertising date of this Contract to determine the date of the applicable standards.

If available, permanently engrave serial numbers and model numbers on all removable components and hardware. Etch, Stamp or mold the serial number and model number. The use of adhesive backed labels is not acceptable.

CONSTRUCTION. Provide video detection cameras that consist of an IP based video camera and a 3-conductor power cable that carries both power to the camera, and video and data signals back to Administration installed video processing equipment in the controller cabinet. The cabinet equipment permits direct connection to the signal controller via a 10/100 Ethernet connection and the industry standard TCP/IP communications protocol, or to contact-closure hardwired devices.

Features.

(a) Built-in IP based addressing with a unique Ethernet MAC address. No plug-in devices or cards shall be necessary.

(b) Web-server interface and network connection via standard CAT-5 cable.

(c) Easy locking connector that allows technicians/installers to pull power cable either up or down a pole without splicing

(d) Zoom configuration is conducted at the cabinet.

(e) MPEG-4 streaming video via any standard digital video player, with viewing rates of 5 fps to 30 fps, depending on bandwidth.

(f) An access point in the cabinet that provides standard NTSC or PAL full-motion video output to an analog video monitor.

(g) Internet browser interface with common Internet browsers for password-protected access over the internet. The embedded web server capability shall enable access to streaming video, configuration editing, and camera monitoring via the Internet.

(h) Dual core processor with DSP image processing and ARM general-purpose processing.

(i) Direct real-time iris and shutter speed control.

(j) Non-volatile memory data storage.

Camera Hardware. Supply hardware that consists of a color video image processing camera, and a 3-wire control & data transfer cable for signal control and streaming MPEG-4 video image transfer.

Machine Vision Processor (MVP). Provide MVP camera that is an integrated imaging color CCD array with zoom lens optics, high speed, dual-core image processing hardware bundled into a sealed enclosure.

(a) The CCD array shall be directly controlled by a dual-core processor, thus providing high-quality video for detection that has virtually no noise to degrade detection performance.

(b) It shall be possible to zoom the lens as required for setup and operation.

(c) The MVP shall provide JPEG video compression as well as standard MPEG-4 digital streaming video with flashing detector overlay.

(d) The MVP shall provide direct real-time iris and shutter speed control.

(e) The MVP camera shall be equipped with an integrated 22x zoom lens that can be changed using either configuration computer software.

(f) The digital streaming video output and all data communications shall be transmitted over the three-wire power cable.

(g) The MVP camera shall operate on 120/220 VAC, 50/60 Hz, with a maximum wattage of 25 watts.

(1) The camera and processor electronics shall consume 10 watts.
(2) The enclosure heater shall consume 15 watts.

MVP Lens.

(a) Low-power thermostatically-controlled ITO faceplate.

(b) Built-in heater.

(c) Hydrophilic faceplate coating to shed water.

(d) Weatherproof rear connector (IDC rapid termination industrial connector).

(e) The lens shall be available in a standard configuration or wide-angle.

(f) The focal length shall be 4.1mm to 87.8mm.

Detection Zone Programming. Placement of detection zones shall be by means of a portable or desktop computer using the Windows XP, or Vista operating system, a keyboard, and a mouse.

(a) The PC monitor shall be able to show the detection zones superimposed on images of traffic scenes.

(b) The mouse and keyboard shall be used to draw detection zones on the PC monitor. It shall be possible to:

(1) Download detector configurations from the PC to the MVP camera and cabinet interface module.
(2) Retrieve the detector configuration that is currently running in the MVP camera.
(3) Back up detector configurations by saving them to the PC fixed disks or other removable media storage.

(c) The supervisor's mouse and keyboard shall be able to:

(1) Edit previously defined detector configurations.
(2) Adjust the detection zone size and placement.
(3) Add detectors for additional traffic applications.
(4) Reprogram the camera for different traffic applications, changes in installation site geometry, or traffic rerouting.
(5) Perform the above upload, store, and retrieve functions for video snapshots of the MVP cameras view.

Optimal Detection. Provide video detection camera that provides optimal detection of vehicle passage and presence when the:

(a) The MVP camera is mounted 10 m (30 ft) or higher above the roadway.

(b) The image camera is adjacent to the desired coverage area.

(c) The distance to the farthest detection zone locations is not greater than 10 times the mounting height of the MVP camera.

(d) The deployment geometry provides an unobstructed view of each traveled lane where detection is required. Although optimal detection may be obtained when the MVP camera is mounted directly above the traveled lanes, the MVP camera shall not be required to be directly over the roadway.

(e) The MVP camera is able to view either approaching or receding traffic or both in the same field of view. The preferred image camera orientation for optimal detection shall be to view approaching traffic since there are more high contrast features on vehicles as viewed from the front rather than the rear.

(f) The MVP camera, when placed at a mounting height that minimizes vehicle image occlusion and equipped with a lens to match the width of the road, is able to monitor a maximum of 7 traffic lanes when mounted at the roadside, or up to 8 lanes when mounted in the center with four lanes on each side.

18-Gauge Camera-to-Cabinet Cable. The cable between the MVP and the cabinet interface shall consist of three conductors 18 AWG, with an overall UV-resistant low density polyethylene jacket.

(a) Conductors.

(1) Three, 18 AWG, 19 strands of 30 gauge tin-plated copper conductor diameter .046”/.052”.
(2) Extruded polyethylene 200 conductor insulation, with nominal .030” wall thickness.
(3) Black, green, and white colors.

(b) Construction.

(1) Extruded black polyethylene jacket .040”/.050” wall thickness, UV-resistant.
(2) 0 .330” - .354” maximum outside diameter.
(3) 600 volt (rms) rated.
(4) The cable shall be imprinted with the manufacturer’s part number, number of conductors, conductor size, voltage rating, jacket material, and an indication that it is conduit rated.

Count Detection Performance. Using a MVP camera installed within the optimal viewing specifications described above for count station traffic applications; the camera shall be able to accurately count vehicles with:

(a) At least 98 percent accuracy under normal operating conditions (day and night).

(b) At least 93 percent accuracy under artifact conditions. Artifact conditions are combinations of weather and lighting conditions that result from shadows, fog, rain, snow, etc. The volume count shall be:

(1) Accumulated for the entire roadway (all traveled lanes).

(2) Accumulated over time intervals that contain a minimum of one hundred (100) vehicles to ensure statistical significance.

Demand Presence Detection Performance. Using a MVP camera installed within the optimal viewing specifications described above for intersection control traffic applications; the camera shall be able to accurately provide demand presence detection.

(a) The demand presence accuracy shall be based on the ability to enable a protected turning movement on an intersection stop line, when a demand exists.

(b) The probability of not detecting a vehicle for demand presence shall be less than 1- Percent error under all operating conditions.

(c) In the presence of artifact conditions, the MVP camera shall minimize extraneous (false) protected movement calls to less than 7 percent.

(d) To ensure statistical significance, the demand presence accuracy and error shall be calculated over time intervals that contain a minimum of100 protected turning movements performance specifications shall be achieved with a minimum of 2 presence detectors coupled with a single detector function (Type-9) to provide adequate road coverage to sample the random arrival patterns of vehicles at the stop line.

(e) The calculation of the demand presence error shall not include turning movements where vehicles do not pass through the presence detectors, or where they stop short or stop beyond the combined detection zones.

Speed Detection Performance. The MVP shall accurately measure average (arithmetic mean) speed of multiple vehicles with more than 97 percent accuracy under all operating conditions for approaching and receding traffic.

(a) The average speed measurement will include a minimum of 100 vehicles in the sample to ensure statistical significance.

(b) Optimal speed detection performance requires that camera location conform to the specifications described above for count station traffic applications with the exception that the camera must be higher than 13 m (40) ft.

(c) The MVP will accurately measure individual vehicle speeds with more than 94 percent accuracy under all operating conditions for vehicles approaching the camera (viewing the front end of vehicles), and more than 90 percent accuracy for vehicles receding from the camera (viewing the rear end of vehicles).

(d) These specifications will apply to vehicles that travel through both the count and speed detector pair and will not include partial detection situations created by lane-changing maneuvers.

(e) To ensure statistical significance, the average speed accuracy and error will be calculated over time intervals that contain a minimum of one hundred vehicles.

Modular Cabinet Interface Unit (Access Point). The modular cabinet interface unit will be furnished and installed by the Administration. This section is for reference only**.**

The modular cabinet interface unit shall communicate directly with up to eight (8) MVP cameras and shall comply with the form factor and electrical characteristics to plug directly into a NEMA type C or D detector rack providing up to thirty-two (32) inputs and sixty-four (64) outputs or a 170 input file rack providing up to sixteen (16) contact closure inputs and twenty-four (24) contact closure outputs to a traffic signal controller.

(a) Additional Features.

(1) Easy IP addressable Ethernet connectivity using RJ-45 connectors.
(2) USB 2.0 connector for a USB mouse.
(3) Provides PAL or NTSC analog video output for MPEG-4 streaming digital video.
(4) Detector rack or shelf mount installation.
(5) 1500 volts RMS isolation between rack logic ground and street wiring.
(6) Emulates the function of up to 4 TS2 Bus Interface Units (BIU).
(7) Self diagnostics on power-up.
(8) High-energy transient protection.

(b) Power: 12 to 24 VDC, 11W maximum.

(c) Environmental.

(1) Temperature: -34° C to +74° C (-29° F to +165° F).
(2) Relative Humidity: 0 to 95 Percent.

(d) Dimensions and Weight.

(1) 114 mm H x 59 mm W x 175 mm L (4.5 in H x 2.34 in W x 6.9 in L)
(2) Weight: 0.5 lb.

(e) Complies with: CE EN 55022, EN 61000-6-1 FCC Part 15, Class A.

Communications Interface Panel. The communications interface panel will be furnished and installed by the Administration. This section is for reference only. The communications interface panel shall have the following features:

(a) Four (4) sets of three (3) electrical terminations for three-wire cables for powering up to eight (8) MVP cameras.

(b) High-energy transient protection to electrically protect the modular cabinet Interface unit and connected MVP cameras.

(c) Single-point Ethernet connectivity via RJ45 connector for communication to and between the modular cabinet interface module and the MVP cameras.

(d) Predefined wire termination blocks for MVP power connections.

(e) A Broadband-Over-Power-Line (BPL) transceiver that supports up to 10 MB/s inter-device communications.

(f) An interface connector to cable directly to the modular cabinet interface unit.

(g) The option of using either 110/220 VAC 50/60 Hz power.

(h) Fuse protection using SLO-BLO, 1/2 amp fuses.

Installation and Training. The supplier of the video detection camera shall supervise the installation and testing of the video detection camera and any optional computer equipment.

Warranty, Maintenance and Support. The video detection camera shall be warranted by its supplier for a minimum of 2 years.

Documentation. The equipment supplier shall deliver a CD containing operating manuals, service manuals, and maintenance instructions for the video traffic detection camera being supplied to the Administration's Office of Traffic & Safety, Signal Operations Division, located at 7491 Connelley Drive, Hanover, Maryland 21076. The phone number is 410-787-7650.

Mounting Hardware. Supply mounting hardware capable of securely mounting the camera to the camera support and mounting the camera support securely to the structure. Provide mounting hardware capable of mounting the camera to a vertical, horizontal or angled structure in accordance with Maryland SHA Typical details. Provide up to 60" vertical extension pipe where required by Contract Documents or as directed by the Engineer.

MEASUREMENT AND PAYMENT. IP Based Video Traffic Detection Cameras will be measured and paid for at the contract unit price per each. The payment will be full compensation for furnishing and installing the video traffic detection camera, equipment specified, all mounting hardware including camera support to structure, up to 60" vertical extension pipe, 3 conductor cable from the camera to the controller cabinet, labor, and all incidentals necessary to complete this work.

The communications interface panel, modular cabinet interface unit, and all other cabinet equipment will be furnished and installed by the Administration.

CATEGORY 800
TRAFFIC

JELLY-FILLED COMMUNICATIONS CABLE

DESCRIPTION. Furnish and install 6 or 12 pair jelly-filled communication cable as specified in the Contract Documents or as directed by the Engineer.

MATERIALS. IMSA 60-2.

CONSTRUCTION. The communication wire shall be #19 AWG twisted-pair copper cables, suitable for direct-buried or conduit installation, and shall meet the requirements of REA Specification PE-39.

Supply, install, and test twisted-pair cables which will provide communications between the field equipment and the corresponding communications leased services demarcation points.

(a) Provide a manufacturer's certification that the offered communication wire complies with all electrical and mechanical requirements listed in this specification.

(b) Twisted-pair communication wire shall contain 6 or 12 stranded conductors, as shown on the Plans or as specified in the Contract Documents.

(c) Conductors shall consist of a stranded wire of plain annealed high conductivity copper, smoothly drawn, circular in section, uniform in quality, and free from defects.

(1) Each conductor shall be insulated with a colored, high density polyethylene jacket. The twisted-pair communication wires shall be color-coded using the REA standard color code.

(2) Insulated conductors shall be uniformly twisted to form pairs.

The twisted length of the pairs shall vary to minimize cross talk. Near-end crosstalk shall not exceed 56 Db @ 772 kHz within a 6-pair cable.

A non-hygroscopic dielectric tape shall be wrapped around the insulated pairs

(d) A laid up core shall be wrapped with aluminum tape and bonded with an overlap to provide 100 percent shielding.

(e) A black, high molecular weight, medium density, polyethylene jacket shall be extruded over the shield.

(f) Filling compound materials used in the communication wire shall not support galvanic action.

(g) The twisted-pair communication wire shall be manufactured for installation in an underground conduit.

(h) The copper communication wire shall contain no faulty pairs and shall be capable of the transmission of 9600 bps over distances up to 3000 ft.

(i) Mutual capacitance: shall not exceed 40 nF, +/-3 nF per kilometer.

(j) DC Resistance shall not exceed 107.0 ohms per 1000 meters.

(k) Characteristic impedance shall be less than 100 ohms (above 1 MHz).

(l) Attenuation: 7.5 dB/Kilometer @ 150 kHz
15.4 dB/Kilometer @ 772 kHz

(m) The Contractor shall be responsible for all testing and documentation required to establish approval and acceptance of the production, and installation of twisted-pair cable.

(1) DC Resistance. The resistance of any conductor in any twisted-pair communication wire shall not exceed 9.38 ohms per 330 ft.

(2) DC Resistance Unbalance. The resistance unbalance between the two conductors of any pair shall not exceed 5 percent.

(3) Mutual Capacitance. The mutual capacitance of any pair shall not exceed 47.6 pF per 3.3 ft at 1 MHz.

(4) Capacitance Unbalance - Pair to Ground. The capacitance unbalance to ground at 1 kHz of any pair shall not exceed 3.3 pF per 3.3 ft.

(n) The Contractor shall ensure that all installed cabling systems are in full compliance with the National Electrical Code (NEC) to ensure that electrical installations meet the necessary safety practices to prevent electrical shock hazards to personnel and to ensure fault clearance of unintentional electrical breakdowns.

(o) The Contractor shall ensure that all installed cabling systems are in full compliance with the National Electrical Code (NEC) to ensure that electrical installations meet the necessary safety practices to prevent electrical shock hazards to personnel and to ensure fault clearance of unintentional electrical breakdowns.

MEASUREMENT AND PAYMENT. Jelly-Filled Communications Cable will be measured and paid for at the Contract unit price per linear foot, complete in place, for all cable furnished and installed. The payment will be full compensation for all cable, connectors, labor, materials, equipment, and all incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

LED LANE USE CONTROL SIGNALS

DESCRIPTION. Furnish and install Light Emitting Diode (LED) Lane Use Control Signals as specified in the Contract Documents or as directed by the Engineer. Within the face, the Lane Use Control Signal shall contain up to three types of LED displays. One display shall include a red "X", yellow "X" and green "Arrow". Each symbol shall be 18 in minimum tall as shown on the Contract Documents. The physical appearance of the Lane Use Control Signals shall be a square shape. Each display shall create the appropriate symbol by a double stroked row of LED pixels. The symbols shall be clearly visible in normal daylight and nighttime conditions.

MATERIALS. All materials and equipment forming part of the LED Lane Use Control Signal shall be new and approved by the Engineer.

Lane Use Control Signal Enclosure.
Each enclosure shall meet the following physical characteristics:

1) Fabricate the weather proof enclosure from 0.125 in. aluminum, 5052-H32 series;

2) The enclosure shall have all corner and seams welded to provide a watertight seal around the entire case;

3) The sign face shall be aluminum, 5052-H32 series. The sign face shall be attached to the enclosure with two stainless steel lift-off hinges. A hand operated stainless steel latch shall secure the sign face to the enclosure. The sign face shall be removable and replaceable in the field without need for tools to allow for easy replacement without removing the entire enclosure. The sign face shall have a quick disconnect plug for easy door removal;

4) The 12 in. deep sign face visor shall be aluminum, 5032-H32 series, attached securely to the sign enclosure. The visor shall not impede the removal of the sign face;

5) A waterproof seal shall be created between the sign face and sign housing by use of a ¼ in. x 1 in. wide neoprene gasket;

6) The enclosure for the multiple display signals shall include a terminal block for termination of the 120 volt supply for the red "X" symbol, yellow "X" symbol, green "arrow" symbol and for the neutral. The enclosure shall include a terminal block for all alarm lead in cables. Each termination point will be labeled to correspond to the appropriate function;

7) Design the enclosure to be securely mounted on a signal mast arm, a 1 ½ in. hub shall be installed on top and bottom of the housing, and connected to the internal stiffeners. Mounting hardware assembly shall be as detailed for rigid mount signal heads on Maryland Standard MD 814.01;

8) The housing, sign face and visor shall be fusion bonded polyester power Black coated per manufacture's recommendations;

9) Maximum Weight: $\leq$ 100 lbs;

10) Operating Temperature Range: -40 F to 165 F;

11) All materials used in construction shall be resistant to fungus growth and moisture deterioration;

12) Dissimilar metals shall be separated by an inert dielectric material;

13) No self-tapping screws may be used on the exterior of the sign unless approved in writing by the Engineer;

14) Sealed aluminum housing as per NEMA 4X requirements;

15) Poor workmanship shall result in rejection of the sign;

16) The housing height shall permit mounting the signs within the space shown in the Contract Documents;

17) Signs shall have at least two stainless steel latches per sign face to tightly secure the face against the gasket;

18) If cable attachments are used in the sign housing, the cables shall be securely clamped as approved by the Engineer. No adhesive attachments shall be allowed.

19) All external fasteners, washers, and hardware shall be stainless steel;

20) All components shall be readily accessible for maintenance when the sign face is open;

21) The sign construction shall be a modular concept consisting of the following "hand removable" self-contained modules: message display, rack mounted individual message drives, driver rack assembly and sign enclosure;

22) The assembly of the sign shall be designed to ensure all internal components are adequately supported to withstand mechanical shock and vibration from wind ratings meeting AASHTO requirement of 90 mph with a 30 percent gust factor.

LED Message Display.

The sign shall display two or more messages in the character size and font shown on the Plans and meet the following requirements:

1) The display shall consist of solid state LED's mounted on a Printed Circuit Board (PCB)

matrix with a matte black mask to conceal solder joints and other circuit board features;

2) Signs shall be one-way with messages displayed on one side only;

3) No phantom words or legend shall be seen under any ambient light condition;

4) All characters shall be legible under all light conditions at a distance of 900 ft, within a 15-17 degree cone of vision centered about the optical axis;

5) The LED's shall be arranged in a manner to form "double stroke" characters and shall be distributed evenly along the message. The maximum distance between consecutive LED's shall not exceed 2.5 times the diameter of the LED used, and shall not vary more than 10 percent;

6) The PCB shall have a minimum thickness of 0.093 in;

7) The PCB shall have a component identifier silk screen;

8) The nominal luminous intensity of each LED shall be 6,000 mcd at 20 mA;

9) The individual LED light sources shall be interconnected so that the catastrophic failure of a single LED will result in a total loss of not more than 5 percent of total number of LED's;

10) There shall be no electronic components visible on the front of the display;

11) The LEDs shall be individually mounted directly to the display module printed circuit board and shall be easily replaceable and individually removable using conventional repair shop methods;

12) Each pixel shall be rated for 100,000 continuous operation with no more than 50 percent lumen depreciation;

13) The red "X", yellow "X" and green "Arrow" shall have a minimum height of 18 in.;

14) Only the LED's for the required message(s) shall be installed on the display matrix;

15) The red and amber LED's shall be of the latest Alln GaP Technology. The green and lunar white LED's shall be of the latest In GaN technology;

16) The rear side of the PCB shall be protected by a molded polymeric back cover to seal and protect it from any possible damage;

17) The display PCB with back cover shall fit into front door which consist of an aluminum frame and face lens;

18) The face lens shall be made of 0.250 in. (1/4 in.) non glare matte-finish polycarbonate with UV

resistant surface treatment. The lens shall have light transmission properties of at least 82 percent;

19) The entire face display shall be assembled as a one piece self-contained module that can be easily removed from the sign housing in less than one minute without need for any tool;

20) The door face shall be mounted on the sign housing on 2 stainless steel "lift-off" type hinges and shall be latched using 2 stainless steel ¼ turn link locks.

21) The display module shall have a multi-conductor cable with an individual 2 pin connector for each message;

22) A retaining rod shall be provided to hold the front door in the open position.

Driver Rack Assembly

1) The driver rack assembly shall be a single part self-contained module consisting of an interconnect PCB and anodized aluminum frame;

2) The driver rack shall have the capabilities to house up to 6 drive modules;

3) The aluminum rack shall be vented from top to bottom and shall include latches to lock the modules in place;

4) The driver rack assembly shall be secured in the sign enclosure by 4 captive type spring-loaded thumbscrews. The entire assembly shall be removable in less than one minute with the need of any tools;

5) The interconnect PCB shall include connectors for 6 drive modules and 6 display messages;

6) The interconnect PCB shall include terminals for all field wiring, 120 VAC controls, external photocell and alarm signals;

7) All interconnections within the Lane Use Control Signal shall be accomplished through the PCB, no internal wiring shall be permitted with the exemption of a single cable for the message display;

8) All connectors and terminals shall be identified via the silk screen identifier on the surface of the PCB;

9) The driver rack assembly shall be UL certified.

Message Control

1) The sign shall be equipped with enclosed (weather-protected) control terminals;

2) The sign shall have one individual LED drive module for each message. The drive module shall be compatible with Malfunction Management Unit (MMU). Each drive module shall be capable of providing an alarm output;

3) The drive modules shall be designed to be "rack mounted" as per industry standard 6.5 inch x 4.5 in. dimensions;

4) The drive modules shall consist of a PCB with a minimum thickness of 0.62 in. with an aluminum front plate and handle as commonly used for vehicle detectors;

5) The drive modules shall drive the LED's at a DC current not exceeding the maximum rating recommended by the LED manufacturer;

6) The drive modules shall regulate the LED drive current to compensate for line voltage fluctuations over the range of 90 VAC to 135 VAC. The luminous output of the display shall not vary more than 1 percent over the voltage range and shall not be perceptible to the human eye;

7) The drive modules shall be fused and include voltage surge protection to withstand high-repetition noise transients and low-repetition high-energy transients as per NEMA TS-2 Section 2.1.6;

8) The circuitry shall ensure compatibility and proper triggering and operation of load switches and conflict monitors in signal controllers currently in use by the Administration;

9) The drive modules shall have a capability of 25 watts or greater;

10) The drive modules shall be designed to maintain a consistent LED drive current regardless of outside temperatures;

11) On-board circuitry shall meet FCC regulations;

12) The drive modules shall be designed to provide automatic dimming while connected to an external photocell;

13) An external photocell shall be provided;

14) LED drive current shall be regulated just as efficiently when in "dimmed state";

15) The drive modules shall be capable of providing a "confirmation" or "alarm" signal, the signal shall be configured for 120 VAC;

16) Drive modules shall include a green LED for power status, a yellow LED for dimming status and a red LED for alarm status.

Supply Voltage. The nominal supply voltage required at the sign housing for full brightness operation shall be 120 VAC. Power supplies shall be modular and rack mounted for easy access and replacement. The drive modules shall meet the latest requirements of ITE led specifications for electrical characteristics such as power factor, THD, surge protection, electronic noise and load switch compatibility.

Brightness Control. The light output of the pixels shall be automatically adjusted via the photocells using pulse width modulation of the DC current.

1) The frequency of the modulation shall not be less than 100 Hz;

2) The duty cycle shall be adjustable from 1 to 99 percent, in 0.5 percent or smaller increments;

3) The dimming feature shall have a built-in 30 sec delay to prevent external interference and shall dim the display "progressively" based on the ambient light level;

4) The automatic dimming circuitry shall be tuned to reduce the light intensity of the display by approximately 35 percent.

Components.

1) All components other than the LEDs shall be standard industry type, available from wholesale electronics distributors or component manufacturers;

2) Components shall carry standard industry identification markings to permit cross-referencing by Administration service personnel after the signs have been accepted for maintenance;

3) All discrete components, such as resistors, capacitors, diodes, transistors, and integrated circuits shall be individually replaceable. Components shall be arranged so they can be easily accessed for testing and replacement.

Heating. The sign face will be heated with a thermostically-controlled heater. The heater shall have sufficient power to prevent icing or condensation on either side of the sign face during the most severe winter weather conditions found in Maryland.

Ventilation. The ventilation system shall be natural convection, for both the display modules and the sign housing interior.

1) The exhaust port shall be on the top of the housing, screened, and shielded to be rain-tight.

2) The air inlet ports shall be screened, and on the bottom of the housing.

Documentation. The sign system supplier shall provide three sets of operating manuals, service manuals, and maintenance instructions for all components of the sign system.

Experience. The manufacturer shall provide the names, addresses, and telephone numbers of at least three transportation agencies in the U.S. currently using the manufacturer's LED lane use control signal system.

1) The agencies so named must confirm that the manufacturer's sign system has operated as specified in their contract documents and any applicable revisions for a period of at least one year.

2) The signs used in the systems shall have a character height of at least 18 in.

3) Manufacturers who meet the above requirements but whose systems have been installed in other North American locations will be considered on a case-by-case basis.

Manufacturers will be required to submit complete documentation, including catalog cuts, shop drawings, and references prior to approval.

The Administration reserves the right to examine and conduct tests on modules and other sign components prior to approval of the sign and manufacturer.

Warranty. LED Lane Use Control Signals and its components shall be warranted against failure for a period of two years after installation. The warranty shall cover all malfunctions related to materials or workmanship.

MEASUREMENT AND PAYMENT. LED Lane Use Control Signals will be measured and paid for at the contract unit price each. The payment will be full compensation for furnishing and installing the sign, necessary mounting hardware, drive rack, control equipment, photocell, visor, message display assembly, power supply, enclosure, lens, terminal blocks, connectors, message driver, cabling, electrical wiring, all electronics, labor, tools, materials, and all other incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

LED BLANK-OUT SIGNS

DESCRIPTION. Furnish and install Light Emitting Diode (LED) Blank-out Signs as specified in the Contract Documents or as directed by the Engineer. Within the face, the blank-out sign shall contain single, double or up to three types of LED message displays. Each sign and symbol shall be to the latest MD Sign Standard and or as indicated in the Contract Documents. The physical appearance of the blank-out sign shall be 30 in. wide and 36 in. high. Each display shall create the appropriate symbol by a single stroked row of clustered LED pixels per color specified in the contract documents. The symbols shall be clearly visible in normal daylight and nighttime conditions.

MATERIALS. All materials and equipment forming part of the LED blank-out sign shall be new and approved by the Engineer.

LED Pixel Requirements.

Each pixel shall meet the following physical and performance characteristics:

1) A pixel shall consist of 7 LED's soldered into a printed circuit board, a brass housing and a polycarbonate UL94-VO rated lens and shall be watertight to NEMA 4X and IP 66 requirements. The pixel shall have a minimum diameter of 1 in. and a maximum diameter of 1.25 in.

2) Each pixel shall be rated for 100,000 hours continuous operation with no more that 50 percent lumen depreciation.

3) The LED's shall be TS-AllnGap or InGan type.

4) Each LED shall provide a minimum of 500 millicandelas on the optical axis and have a dominant light wavelength between 620 and 660 NM.

5) Internal circuitry for each pixel shall have an operating voltage of 125 VAC at 60 Hz. External power supplies are not allowed.

6) The pixel housing for the printed circuit board shall be made from brass and shall have a nickel plated finish.

7) A flat, impact resistant polycarbonate lens shall be required to cover the LED cluster. The lens shall meet UL 94-VO ratings.

8) The lens and housing shall be sealed to create a watertight enclosure per NEMA 4X and IP 66 standards.

9) Electrical connection to the indicator is made through 8-32 screws in the rear of product.

10) The light output from the pixel shall meet ITE requirements for chromaticity (i.e. the color of the light emitted by the module, specified as x-y chromaticity coordinates on the chromaticity diagram according to the 1931 Commission Internationale d'Eclairage (CIE) standard observer and coordinate system).

11) The pixels shall consume 1.5 watts typical at 125 VAC at 25 C. Operating current shall be 11 ma.

12) The LEDs used in the blank-out sign shall be capable of being dimmed.

CONSTRUCTION.

Blank-out Sign Enclosure.

Each enclosure shall meet the following physical characteristics:

1) The enclosure shall be fabricated from 0.125 in. aluminum, 5052-H32 series.

2) The enclosure shall have all corners and seams welded to provide a weatherproof seal around the entire case.

3) The sign face shall be aluminum, 5052-H32 series. The sign face shall be attached to the enclosure with stainless steel lift-off hinges. A hand operated stainless steel latch shall secure the sign face to the enclosure. The sign face shall be removable and replaceable in the field without need for tools to allow for easy replacement without removing the entire enclosure. The sign face shall have a quick disconnect plug for easy door removal.

4) The sign face visor shall be aluminum, 5032-H32 series, welded securely to the sign enclosure. The visor shall not impede the removal of the sign face.

5) A waterproof seal shall be created between the sign face and sign housing by use of a 3/16 in. x 1 in. neoprene gasket.

6) The enclosure for the multiple display signals shall include a terminal block for termination of the 120 volt supply for the first (1^{st}) message display/symbol, the 120 volt supply for the second (2^{nd}) message display/symbol, the 120 volt supply for the third (3^{rd}) message display/symbol and for the NEUTRAL. The enclosure for the Single and Dual message display/symbol signs shall include a terminal block for termination of the 120 volt supply for the first (1^{st}) symbol and a terminal block for termination of the 120 volt supply for the second (2^{nd}) symbol and for the NEUTRAL. Each termination point will be labeled to correspond to the appropriate function.

7) The bottom of the housing shall contain four holes to allow proper drainage, each of which shall be fitted with a dense screen to filter against insects or foreign matter entering the sign housing.

8) The Housing shall be designed to be securely mounted on a signal mast arm, a 1½-in. hub shall be installed on top and bottom of the housing, and connected to the internal stiffeners. Mounting hardware assembly shall be as detailed for rigid mount signal heads on Standard Plate MD 814.01.

9) The enclosure sign face shall be acid etched, primed with zinc chromate primer and painted flat black with two coats of exterior enamel.

Equipment Approval. All LED blankout signs to be installed under this contract must be tested and pre-approved for proper operation with the Malfunction Management Unit (MMU) used in SHA signal cabinets. The testing and approval must have been completed before the date of advertisement of this contract.

1) The Contractor must provide written evidence from the manufacturer with their catalog cuts that their product has passed the testing and approval process.

2) Catalog cuts that do not include this evidence will be rejected without further review.

Warranty. LED Blank-Out Sign and its components shall be warranted against failure for a period of two years after installation. The warranty shall cover all malfunctions related to materials or workmanship.

MEASUREMENT AND PAYMENT. LED Blank-out Signs will be measured and paid for at the contract unit price each for each type of display as noted in the Contact Documents or as directed by the Engineer. The payment will be full compensation for the Furnish and Installation of sign, labor, tools, materials, and incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

LED COUNTDOWN PEDESTRIAN SIGNALS

DESCRIPTION. Furnish and install self-contained LED pedestrian countdown signals, as specified in the Contract Documents or as directed by the Engineer.

MATERIALS. Provide LED pedestrian signals and all component parts that meet the latest edition of the National Electrical Manufacturers Association (NEMA) Standards and Underwriters Laboratory (UL), as applicable. In addition, LED pedestrian countdown signals shall meet the requirements set forth in the most recent, formally-adopted version of the specification titled "Pedestrian Traffic Control Signal Indications (PTCSI) – Part 2: Light Emitting Diode (LED) Pedestrian Traffic Signal Modules," published by the Institute for Transportation Engineers (ITE). All LED pedestrian countdown signals shall be certified by the manufacturer to meet or exceed all requirements of that specification over their entire 5 year warranty period. If available, permanently engrave serial numbers and model numbers, on all removable components and hardware. The serial number and model number shall be etched, stamped, molded, or attached using metallic self-adhesive labels. The use of adhesive backed paper labels is not acceptable.

CONSTRUCTION.

LED Countdown Signal Modules.

(a) LED countdown modules shall fit into existing 16 in. traffic signal housings built to PTCSI standards without modification to the housing.

(b) The LED countdown module shall be a single, self-contained device, not requiring on-site assembly for installation into existing traffic signal housing.

(c) Design the assembly of the LED countdown module to assure all internal components are adequately supported to withstand mechanical shock and vibration from high winds and other sources.

(d) The signal module shall be protected by a ¼ in. thick non-glare UV treated polycarbonate face lens.

(e) The signal shall have 2 individual sets of wires for electrical connections. One set for the hand/man section and another for the countdown section. Each set shall be made of three secured, color coded (blue, red, white), 36 in. long, 600V, 16 AWG jacketed wires, rated for service at +105ºC.

Environmental.

(a) The LED countdown module shall be rated for use in the ambient operating temperature range of -40°C (-40°F) to +74°C (+165°F).

(b) Completely seal the LED countdown module against dust and moisture intrusion per the requirements of NEMA Standard 250 – 1991 sections 4.7.2.1 and 4.7.3.2 for type 4 enclosures to protect all internal components.

Chromaticity.

(a) The measured chromaticity coordinates for the white walking Person and the Portland Orange Hand and Digits shall conform to the chromaticity requirements of section 8.04 and figure 1 of the PTCSI standard.

(b) The chromaticity measurements shall remain unchanged over the input line voltage range of 80 VAC to 135 VAC.

Display.

(a) The LED countdown signal module shall consist of a double overlay message combining the symbols of a Hand and walking Person and two "7 segment" digits forming the time display.

(b) Arrange the Pedestrian icon LEDs to form solid icon symbols. The shape of the symbols shall conform to the standard symbols for pedestrian signals.

(c) Distribute the LED's evenly in each Pedestrian icon. The distance between each LED shall be evenly spaced.

(d) The Hand/Person symbols shall be at least 10 in. high and 6.5 in. wide and shall incorporate sufficient LED's to assure adequate luminous intensity.

(e) The countdown digits shall be at least 9 in. high and shall be made of 2 rows of at least 144 LED's.

(f) Provide Portland Orange LED's shall be of the latest AlIn GaP technology and the white LED's of the latest In GaN technology.

(g) Interconnect the individual LED light sources so that a catastrophic failure of a single LED will result in a total loss of not more than 3 LED's or 5 percent of the signal light output.

Drive circuitry.

(a) The LED drive current shall be regulated to compensate for line voltage fluctuations over the range of 80VAC to 135 VAC. The luminous output shall not vary more than 1 percent over the voltage range and shall not be perceptible to the human eye.

(b) The drive circuitry shall include voltage surge protection to withstand high-repetition noise transients and low-repetition high-energy transients as stated in section 2.1.6, NEMA Standard TS-2, 1992.

(c) The on-board circuitry shall meet FCC title 47, Sub-Part B, Section 15 regulations concerning the emission of electronic noise.

(d) The circuitry shall ensure compatibility and proper triggering and operation of load switches and conflict monitors in signal controllers currently in use by the procuring traffic authority.

(e) The countdown signal shall not be activated by input signals under 80 VAC.

(f) The "countdown" portion of the signal shall have a high "off state" input impedance to ensure it does not prevent the conflict monitor from detecting an open load failure on the pedestrian signals. The input impedance of the countdown signal shall be such as to produce a load switch leakage voltage above 25 VAC to the conflict monitor for up to 4 units per channel.

(g) The countdown signal drive circuitry shall not suffer any damage when subjected to defective load switches providing a half wave signal output.

(h) Typical power consumption of the countdown display shall not exceed 5 watts with a power factor greater than 90 percent.

Countdown Function.

(a) The countdown module shall be compatible with all types of traffic controllers.

(b) The countdown timer module shall have a micro-processor capable of recording its own time when connected to a traffic controller.

(c) When connected, the module shall blank out the display during the initial cycle while it records the countdown time using the Walk & D/Walk signal indications.

(d) The display of the number of remaining seconds shall begin only at the beginning of the pedestrian change interval.

(1) After the countdown displays "zero," the display shall remain dark until the beginning of the next countdown.

(2) The countdown pedestrian signal shall display the number of seconds remaining until the termination of the pedestrian change interval.

(3) Countdown displays shall not be used during the walk interval, nor during the yellow change interval of a concurrent vehicular phase.

(e) The countdown timer module shall continuously monitor the traffic controller for any changes to the pedestrian phase time and re-program itself automatically if needed.

(f) The countdown module shall register the time for the walk and clearance intervals individually and shall begin counting down from the start of the clearance time or the sum of both interval times if selected.

(g) If the walk interval is pre-empted (emergency vehicle), the countdown module shall skip the remaining walk time and begin the clearance interval countdown to reach 0 at the same time as the flashing hand becomes solid.

(h) If the clearance interval is pre-empted (train), the countdown module shall skip the remaining clearance time and reach 0 at the same time as the flashing hand becomes solid.

(i) In the cycle following a pre-emption call, the signal shall display the correct time and not be affected by the reduced previous cycle. The countdown shall always reach 0 at the same time as the flashing hand becomes solid.

(j) When the flashing hand becomes solid, the module will display "0" for one second and then blank-out.

(k) The countdown timer shall be capable of timing 2 consecutive complete pedestrian cycles outputted by the traffic controller (no steady hand signal between cycles).

(l) The countdown module shall have an internal conflict monitor preventing any possible conflicts between the Hand/Person signal indications and the time display. It shall be impossible for the countdown to display any time during a solid hand indication.

(m) The countdown module shall have accessible dip-switches for the following user selectable options:

(1) Display 0 during stand-by.

(2) Turn on all LEDs for testing

(3) "Coordinated" mode, (displays clearance time only)

(4) Disable countdown display.

(n) The LED module shall have a removable plug on the rear of the unit to allow for easy access to dip switches.

(o) If the pedestrian change interval is interrupted or shortened as a part of a transition into a preemption sequence, the countdown pedestrian signal display shall be discontinued and go

dark immediately upon activation of the preemption transition.

Housing. Countdown Pedestrian Signals shall have a single piece cast aluminum case housing, a lens, and a single piece cast aluminum swing down door frame.

(a) The maximum overall dimension of the signal shall be 18.5 in. W x 18.75 in. H x 9 in. D. (470 x 476 x 229 mm), including the visor and hinges. The distance between the mounting surfaces of the upper and the lower openings shall be 15.75" (400 mm).

(b) The case shall be one piece corrosion resistant aluminum alloy die casting, complete with integrally cast top, bottom, sides and back.

(1) Four integrally cast hinge lug pairs, two at the top and two at the bottom of each case, shall be provided for operation of the swing down door.

(2) When properly mated to other pedestrian signal components and mounting hardware, the case shall provide a dustproof and weatherproof enclosure and shall provide for easy access to and replacement of all components.

(3) The case shall be mounted via upper and lower openings, suitable for either post top or bracket mounting. The openings shall accommodate standard 1.5" (39 mm) pipe brackets. The bottom opening of the case shall have a shurlock boss integrally molded into the case. The dimension of the shurlock boss shall be:
Outside diameter 2.625 in. (667 mm)
Inside diameter 1.969 in. (50 mm)
Number of teeth 72
Angle of teeth 90°
Depth of teeth 5/64 in. (2 mm)

A shurlock boss of the same dimensions shall be an option for the top opening of the case. The radial angular grooves of the shurlock boss when used with the shurlock fittings shall provide positive positioning of the entire signal to eliminate rotation or misalignment of the signal.

(c) The door frame shall be a one piece corrosion resistant aluminum alloy die casting, complete with two hinge lugs cast at the bottom and two latch slots cast at the top of each door.

(1) The door shall be attached to the case by means of two Type 304 stainless steel spring pins.

(2) Two stainless steel hinged bolts with captive stainless steel wingnuts and washers shall be attached to the case with the use of stainless steel spring pins.

(3) Latching or unlatching of the door shall require no tools.

Warranty. Manufacturers shall provide a written warranty with the following minimum provisions:

(a) LED countdown signal modules shall be replaced, repaired or purchase value refunded if the module fails to function as intended due to workmanship or material defects within the first 60 months from the date of delivery.

(b) LED countdown signal modules which exhibit luminous intensities less than the minimum specified values within the first 60 months of the date of delivery shall be replaced, repaired or purchase value refunded.

Compatibility Testing: The LED Pedestrian Countdown Signal manufacturer shall certify that their equipment meets the Load Switch and Signal Conflict Monitor Compatibility testing requirements found in the most recent, formally-adopted version of the specification titled "Pedestrian Traffic Control Signal Indications – Part 2: Light Emitting Diode (LED) Pedestrian Traffic Signal Modules," published by the Institute for Transportation Engineers (ITE).

MEASUREMENT AND PAYMENT. LED Pedestrian Countdown Pedestrian Signals will be measured and paid for at the contract unit price each. The payment will be full compensation for furnishing and installing the signals, LED modules, equipment specified, all mounting hardware, labor, and incidentals necessary to complete this work.

CATEGORY 800
TRAFFIC

LED TRAFFIC SIGNAL MODULES

DESCRIPTION. Furnish and install self-contained LED signal head modules to be used in place of the incandescent lamp, reflector, socket, gasket, and lens assembly of standard vehicle signal sections, as specified in the Contract Documents or as directed by the Engineer.

MATERIALS. Manufacturers of red and green 8 in. and 12 in. LED traffic signal modules are required to file a statement with the Maryland Energy Administration, certifying that each signal to be sold or offered for sale in Maryland is in compliance with the State's energy efficiency standard. Information on this requirement can be found at the Maryland Energy Administration's website.

The modules shall employ a lens assembly that presents an appearance that is similar to those found on standard incandescent signals.

Provide LED signal heads, and all component parts that meet the latest edition of the National Electrical Manufacturers Association (NEMA). In addition, LED signals shall meet the requirements set forth in the most recent, formally-adopted version of the specification titled "Vehicle Traffic Control Signal Heads - Part 2: Light Emitting Diode (LED) Vehicle Traffic Signal Modules," published by the Institute for Transportation Engineers (ITE).

(a) The manufacturer must certify all signals meet or exceed all requirements of that specification over their entire 5-year warranty period.

(b) Permanently identify serial numbers and model numbers, if available, on all removable components and hardware. The serial number and model number shall be etched, stamped, molded, or attached using metallic self-adhesive labels. The use of adhesive backed paper labels is not acceptable.

CONSTRUCTION. LED modules shall fit in standard, incandescent vehicle traffic signal housings without modifications or the need for special tools, and shall be complete with a one-piece, integral lens assembly that is tinted for the appropriate color.

Design. LED traffic signal modules shall have:

(a) A printed circuit board inclusive of all of the LEDs and required circuit components.

(b) Minimum 39 in. wire leads, minimum # 20 AWG, 600 volt, 105 C, with strain relief and spade terminals. Screw-type terminals shall not be allowed.

(c) A rigid housing for protection in shipping, handling and installation.

(d) A one piece neoprene gasket shall be used to seal out water and contaminants.

Assembly Techniques.

(a) The LEDs within the modules shall be mounted and soldered to a printed circuit board.

(b) LED signal modules shall be watertight when properly installed in traffic signal housings.

(c) LED signal modules shall utilize the same mounting hardware used to secure a standard incandescent lens and gasket assembly, and shall only require a screwdriver or basic installation tools to complete the mounting.

(d) LED signal module assemblies shall weigh less than 5 lb.

(e) LED signal modules may not protrude into the signal visor area more than two and three-quarters of an in. in depth.

(f) LED signal modules shall be marked 'TOP' or have an up arrow to designate the proper orientation of the signal module in the traffic signal housing.

(g) LED signal module housings shall utilize an integral metal layer in their design and construction.

(h) LED signal modules shall utilize the latest technology in thermal management.

Lenses. Make lenses for ball type modules of ultraviolet stabilized polycarbonate, and incorporate facets that serve to enhance the optical efficiency of the LED traffic signal module. Individual lens-lets or external lens facets shall not be permitted.

(a) The ball type signals shall incorporate a diffuser-type lens system that serves to collimate the light emitted by the LEDs. The lens and diffuser system shall focus the collimated light, to meet ITE intensity and distribution standards.

(b) LED signals shall almost perfectly approximate the appearance of an incandescent traffic signal to the motorist.

(1) The face of the ball LED lamps shall appear to the motorist as uniform in illumination, and have a wide viewing angle that makes it suitable for installation on wide boulevards.

(2) The external lens surface for all vehicle signals shall be smooth, with no raised features, so as to minimize the collection of dirt, diesel smoke, and other particulate contaminates, and to facilitate periodic cleaning.

(3) The lens shall be keyed to the housing of the LED signal module to insure the proper

orientation and to avoid possible rotation during any handling.

(4) Hard coat external lenses to prevent an accumulation of dust and dirt.

(5) For LED turn arrow signals, the LED arrow lens may be a replaceable part without the need to replace the complete LED arrow.

Optical. The light intensity, chromaticity, and distribution from eight and twelve-in. red and green, and eight-in. yellow LED traffic signal modules shall meet all photometric values stated in the most recent, formally-adopted version of the specification titled "Vehicle Traffic Control Signal heads – Part 2: Light Emitting Diode (LED) Vehicle Traffic Signal Modules," published by the Institute for Transportation Engineers (ITE). Twelve-in. Yellow LED traffic signal modules shall meet the chromaticity requirements of the most recently-adopted ITE specification, with a minimum intensity of 1,500 candelas.

(a) Red and Green LED signals shall be certified by the manufacturer to meet or exceed all requirements of that specification over their entire 5-year warranty period.

(b) The light output from twelve-in. Yellow LED signals shall be the peak instantaneous intensity, measured at instant-on and at the highest intensity point.

Design.

(a) Connect the LEDs in series-parallel strings.

(1) No more than 1 percent of the total luminosity of the entire signal module may be lost in the event of a single string failure.

(2) The failure of a single LED shall cause loss of light from only that LED.

(3) No loss of light output from the complete module assembly shall occur as a result of a single LED failure.

(b) The control circuitry shall prevent the current flow through the LEDs in the off state to avoid any false indication as may be perceived by the human eye, during daylight and evening hours.

(1) The LED traffic signal module shall be operationally compatible with NEMA TS – 1 and NEMA TS – 2 conflict monitoring parameters.

(2) The intensity of the LED signal module shall not vary by more than 10 percent over the allowable voltage range as specified in the electrical section below.

Electrical.

(a) The Power factor shall be 0.90 or greater, at nominal rated voltage, at 25°C, after 60 minutes of operation.

(b) Total harmonic distortion (THD) shall be less than 20 percent at rated voltage, at 25°C.

(c) All LED traffic signal modules shall be in compliance with FCC noise regulations and must meet the FCC Title 47, SubPart B Section 15 regulation.

(d) The LED junction technology used in all signal modules shall not exhibit degradation of more than 30 percent of the modules' initial light intensity following accelerated life testing (operating at 85 degrees C and 85 percent humidity, for 1000 hours). Under no circumstances shall AlGaAs technology be acceptable.

(e) The LED signal modules shall be connected directly to line voltage, 120 Volts AC nominal, and shall be able to operate over the voltage range of 80 VAC to 135 VAC.

(f) Red and Green LED traffic signal modules shall consume no more than a nominal 15 watts for either the 8 in. or 12 in. signal. Yellow signal modules shall consume no more than 24 watts.

(g) Transient voltage suppression rated at 1500 watts for 1 millisecond and fusing with a maximum rating of 2 amps shall be provided to minimize the effect and repair cost of an extreme over voltage situation or other failure mode.

(h) Low Voltage Turn OFF: There shall be no visible illumination from the LED signal module when the applied voltage is less than 50 VAC.

(i) Turn-ON and Turn-OFF Time: A module shall reach 90 percent of full illumination (turn-ON) within 75 msec of the application of the nominal operating voltage. The signal shall cease emitting visible illumination (turn-OFF) within 75 msec of the removal of the nominal operating voltage.

Compatibility Testing. The LED module manufacturer shall certify that their modules meet the Load Switch and Signal Conflict Monitor Compatibility testing requirements found in the most recent, formally-adopted version of the specification titled "Vehicle Traffic Control Signal heads - Part 2: Light Emitting Diode (LED) Vehicle Traffic Signal Modules," published by the Institute for Transportation Engineers (ITE).

Electronic Failure Protection. To assure compatibility with NEMA TS1/TS2 controllers for both conflict monitoring and Red Fail, all signal colors (Red, Yellow, and Green) once energized, must turn off prior to 50 VAC, and if the signal fails it shall present a high impedance on the input side of the signal.

Warranty. Manufacturers shall provide a written with the following minimum provisions:

(a) Modules shall be replaced, repaired or purchase value refunded if the module fails to function as intended due to workmanship or material defects within the first 60 months from the date of delivery.

(b) Modules which exhibit luminous intensities less than the minimum specified values within the first 60 months of the date of delivery shall be replaced, repaired or purchase value refunded.

Miscellaneous. The manufacturers part number, date code, and electrical characteristics of the LED signal module shall be visible on the rear of the assembly.

MEASUREMENT AND PAYMENT. LED Traffic Signal Modules will be measured and paid for at the contract unit price per each. The payment will be full compensation for the LED module, hardware, assembly, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

LIGHTNING GROUNDING FOR ITS DEVICES

DESCRIPTION. Furnish and install additional lightning grounding for Dynamic Message Signs (DMS), Closed-Circuit Television (CCTV), pole-mounted radar detectors, or other ITS equipment as specified in the Contract Documents or as directed by the Engineer. Lightning grounds consist of a heavy copper conductor which is exothermically welded to the uncoated reinforcing steel within the device foundation to electrically connect the metal structure to the foundation reinforcing steel. This grounding method allows the energy from a lightning strike to be transferred to the earth more effectively than ground rods alone because concrete absorbs moisture from the surrounding soil quickly, making a large concrete foundation a good conductor of electricity.

MATERIALS. Section 804, 950.

CONSTRUCTION. The conductor between the reinforcing steel and the ITS device structure shall be as straight as possible.

(a) The conductor shall be #2 AWG or larger bare copper. The conductor shall be exothermically welded to the reinforcing steel cage as follows.

(1) For DMS spread footing foundations, the pigtail shall be welded to one of the horizontal, longitudinal rebar's at the bottom of the foundation. Overhead DMS foundations require a total of two pigtails one at each upright location.

(2) For CCTV or other vertical foundations, the pigtail shall be exothermically welded to the midpoint of one of the long vertical rebar's making up the reinforcing cage.

(b) The conductor shall exit the top of the foundation as a pigtail within the area of the anchor bolt pattern. The length of the pigtail above the foundation surface shall be at least two (2) ft. long to permit connection to the device structure without splicing.

(c) The pigtail shall be properly bonded to the inside surface of the upright(s) of the overhead sign structure, or the camera/detector pole.

MEASUREMENT AND PAYMENT. Lightning grounds shall not be measured separately, but the cost shall be incidental to each individual foundation installed. The payment will be full compensation for the copper wire pigtail, connectors, labor, tools, materials, testing and incidentals necessary to complete this work.

CATEGORY 800
TRAFFIC

MAINTAIN EXISTING ROADWAY LIGHTING

DESCRIPTION. Maintain existing roadway and sign lighting during construction.

MATERIALS. Not applicable.

CONSTRUCTION. Maintain all roadway and sign lighting at all times except as indicated in the Contract Documents, or as directed by the Engineer. Contact the Traffic Control device Inspection Section prior to beginning any work to inventory the working condition of the existing lights.

The roadway shall continue to be illuminated at the levels existing on the first day of construction throughout the project, unless approved otherwise, in writing, by the Engineer. Upon notification of inadequate illumination by the Engineer, provide lighting up to the minimum levels as specified in the Contract Documents, within 48 hours. Failure to correct the noted problems will result in a $500 per day penalty.

The electrical circuits, either existing or new, which are to be affected by construction activities, shall have replacement circuits in operation before the existing circuits are disconnected. If unable to install the ultimate circuits and maintain them in working order, temporary bypasses shall be provided. All temporary wiring shall conform to NEC, and the policies of the Administration. No overhead wiring shall be connected to breakaway poles unless the poles are protected from traffic and from construction activities.

Install a temporary lighting system with written approval by the Engineer. The temporary lighting system may include relocation of existing lighting poles or installation of final lighting poles.

At the conclusion of construction, all temporary cables shall be disconnected and made safe. Temporary underground cables may be abandoned, but shall be disconnected from the power supply system, and isolated so that there is no possibility of their becoming re-energized.

MEASUREMENT AND PAYMENT. Maintain Existing Roadway Lighting will be not be measured but the cost will be paid for at the contract lump sum price. Payment of the contract lump sum price will be prorated and paid in equal amounts on each monthly estimate. The number of months used for prorating will be the number estimated to complete the work. Payment will be full compensation for all manholes, duct cable, cable, conduit, connector kits, wood poles, luminaires, lighting arms, labor and incidentals needed to complete the work.

CATEGORY 800
TRAFFIC

MAST ARMS AND MAST ARM POLES - SINGLE, TWIN AND TRIPLE

DESCRIPTION. Furnish and install galvanized traffic signal mast arms and mast arm poles at locations specified in the Contract Document or as directed by the Engineer.

MATERIALS. Design shall meet the 2001 edition of AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, except as noted. All welding shall conform to American Welding Society (AWS) Structural Welding Code D1.1 - Steel, Tubular Structures.

Each mast arm(s) and mast arm pole structure furnished shall consist of a design from a steel pole shaft with a steel base plate and flange plate, steel mast arm shaft(s) with steel flange plate(s), four flange bolts per mast arm, four anchor bolts and miscellaneous hardware.

(a) Manufacture the mast arms and mast arm poles from steel tubing conforming to A 595 Grade A or equal. Each mast arm and mast arm pole shall be fabricated of one length and shall have one longitudinal weld, parallel to the long axis of the mast arm or mast arm pole, with no transverse welds. Finish the longitudinal weld to form a smooth outside surface and the wall of the mast arms and mast arm poles shall be of uniform thickness including the welded area. The mast arms and mast arm poles shall be round or multi-sided (8 sides or more) in cross section and be uniformly tapered from butt to tip with a 1 in. reduction in diameter for each 7 ft in length (0.14 in./ft). Mast arms shall be of two piece design for all mast arms 50 ft and 60 ft in length. Mast arms shall be of three piece design for all mast arms 70 ft in length. Any combination of two piece of 50 ft and 60 ft arms of the same butt diameter shall fit together and any combination of two or three piece of 60 ft and 70 ft mast arms in sequence shall fit together. The bolted splice for two or three piece mast arms shall be as specified in the Contract Document.

(1) 50 ft mast arms shall have a butt section 30 ft in length.

(2) 60 ft and 70 ft mast arms shall have a butt section of 35 ft in length.

(3) 38 ft single piece mast arms shall be 9 in. outside diameter at the flange plate and made of 7 gauge (0.179 in.) thickness steel.

(4) 50 ft two piece mast arm butt sections shall be 10 in. outside diameter at the flange plate and made of 3 gauge (0.250 in.) thickness steel.

(5) 60 ft two piece and 70 ft three piece mast arm butt sections shall be 12.5 in. outside diameter at the flange plate and made of 3 gauge (0. 250 in.) thickness steel.

(6) All extension sections of two and three piece mast arms shall be made of 7 gauge (0.179 in.) thickness steel.

(7) Single 27 ft mast arm pole designed with a 38 ft mast arm length shall be 12 in. outside diameter at the base plate and made of 7 gauge (0.179 in.) thickness steel.

(8) Single 27 ft mast arm pole designed with a 50 ft mast arm length shall be 13 in. outside diameter at the base plate and made of 3 gauge (0.250 in.) thickness steel.

(9) Single 27 ft mast arm pole designed with 60 ft or 70 ft mast arm lengths shall be 15 in. outside diameter at the base plate and made of zero gauge (0.312 in.) thickness steel.

(10) Twin 27 ft mast arm poles designed with 50 ft mast arm lengths shall be 13 in. outside diameter at the base plate base and made of 3 gauge (0.250 in.) thickness steel.

(11) Twin 27 ft mast arm poles designed with mast arm lengths for one mast arm of 50 ft and the remaining mast arm of 60 ft or 70 ft shall be 15 in. outside diameter at the base plate and made of zero gauge (0.312 in.) thickness steel.

(12) Triple 27 ft mast arm pole designed with mast arm lengths for one mast arm of 38 ft, second mast arm of 60 or 70 ft and the third mast arm of 50 ft shall have 15 in. outside diameter at the base plate and made of zero gauge (0.312 in.) thickness steel.

(b) The material for mast arm pole base plate shall conform to A 709, Grade 36 and shall be of sufficient size and strength. Secure the base plate to the lower end of the mast arm pole by two continuous electric arc welds. The base plate must telescope the mast arm pole with one weld on the inside of the base plate at the end of the mast arm pole shaft. Locate the remaining weld on the outside of the base plate, around the circumference of the mast arm pole. The weld connection shall develop the full strength of the adjacent mast arm pole shaft to resist bending action. Fabricate all base plates with the holes for anchor bolts to the size and location dimensions as shown on the appropriate detail.

(c) All mast arms and mast arm poles must be furnished with flange plate(s) as noted in the details. Connect these attachments, including the bolts, in such a manner as to develop the minimum guaranteed yield and ultimate tensile strength for the mast arm and mast arm pole. This assembly shall be capable of transferring the maximum moment being carried by the mast arm without distortion or rotation of the mast arm or the attachment. Connect flange plate(s) by the use of 4 bolts. The size of the plates and bolts shall be as shown in the details. Furnish four (1-1/2 in. O.D.) rubber grommets for each mast arm to accommodate signal heads wiring access.

(d) Secure the mast arm flange plate to the lower end of the mast arm pole by two continuous electric arc welds. The mast arm flange plate shall telescope the mast arm with one weld located on the inside of the flange plate at the end of the mast arm. Locate the remaining weld on the outside surface of the flange plate around the circumference of the mast arm

pole. The weld connections shall develop the full strength of the adjacent mast arm to resist bending action.

(e) Mast arm flange plates and mast arm pole flange plates surfaces shall be plane to within 1/16 in. and shall be free of any buildup of galvanizing (drips, runs, etc.) which would prevent intimate contact between the connecting surfaces.

(f) Weld access hole frames into the mast arm pole as detailed in MD 818.11. A galvanized steel cover, conforming to A 709, Grade 36 shall cover the access hole frame. Secure the access hole cover's top to the access hole frame by a hinge fabricated from 0.063 in. stainless steel using a 0.120 in. diameter stainless steel hinge pin. Secure the hinge to the access hole frame with 2 (1/4 in. - 20 UNC) hex head stainless steel bolts. Secure the hinge access hole cover by 2 (1/4 in. - 20 UNC) hex head stainless steel bolts and lock nuts. Provide a slotted opening at the bottom of the access hole cover to allow for attachment of a furnished (1/4 in. - 20 UNC) hex head stainless steel bolt into the access hole frame face.

(g) A 3/8 in. diameter X 1 in. stud copper servit post for two #6 AWG stranded wire shall be furnished into the bottom of the access hole frame.

(h) Provide mast arm poles with entrance ways for cable as noted on the appropriate detail. These holes shall be factory drilled and a straight tapped coupling, conforming to Underwriters Laboratory's UL-6 Specification, for 3 in. rigid conduits, shall be installed for each hole. A nipple with a unitized hexagonal fitting and integral inside radius on one end shall then be installed and fully seated on the interior side of the coupling. Location and installation of the coupling shall be as shown in the details.

(i) Install "J" hooks as follows, located 1 ft above the highest mast arm T dimension.

(1) Weld a single "J" hook inside the pole for single mast arm poles.

(2) Weld two "J" hooks inside the pole for twin mast arm poles and triple mast arm poles.

(j) Hot dip galvanize all mast arms, mast arm poles, access hole frames and hardware, except materials manufactured from stainless steel or cast aluminum. The galvanized coating shall conform to the thickness, adherence and quality requirements of A 123 or A 153 for hardware. Chase and clean threaded components after galvanizing. Tap all internally threaded components the minimum amount required to permit assembly on the coated externally threaded fastener. Provide internally threaded components with a lubricant which shall be clean and dry to the touch.

(k) Furnish each mast arm pole with four removable ornamental anchor bolt covers made of cast aluminum. Bolt holes for attaching the bolt covers to the base plate shall be drilled at the location obtained by following the diagonal line of the base plate until it intersects the bolt circle diameter, then proceeding tangentially from the bolt circle diameter a distance

equal to the Anchor Bolt Center to Bolt Slot Center Distance as provided in the MD 818.14. Attachment to the base shall be made using hex head stainless steel bolts (1/4 in. - 20 UNC).

(i) Furnish each mast arm extension section and mast arm pole with a removable domed cap, fabricated from cast aluminum, circumferentially attached to the outside of the pole shaft or mast arm end with 3 hex head stainless steel bolts (1/4 in.- 20 UNC). All mast arm caps shall have inside diameter one in. larger than the outside diameter of mast arm end.

(m) Each mast arm and mast arm pole shall have an identification plate mechanically attached, oriented such that the identification plate may be read from a ground observation position.

(1) Single piece mast arms and the butt section of two and three piece mast arms shall have the identification plate attached 6 in. above the flange plate.

(2) Each extension section of two and three piece mast arms shall have the identification plate attached 6 in. from the larger diameter end.

(3) Poles shall have the identification plate attached 6 in. above the bottom flange plate.

(n) Insert recessed hub type, galvanized malleable iron plugs flush into all mast arm pole couplings.

Anchor Bolts.

(a) Make each mast arm pole anchor bolt of steel in accordance with F1554, Grade 55 S1.

(b) Anchor bolt threads shall be of cut thread design with a minimum 9 in. of threads at the top and bottom.

(c) The template and anchor plates shall be as shown the contract documents.

(d) Stamp the diameter of the anchor bolt into the top of the threaded end of each anchor bolt.

(e) Provide each anchor bolt with two anchor bolt nuts and two flat washers.

(1) Anchor bolt nuts shall conform to A 194 grade 2 or 2H or A 563 D or DH.

(2) Tap all nuts oversize the minimum amount required to permit assembly on the coated externally threaded fastener.

(3) Washers shall conform to F436.

(f) Hot dip or mechanically galvanize all nuts, washers and the top 12 in. of all anchor bolts.

The galvanized coating shall conform to the thickness, adherence and quality requirements of A 123 or A 153 for hardware.

All high strength bolts (of a given length), nuts (of a given size) and washers (of a given diameter) shall be from the same manufacturing lot per each requisition of materials. The use of foreign made fasteners is prohibited!

Alternate Design. Alternate mast arm and mast arm pole designs will be considered provided the following qualifications are observed:

(a) Alternate mast arm designs may use sectional construction provided each section has a minimum length of 30 ft except for the outer most section.

(b) Overlap between sections shall be a minimum 18 in.

(c) Bolt circle diameters shall be as specified in the Contract Document.

(d) Alternate post designs may be straight (not tapered) sections and shall have a base diameter equal to, or no greater than 1 in. more than, those values shown on the typicals.

(e) All alternate design must be structurally equivalent to the original design and as approved by the Engineer.

CONSTRUCTION. Refer to 818.03

MEASUREMENT AND PAYMENT. Mast Arm(s) and Mast Arm Pole(s) will be measured and paid for at the contract unit price per each type of pole and mast arm(s) size as specified in the Contract Document. The payment will be full compensation for furnishing & installing all materials including labor, equipment, materials, tools and incidentals necessary to complete the work.

Anchor bolts will be measured and paid for as specified in Section 801.

Tag Details.

Single Mast Arm Pole

Mfg: [1] Contract. #: [2]

Pole Height: [3]

Arm Sizes: [4]

Anchor Bolts: [5] Bolt Circle: [8]

Flange Bolts: [7]

One Piece Mast Arm

Mfg: [1] Contract #: [2]

Arm Length: [6]

Flange Bolts: [7]

Two or three Piece Mast Arm - Butt Section

Mfg: [1] Contract #: [2]

Butt For Arms: [4]

Flange Bolts: [7]

Connection Bolt: [9]

**Two or three Piece Mast Arm –
Extension Section**

Mfg: [1]	Contract #: [2]
Extension Arm: [6]	
Connection Bolt: [9]	

**Twin Mast Arm Pole
(Identical Size Flange Plates)**

Mfg: [1]	Contract #: [2]
Pole Height: [3]	
Arm Sizes: [4]	
Anchor Bolts: [5]	Bolt Circle: [8]
Flange Bolts: [7]	

Twin Mast Arm Pole
(Different Size Flange Plates)

Mfg: [1] Contract #: [2]

Pole Height: [3]

Left Arm Sizes: [4]

Right Arm Sizes: [4]

Anchor Bolts: [5] Bolt Circle: [8]

Left Arm Flange Bolts: [7]

Right Arm Flange Bolts: [7]

Pole Type [10]

Triple Mast Arm Pole
(Different Size Flange Plates)

Mfg: [1] Contract #: [2]

Pole Height: [3]

Left Arm Sizes: [4]

Center Arm Sizes: [4]

Right Arm Sizes: [4]

Anchor Bolts: [5] Bolt Circle: [8]

Left Arm Flange Bolts: [7]

Center Arm Flange Bolts: [7]

Right Arm Flange Bolts: [7]

Tag Reference.

[1] Name of the manufacturer of the mast arm or mast arm pole.

[2] Administration Contract Number of the mast arm or mast arm pole.

[3] 27 ft. height.

[4] Mast Arm Size and Orientation[1].

Pole Gauge Size	Indicate
7 GA	38'
3 GA	50'
0 GA	60' or 70'

[5] Anchor Bolts.

Pole Gauge Size	Indicate
7 GA	1-½" x 54" & 2 Washers
3 GA	1-¾" x 66" & 2 washers
0 GA	2" x 72" & 2 washers

[6] Mast Arm Length.

-

Constructed Extension for arm length	Indicate
50'	50'
60'	60'-70'
70'	70'

[7] Flange Bolt Size[2].

[1]For twin mast arm poles with identical size flange plates, indicate **L & R** preceding the 50' mast arm size; for twin mast arm poles with different size flange plates, indicate either 50' or 60'-70' mast arm sizes in the corresponding Left Arm Size or Right Arm Size as oriented by the line bisecting the acute angle formed by the two mast arm pole flange plates. For triple mast arm poles with different size flange plates, indicate either 50', 60'-70' or 38' mast arm sizes in the corresponding Left Arm Size, Center Arm Size or Right Arm Size as oriented by the centerline of the mast arm pole center flange plate.

[2]For twin mast arm poles with identical size flange plates, indicate **L & R** preceding the 1-½" x 5" & washer

Pole Gauge Size	Indicate
7 GA	1-¼" x 4" & washer
3 GA	1-½" x 5" & washer
0 GA	1-¼" x 6-½" & 2 flat washers & lock washer

[8] Bolt Circle

Pole Gauge Size	Indicate
7 GA	16" Dia.
3 GA	18" Dia.
0 GA	22" Dia.

[9] Connection Bolt Size

Two or three Piece Arm Size	Indicate[3]
50'	5/8" x Var.
60'	5/8" x Var.
70'	5/8" x Var.

[10] Standard or Alternate Twin.

Flange Bolt Size; for twin mast arm poles with different size flange plates, indicate either 1-½" x 5" & washer or 1-¼" x 6-½" & 2 flat washers & lock washer flange bolt sizes in the corresponding Left Flange Bolt Size or Right Flange Bolt Size as oriented by the line bisecting the acute angle formed by the two mast arm pole flange plates. For triple mast arm poles with different size flange plates, indicate either 1-½" x 5" & washer, 1-¼" x 6-½" & 2 flat washers & lock washer or 1-¼" x 4" & washer flange bolt sizes in the corresponding Left Flange Bolt Size, Center Flange Bolt Size or Right Flange Bolt size as oriented by the centerline of the mast arm pole center flange plate.

[3]Length to be determined by the successful bidder.

CATEGORY 800
TRAFFIC

NEMA SIZE 3 CABINET

DESCRIPTION. Furnish and install base-mounted, NEMA size 3 cabinets and concrete foundations for electronic equipment. This work shall include all necessary hardware and electrical connections. Cabinets may be natural aluminum finish, or painted National Park Service Brown, as specified in the Contract Documents or as directed by the Engineer.

MATERIALS. Electrical/electronic equipment, cabinets, and all component parts shall meet the requirements as specified in Section 820.02 and the standards as set forth in these special provisions.

Anchor bolts/Bolts/Nuts/Washers
Cabinets and doors
Mounting hardware
Conduit
Environmental control equipment

CONSTRUCTION. Electronic equipment to be installed in Nema Size 3 cabinets shall be as specified in the Contract Documents or as directed by the Engineer.

Provide cabinets that have dual fans for improved cooling, one moveable shelf, and a grounded aluminum backplane for mounting electronic equipment.

Cabinets: General.

(a) Serial numbers and model numbers, if available, shall be permanently engraved on all removable components and hardware. The serial number and model number shall be etched, stamped, or molded.

(1) The use of adhesive backed labels is not acceptable.

(2) Mainframe serial numbers and model numbers shall be readable without disassembly or removal of any part of the cabinet or components located within the cabinet and located on the front face of the mainframe unit.

(b) All cabinets shall meet or exceed the requirements of a NEMA 3R rating and shall be UL listed.

(c) All cabinets and doors shall be fabricated from 5052-H32 sheet aluminum alloy with a minimum one eighth of an inch (1/8 in.) thickness.

(1) All mounting hardware and cabinet bracing shall also be made from aluminum.

(2) All external welds shall be made using the Tungsten Inert Gas (TIG) welding method.

Cabinet Equipment. All cabinets shall include the following components.

(a) Metal-encased load center, configured for 120/240 Volt operation.

(b) Power Surge Suppression module configured for 120/240 Volt operation (See SURGE SUPPRESSION).

(c) T1 phone Line Surge Suppressor.

(d) Front overhead white LED interior lighting.

(e) Thermostatically-controlled dual fans for cooling and cabinet heater.

(f) Stainless-Steel Disconnect Switch rated at 60 amperes. The switch shall be wired between the line and the load center. The switch may be mounted on the back or either side of the cabinet, as shown on the Plans or as directed by the Engineer.

Cabinets: Electrical.

(a) All power conductor wire runs shall be continuous with no splices.

(b) All wiring harnesses shall be encased in a continuous sheath. The use of cable ties to arrange wiring harnesses is not acceptable. The use of adhesive backed wire holders is also not acceptable.

(c) All cabinet back and panel harness wiring shall be soldered at its destination point as specified.

(d) All conductors shall be labeled. Labels shall be either attached to each end of the conductor and indicate the destination of the other end of the conductor, or shall be a continuous, permanent identification of the conductor's function and located every six inches along the conductor.

(e) All conductors used in the controller cabinet wiring shall conform to the following color code requirements.

(1) AC Neutral conductors shall be identified by a continuous white color.

(2) AC Ground conductors shall be identified by a continuous green color.

(3) AC Phase (hot) conductors shall be identified by a continuous black color.

(4) All other conductors shall be identified by any color not previously specified.

(f) All bolts used for electrical connections shall be fabricated from stainless steel.

(g) All hardware used for electrical connections and terminal facilities shall be fabricated using cadmium plated brass.

(h) All fuse holders shall be of the encased type.

(i) The housing shall be equipped with a heating element installed in the bottom front of the cabinet, and conforming to the following requirements:

(1) The heating element shall be rated at 500 watts and have a minimum output of 1700 BTU/hr.

(2) The heating element shall have a built-in quick response thermostat with sealed contacts with a temperature control range of 40 F to 100 F, and a built-in thermal cut-off to automatically turn off the heater in case of overheating.

(3) The heating element shall have a protective cover with vent holes to prevent damage to adjacent wires or burns to service personnel.

(j) All switches shall be encased, environmentally sealed, and rated for one hundred and twenty-five percent of capacity. Switches and thermostats shall break the "hot" side of the line.

Power Distribution. NEMA Size 3 cabinets shall be equipped with a metal-encased, split-phase load center, equipped with main breakers rated at 60 amperes. The panel shall be mounted on a 0.125 in thk aluminum plate and shall be located on the lower right-hand side of the cabinet.

(a) Main Breakers. The main breakers shall be double-pole type, so that an overload on either phase will disconnect the entire cabinet from the line.

(b) Branch Circuit Breakers. All branch circuit breakers shall be molded case single or double-pole, 120/240 volts AC, 10 000-ampere interruption capacity, supplied in a Q.O.U. mounting system. Circuit breakers shall be provided in all panel spaces as follows.

(1) One double-pole 40-ampere breaker, and four 15-ampere single-pole breakers (two per phase).

(2) One convenience Ground Fault Interrupter dual electrical outlet, mounted on the cabinet wall adjacent to the load center.

Service Panel. All cabinets shall have an aluminum service panel, containing electrical outlets and other associated equipment.

(a) Viewed from the front door, the Service Panel shall be mounted on a 0.125 in. thick aluminum plate that is mounted at the upper left-hand side of the cabinet.

(b) The service panel shall be equipped with a metal-encased box with two, grounded, duplex outlets.

(c) The outlet box shall be wired to one of the 15-ampere circuit breakers specified above.

Interior Lighting. Modular LED traffic cabinet-rated light assemblies, located vertically on both sides of the door frame(s) to provide uniform illumination of the cabinet interior.

(a) Cool White: 5000K
(b) Operating Temperature: -10C to +40C Free air or cabinet mounted.
(c) 24 Volt
(d) 280 lumens per single module.
(e) Class 2 Power supply included.
(f) Switched to activate whenever either door is opened.
(g) UL-2108 Approved

Cabinets: Mechanical.

(a) Size. Cabinets shall be NEMA TS-2, size 3, unless shown otherwise on the Plans. Size 3 cabinets shall be forty inches in height by twenty-four inches in width by fifteen inches in depth (40 in. H x 24 in. W x 15 in. D).

(b) Foundation. See Foundation Detail.

(c) Shelving. One moveable shelf shall be supplied and installed in the cabinet.

(d) Natural Ventilation. The cabinets shall be designed for continuous operation over an outside temperature range of -13 F to +113 F (-25 C to +45 C) without requiring fans, in the event the cabinet cooling system fails.

(e) Fan-Forced Ventilation. Cabinets shall be equipped with dual electric fans with ball or roller bearings and a capacity of at least 100 cubic feet each free air delivery per minute. Each fan shall have a finger guard**.**

(1) The fans shall be thermostatically controlled and shall be manually adjustable to turn on between 33° C and 65° C with a differential of not more than 6° C between automatic turn on and off.

(2) The fan circuit shall be protected at 125 percent of the fan motor ampacity.

(3) The manual adjustment shall be graded in 10° C increments.

(f) Venting and Air Filtration. All cabinets shall be provided with louvered vents in the front door with a removable air filter. Louvers shall satisfy the NEMA Rod Entry Test for a 3R rated ventilated enclosure.

(1) Three extra filters shall be supplied for each cabinet installed.

(2) The filter shall cover the vents and be held firmly in place with top and bottom brackets and a spring loaded upper clamp.

(3) Exhaust air shall be vented out of the cabinet between the top of cabinet and the main access door.

(4) The exhaust area shall be screened with a material having a maximum hole diameter of 1/8 in.

(g) Access Door. All cabinets shall have a single access door located on the front of the cabinet.

(1) The door opening shall be a minimum of eighty percent of the front surface area of the cabinet.

(2) All doors shall be provided with a gasket conforming to the physical properties listing in UL508 Table 2(1)1 and be such that the gasket forms a weather tight sealbetween the door and the cabinet.

(3) All doors shall be hinged on the right side as viewed facing the cabinet.

(4) Hinges shall be of a single, continuous design utilizing a fixed hinge pin.

All hinging shall be bolted to the cabinet and door utilizing ¼-20 stainless steel carriage bolts and nylon lock nuts.

All hinge pins shall be capped at the top and bottom by weld to render the pin tamper proof.

All cabinets shall have hinges fabricated from 0.093 in. stainless steel using a 0.250 in. diameter stainless steel hinge pin and shall provide a three inch open width.

(h) All cabinets shall include a door restraint to restrict the door to a maximum one hundred and thirty-five degrees of swing.

(1) The restraint mechanism shall provide latching positions at ninety degrees and at one hundred and thirty-five degrees.

(2) All cabinets shall be equipped with a lock compatible with the State's existing cabinet locks, (dead bolt type) and key hole cover and be keyed for a number 2 key. The Contractor shall provide the State with a minimum of one key each per cabinet.

(3) All cabinets shall have a weather-resistant, 12” x 16” or larger, clear Plastic folder on the inside of the door for schematic and wiring diagrams, and other maintenance information.

Finish.

(a) All welds shall be neatly formed and free of cracks, blow holes and other irregularities.

(b) All inside and outside edges of the cabinet shall be free of burrs.

(c) All access door openings shall have a double flange on all four sides.

(d) All cabinets shall have a sloped top surface to prevent the accumulation of water on the cabinet.

(e) All outside surfaces of the cabinets shall have a smooth, uniform, natural aluminum finish, unless shown otherwise on the Plans.

Cabinet Installation.

(a) **Mounting.** The Contractor shall securely fasten the cabinet on a new aluminum pedestal base or concrete foundation, as shown on the Plans, or as directed by the Engineer.

(1) Bolted stainless steel connections shall be provided with lockwashers, locking nuts, or other approved means to prevent the connection nuts from loosening.

(2) Dissimilar materials shall be isolated from one another by stainless steel fittings.

(3) If a pedestal base is specified for the cabinet, it shall be an enclosed rectangular aluminum base, fabricated specifically for use with NEMA size 3 cabinets.

The pedestal shall not be supplied with any internal equipment, such as ATR input files or terminal strips.

The pedestal base shall be the same color as the Size 3 cabinet.

The pedestal height shall be 18 inches, unless shown otherwise on the Plans.

If any portion of the pedestal base or cabinet is exposed due to overhang or unusual mounting circumstances, the exposed area shall be covered with a 0.125 in. thick aluminum plate.

(4) Cabinets shall have a continuous neoprene gasket between the cabinet and the pedestal base or the cabinet and the foundation to prevent the ingress of water and other contaminants.

(b) Power Connections. The Contractor shall make all power connections to the cabinet.

(1) The neutral bus shall be isolated from the cabinet and equipment ground.

(2) The bus shall terminate at the neutral lug ultimately attached to the meter pedestal.

(c) Equipment Connections. The Contractor shall make all equipment connections cabinet to provide the required operation, unless directed otherwise by the Engineer.

Testing. After the equipment specified in the Contract Documents has been installed, and all and connecting cabling has been installed, a field test shall be conducted for each cabinet.

(a) The test is designed to demonstrate that all hardware, cable, and connections furnished and installed by the Contractor operate correctly and that all functions are in conformance with the Specifications.

(b) The field test will begin within 48 hours after the Engineer is advised by the Contractor that he is ready to begin the test.

(c) The test may begin when the Contractor is satisfied that all work has been completed at each cabinet location. After the cabinet and equipment has been placed in operation, the Contractor shall demonstrate that all equipment furnished and installed operates as specified herein.

(d) Each cabinet and its associated equipment shall be tested for proper operation for 30 consecutive days.

(1) During the testing period, all Contractor-provided equipment in the cabinet shall operate without failures of any type.

(2) If any component malfunctions or fails to provide the capabilities specified herein, during the 30-day test period, the Contractor shall replace or repair the defective equipment within 48 hours or notification by the Engineer.

(3) The cost of correcting component malfunctions shall be borne by the Contractor.

(4) After a component malfunction has been corrected to the satisfaction of the Engineer, a new 30-day test period shall be started.

The 30-day test applies only to Contractor-furnished hardware.

In the event of a failure of hardware furnished by others that prevents the 30-day test from continuing, the test shall be suspended until the non-Contractor furnished hardware has been repaired or replaced.

The cost of correcting malfunctions in Contractor-furnished equipment shall be borne by the Contractor.

(e) After a component malfunction has been corrected to the satisfaction of the Engineer, a new 30-day test period shall be started.

(1) The 30-day test applies only to Contractor-furnished hardware.

(2) In the event of a failure of hardware furnished by others, or failure of detector hardware, that prevents the 30-day test from continuing, the 30-day test will be suspended until the other hardware failures are corrected, at which time the test will resume.

(f) Documentation. The equipment supplier shall provide three sets of operating manuals, service manuals, and maintenance instructions for all components of the system.

MEASUREMENT AND PAYMENT. Furnishing and installing NEMA Size 3 electronic control equipment cabinets will be measured and paid for at the contract unit price each. The payment will be full compensation for the cabinets, concrete foundation, neoprene gasket(s), shelf, cable sheathing, material, labor, and other related equipment specified for each cabinet, including all incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

NON INVASIVE, MAGNETO-INDUCTIVE MICROLOOP DETECTOR

DESCRIPTION. Furnish and install non-invasive, magneto-inductive microloop vehicle detection sensors/probes. Install the sensors/probes as a set or assembly of 3 per traveled lane.

MATERIALS. All materials and equipment furnished and installed shall be new corrosion resistant, and approved by the Engineer. Furnish manufacturers certifications or certified copies of reports of tests, as directed by the Engineer.

CONSTRUCTION.

(a) Vehicle data collection requirements.

(1) Each non-invasive sensor shall have an inductance change that will allow an appropriately designed, matched inductive loop vehicle detector to detect all licensable vehicles that contain ferromagnetic material. The sensor will detect these vehicles when they are within a travel distance less than one half the height of the ferromagnetic material of the vehicle.

(2) The non-invasive vehicle sensing assemblies shall consist of three sensors connected in series to a common lead in wire.

(3) Connect each non-invasive, magneto-inductive vehicle sensing assembly to an appropriately designed, matched inductive loop vehicle detector.

(4) Optimize traffic data collection or traffic flow parameter measurements across diverse roadway geometry by installing, triple non-invasive sensor assemblies.

(b) Electrical and magnetic requirements.

(1) The non-invasive sensor shall convert changes in the ambient magnetic field to changes in its inductance. An increase in the ambient magnetic field shall result in a decrease in the inductance of the non-invasive sensor, and the inductance change of the non-invasive sensor shall be directly proportional to the changes in the earths magnetic field.

(2) The nominal magnitude of the vertical magnetic field over which the non-invasive sensor shall function to specified requirements shall be 200 millioerstads to 800 millioerstads. The non-invasive sensor shall detect reliably and consistently changes in the ambient magnetic field of seven (7) millioerstad or greater when the earth's magnetic field is ≥ 200 millioersted (H_{DC}=200 mOe) and the peak-to-peak amplitude of the applied inductive current is 40 $mAmp_{p-p}$ (I_{AC} = 40 $mAmp_{p-p}$). This requirement

defines the sensitivity to be ≥ 2 nanohenries/millioerstad at H_{DC}=200 mOe and I_{AC} = 40 $mAmp_{p-p}$.

(3) The sensor/probe inductance shall be between 50 μH to 80 μH. The nominal operating frequency of the probe shall be between 20 kHz and 60 kHz. The non-invasive sensor shall operate with drive currents of 2.5 $mAmp_{p-p}$ to 175 $mAmp_{p-p}$. The specified electrical and operating requirements shall be maintained over temperatures ranging from –29.9 F to 162.5 F

(c) Sensor physical requirements. The non-invasive sensor shall have a maximum outer diameter of 0.8125 in. and a maximum height of 2.25 in. and shall be suitably sealed for use in 100 percent humidity environments within a conduit. Equipment shall be included to secure the probes in the conduit, ensure proper orientation during installation, and maintain proper orientation through life of the device. The sensors shall have pull chords to facilitate installation and removal from the conduit. The probes shall be designed to be easily assembled on-site without the use of special tools and equipment. The sensors shall be serviceable from adjacent handholes. Installation of sensors shall not disturb roadway surface.

(d) Conduit installation requirements.

(1) For detection locations that shall require new conduit installation, the conduit shall be a 3 in.conduit consisting of schedule 80 PVC with an inner diameter of 2.9 in. and an outer diameter of 3.5 in. The conduit shall be installed at a nominal centerline depth of 20 in. from the road surface following the roadway crownline. The depth of the conduit centerline from the road surface shall be maintained between 18 and 22 in. over its entire length. The centerline of the conduit shall not deviate horizontally more than required by the application, however, any deviation in conduit alignment shall be less than 0.25 in. per foot. At least one end of the conduit shall terminate at a standard size handhole with a nominal 24 in. diameter and extend three in into the handhole, and the conduit shall have a grade to permit drainage.

(2) The non-invasive probes shall function in 3 in. conduits that have been previously installed at greater than the optimum operational depth stated above. Non-invasive probe installation and alignment for non-optimum pavement depths shall be performed as directed by the Engineer or described in the contract plans.

(e) Probe lead-in cable. The cable leading from each probe set or assembly to the controller shall be included with the probes.

(f) Requirement of verification of proper installation.

(1) Provide a log of the boring depth measured every 2 ft in boring distance.

(2) Verify that the non-invasive sensor set or assembly and lead-in cable installation meets requirements by measuring the inductance of the non-invasive sensor assembly with a properly designed, matched vehicle detector. The installer shall verify that the installation meets requirements by measuring the DC resistance of the non-invasive sensor assembly with a properly calibrated ohm meter. The installer shall measure the change in inductance of the installed non-invasive sensor assembly using a properly designed, matched vehicle detector when a standard, midsize vehicle is driven directly over the sensor.

Provide a log of the measured inductance, DC resistance and the change in inductance for each installed non-invasive sensor assembly.

(3) The inductance shall be the sum of probe inductance, inductance of lead-in cable (16.5 μH per 100 ft) and home-run cable (23 μH per 100 ft) and shall be within ±20 percent of the calculated inductance. The measured DC resistance shall be the sum of 1.5 ohms per probe, 3.0 ohms per 100 ft of lead-in wire and 2.0 ohms per 100 ft of home-run cable and shall be within ±20 percent of the calculated DC resistance. The measured change in inductance for a standard midsize vehicle shall be in the range from 120 nH to 1200 nH.

MEASUREMENT OF PAYMENT. Non-Invasive Magneto Inductive Vehicle Detectors shall be measured and paid for at the contract unit price per each in the cable length specified. The payment will be full compensation for furnishing and installing one probe set, lead-in cable from the probe set to the field cabinet, probe carrier system, pull rope and all other incidentals. The payment shall be full compensation for all materials, labor, equipment and all other incidentals necessary to complete this work.

Conduit will be measured and paid for as specified in section 805.

CATEGORY 800
TRAFFIC

NON-INVASIVE ROAD WEATHER SENSORS

DESCRIPTION. Furnish and install non-invasive road weather sensors, as specified in the Contract Documents, or as directed by the Engineer. The weather sensors shall consist of the sensor unit and connection cables, and all necessary connectors.

MATERIALS. Non-invasive road weather sensors, connection cable assemblies and all component parts shall meet the latest edition of the National Electrical Manufacturers Association (NEMA) Standards, Underwriters Laboratory (UL), and Military Standards (MIL), as applicable. The advertising date of this Contract shall be used to determine the date of the applicable standards.

CONSTRUCTION. Furnish and install all non-invasive weather sensors, power supplies, cables, connectors, materials, supplies, and manufactured articles, and perform all operations and equipment testing necessary to connect non-invasive road weather sensors to their respective field equipment cabinets to create fully operational sites.

Electrical.

(a) Power supply
- **(1)** Voltage: 12 – 24 VDC +/- 10%
- **(2)** Power input: 40 VA, 15 VA in Energy Saving Mode
- **(3)** Current consumption:
  Approx. 1.65 A at 24 VDC
  Approx. 1.75 A with 15 meter cable
- **(4)** Inrush current: approx. 32 A (50µs) at 24 VDC.

(b) Data Interface: RS485, 2 wire, half-duplex

(c) Data bits: 8 (SDI-12 Mode: 7) Stop bit: 1 Parity: No (SDI-12 Mode: even)
- **(1)** Tri-state: 2 bits after stop bit edge
- **(2)** Adjustable baud rates: 1200, 2400, 4800, 9600, 14400, 192001, 28800, 57600
- **(3)** Factory setting and baud rate for firmware update (SDI-12 Mode: 1200 fixed)

Measurements: Sensors.

(a) Road Surface Temperature
- **(1)** Measurement process: Pyrometer
- **(2)** Measuring range: -40 C to +70 C
- **(3)** Resolution: 0.1°C
- **(4)** Accuracy: +/- 0.8°C
- **(5)** Sampling rate: 1 minute Units: °C; °F

(b) Water Film Height
- **(1)** Measurement process: Spectroscopic

(2) Measuring range: 0 to 2000 µm
(3) Resolution: 0.01 µm
(4) Accuracy: +/- 0.1 mm +/- 20% of measurement
(5) Sampling rate: <1 minute Units: µm, mil

(c) Ice Layer Thickness
(1) Measurement process: Spectroscopic
(2) Measuring range: 0 to 2000 µm
(3) Resolution: 0.01 µm
(4) Sampling rate: <1 minute Units: µm, mil

(d) Freezing Temperature
(1) Measurement process: Spectroscopic
(2) Measuring range: -40°C to 0°C
(3) Resolution: 0.1°C
(4) Sampling rate: <1 minute Units: °C; °F

(e) Ice Percentage
(1) Measurement process: Spectroscopic
(2) Measuring range: 0% to 100%
(3) Resolution: 0.1%
(4) Sampling rate: <1 minute Units: %

(f) Saline Concentration
(1) Measurement process: Spectroscopic
(2) Measuring range: 0% to 100%
(3) Resolution: 0.1%
(4) Sampling rate: <1 minute Units: %

(g) Snow Height
(1) Measurement process: Spectroscopic
(2) Measuring range: 0 to 10mm
(3) Resolution: 0.01mm
(4) Sampling rate: <1 minute Units: mm

(h) Friction
(1) Measurement process: Spectroscopic
(2) Measuring range: 0 to 1
(3) Resolution: 0.01
(4) Sampling rate: <1 minute

Sensor Housing:

(a) Dimensions
  (1) Height 425 mm
  (2) Width 225 mm
  (3) Depth 285 mm
(b) Sensor Body Weight: approx. 9.9 kg
(c) Mast bracket weight: approx. 1.0 kg
(d) Attachment Type: Mast bracket: 60 - 76mm

Environmental.

(a) Protection class: III (SELV)
(b) Protection type: IP 65
(c) Storage conditions
  (1) Permissible storage temperature: -40°C to +70°C
  (2) Permissible relative humidity: 0 to 95% R.H. non-condensing
(d) Operating conditions
  (1) Permissible ambient temperature: -40°C to +60°C
  (2) Permissible relative humidity: 0 to 100% R.H.
  (3) Permissible altitude above sea level: N/A

MEASUREMENT AND PAYMENT. Non-invasive road weather sensors will be measured and paid for at the contract unit price bid per each. The payment will be full compensation for the sensor, cable, connectors, materials, labor, testing and test equipment rental fees (if applicable), and all other incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

POWER DRIVE UNIT

DESCRIPTION. Furnish and install handheld power drive units for raising and lowering hinged CCTV poles, as shown in the Contract Documents, or as directed by the Engineer. Power drives shall be complete handheld units with an 8 in., 1 in. square-drive crank hub/pole chuck assembly that fits into the hand crank winch tube socket in the pole housing.

MATERIALS. The power drive housing shall be made of fiberglass-reinforced plastic and die-cast aluminum.

CONSTRUCTION. The power drive chuck shall be 100 percent compatible with the Administration's hinged CCTV camera poles. The equipment shall satisfy the following requirements.

(a) Mechanical.

(1) Spindle Speed (no load): 32 RPM.

(2) Crank Hub/Pole Chuck: 8 in. length x 1 in. square drive.

(3) Weight : Less than 15 lbs.

(4) Overall Length: Less than 24 in.

(5) Gear Head: Ball and needle bearings.

(6) Gear Housing: Die Cast Aluminum.

(7) Carry Case: Polystyrene, molded to fit drive unit.

(b) Electrical.

(1) Motor: 1/2 HP Reversible, 115 or 220 VAC, 50/60 Hz.

(2) Switch: Heavy-duty paddle-type switch with safety lock off switch.
Separate FORWARD/REVERSE switch.

(3) Certifications: UL/CSA/RoHS/WEEE.

(c) Warranty. Standard manufacturer's lifetime warranty.

MEASUREMENT AND PAYMENT. Furnishing and installing power drive units for hinged CCTV camera poles will be measured and paid for at the Contract unit price each. The payment will be full compensation for the power drive units, crank hub/pole chuck assemblies, carry case, tools, materials, labor, testing and incidentals necessary to complete this work.

CATEGORY 800
TRAFFIC

RED SIGNAL AHEAD LED SIGNS

DESCRIPTION. Furnish and install signs with all or part of their legend formed by Light Emitting Diodes (LEDs).

MATERIALS.

Sign Supports and Hardware	909.07
Reflective and Non Reflective Sheeting	950.03
Sign Materials	950.08

General. Design the signs to function in an outdoor environment, be fully weather tight, and function at an ambient temperature of -37 C to 48 C.

Provide signs that are in full compliance with the MUTCD.

The legend formed by LEDs must be clearly legible at 400 ft, and visible at 1000 ft, along the optical axis of the LED sign, when the LEDs are energized and the sign is viewed against a clear daylight sky. When the LEDs are not energized the LEDs shall not be evident.

Light Emitting Diodes. Provide LEDs that are Aluminum Indium Gallium Phosphide type. The LED shall be rated for 100,000 hours continuous operation with no more than 50 percent lumen depreciation. Each LED shall provide at least 500 millicandelas on the optical axis with a 20 degree or greater beam angle, at 20 milliamps. Red LEDs shall have a dominant wavelength of the emitted light between 620 and 660 NM.

CONSTRUCTION.

Light Emitting Diodes. The LEDs shall be securely soldered into a printed circuit board. The boards shall be arranged so that the failure of any one LED will not deactivate any other LED. The current supplied to each LED shall not vary more than 5 percent from any other LED.

Pixels. The LEDs shall be grouped to form individual pixels. Each pixel shall be between 1 in. and 1.25 in. diameter. Each pixel shall have a luminance greater than 35 candela along the optical axis, at 20 milliamps operating current per LED. The pixel, and associated circuit board, shall be mounted into the module in such a manner as to allow easy access for repair. The pixel shall be watertight when properly installed.

Each pixel shall contain internal circuitry for 125 VAC operating voltage. External Power supplies are not allowed. The pixel shall have 6 in. 18 AWG wire leads that are color coded to indicate the color output of the pixel.

Each pixel housing shall be made from brass, and shall be nickel plated. The pixel shall be front mounted through a 1 in. mounting hole where the product is water sealed. Each Pixel shall have a flat, impact resistant polycarbonate lens and shall meet UL94VO ratings. The external lens surface shall be smooth with no raised features. External Facets are not allowed. The complete pixel shall meet NEMA 4X and IP 66.

Modules. Each word using LEDs will be formed by one independent weather tight module, which is fastened, into the sign face. The module shall protect and support the LED pixel. The modules shall be removable from the sign face using only a screwdriver. A wiring harness shall be installed behind each module to allow the wiring to be easily disconnected when the module is removed. A visor shall be provided for each module to shade it from illumination by sunlight. The face of the module shall not project from the sign face more than 0.32 in. exclusive of the Visors.

Legend. The entire legend shall use the FHWA type 'D' standard alphabet. The word "RED" shall be 10 in. high and the words "SIGNAL" and "AHEAD" shall be 8 in. high.

"RED" shall be formed by red LED's on a matte black panel, which shall also form the face of the module. The face shall be a 29 in. by 15 in. More than 0.5 in shall not separate the pixels. The LEDs and word "RED" shall not be visible when the LEDs are not energized.

"SIGNAL" and "AHEAD" shall be formed of black non-reflective letters sheeting on a yellow, High Performance Wide Angle Retroreflective sheeting background. LED pixels shall be inset into the letters so as not to be visible when not energized. The pixels shall not be separated by more than 0.5 in.

Sign Face. The sign face shall be diamond shaped, 60 in. on each side.

Background. The sign background shall be yellow, High Performance Wide Angle Retroreflective sheeting. A black Border 1.5 in. thick shall be placed 1 in. in from the edge of the sign. At the corners, the border will have a 4 in. radius.

Sign Enclosure. The sign enclosure shall be constructed of aluminum alloy a minimum of 0.125 in. thick. Sides of the structure shall be formed of extrusions, while front and back will be formed from plate. All seams shall be welded and made smooth.

The sign enclosure shall be 60 in. (56 in. internal) on a side and at least 3.25 in. deep.

A reinforcing framework of 1 x 2 in. aluminum extrusions shall installed to stiffen the structure, and provide bracing for the mounting hardware. The framework shall consist of two 51.2 in. vertical members, and one 28 in. horizontal member arranged in an "H" pattern. The centerline of the horizontal member shall be located 3 in. above the centerline of the sign. All bracing members shall be welded to each other, and to the enclosure sides and back.

Appropriate holes will be drilled and tapped into the enclosure back and bracing for mast arm mounting hardware. The mounting hardware shall consist of 2 PELCO ASTRO-BRAC sign mounting brackets, or approved equal.

Weep holes shall be drilled on either side, 2.6 in. from the bottom corner. Each weep hole shall be 0.75 in. diameter. Screening shall be fitted over the weep holes to prevent the entrance of insects.

The sign enclosure shall house only the terminal blocks necessary to connect the field wires from the control cabinet.

Electrical. The field wires shall operate as follows.

(a) There shall be one terminal labeled RED, by applying 120 volts to this terminal the word RED will light.

(b) There shall be one terminal labeled Signal Ahead, by applying 120 volts to this terminal the word SIGNAL AHEAD shall light

(c) There shall also be a terminal labeled NEUTRAL to terminate the neutral to the control cabinet.

The entire sign and sub-controller shall be warranted by its manufacturer for a period of 6 months.

Environmental. The sign shall be capable of operating between -30 C to +85 C.

MEASUREMENT AND PAYMENT. Red Signal Ahead LED Signs will be measured and paid for at the contract unit price per each installed. The payment will be full compensation for the sign, LEDs, relays, transformers, photocells, mounting hardware, electrical connections, and for all material, labor, tools, equipment, and incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

RELOCATE EXISTING SIGNAL OR SIGN ON SIGNAL STRUCTURE

DESCRIPTION. Relocate Existing Signal Head Assemblies and or Signs on Signal Structures as specified in the Contract Documents or as directed. Replace existing mounting hardware.

MATERIALS. Not applicable

CONSTRUCTION. Maintain the existing signals and signs by relocating equipment during phases of the Maintenance of Traffic.

Relocate Signal Head Assembly shall consist of relocating all signal head indications connected in one assembly, rerouting and resecuring all cables connected to the signal head assembly; and insuring the signal heads are aimed and working correctly. Replace all mounting hardware.

Relocate Signs on Signal Structures shall consist of relocating one sign to different location on the same signal structure or span wire. Replace all mounting hardware.

The Contractor along with the Engineer shall coordinate the equipment locations in accordance to the Contract Documents or as directed.

Plan the work to minimize interference with any existing traffic control device.

MEASUREMENT AND PAYMENT. The payment shall include replacement of mounting hardware and shall be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Relocate Traffic Signal Head Assemblies will be measured and paid for at the contract unit price per each.

Relocate Signs on Signal Structures shall be measured and paid for at the contract unit price per square foot.

Relocation of signs not mounted on signal structures will be measured and paid for as specified in the contract documents under Section 822.

CATEGORY 800
TRAFFIC

REMOVE AND DISPOSE OF EXISTING LIGHTING INFRASTRUCTURE

DESCRIPTION. Remove and dispose of existing lighting infrastructure including but not limited to existing lighting structures, bridge mounted sign mountings, manholes, handholes, traffic control device cabinets and equipment, foundations, cables, conduits, duct cables, electrical service equipment, breakaway base support system, ground wire, roadway luminaires, connector kits and ground rods as shown in the contract documents and/or as directed by the field engineer within the project limits.

MATERIALS. Not applicable.

CONSTRUCTION. Remove concrete foundations and place backfill as specified in 822.03.01.

Make all existing cable safe in conformance with the appropriate electrical codes. If removing duct cable, underground conduit, ground wire, etc., backfill as specified in 809.03.

Remove existing manholes and handhole as specified in 207.03.01. Place backfill as specified in 822.03.01.

MEASUREMENT AND PAYMENT. Remove and Dispose of Existing Lighting Infrastructure will not be measured but will be paid for at the Contract lump sum price. The payment will be full compensation for the removal and disposal of existing lighting infrastructure including but not limited to existing lighting structures, bridge mounted sign mountings, manholes, handholes, traffic control device cabinets and equipment, foundations, cables, conduits, duct cables, electrical service equipment, breakaway base support system, ground wire, roadway luminaires, connector kits, ground rods, excavation, backfill, transportation and all materials, labor, equipment and incidentals necessary to complete the work as indicated on contract documents and/or as directed by the field engineer within the project limits.

CATEGORY 800
TRAFFIC

SIGNAL EQUIPMENT TURN ON, PICK UP, REMOVAL AND MAINTENANCE

DESCRIPTION. Pick up of Administration furnished materials, remove existing equipment, and maintain existing equipment as specified in the Contract Documents or as directed by the Engineer.

MATERIALS. Not applicable

CONSTRUCTION.

Equipment Turn On. Notify the Engineer and Traffic Operations Division representatives within 10 working days prior to completion of the project to allow the Administration to install any additional traffic control device.

Notify the Engineer and Traffic Operations Division representative five working days prior to the completion of the project to schedule a final inspection and turn-on.

Stakeout, with the Engineer present, the proposed construction as indicated on the plan.

Pick-Up of Administration Furnished Materials. Notify the appropriate OOTS warehouse a minimum of 72 hours in advance of the anticipated pick up or delivery of materials. The OOTS signal and sign warehouses are located at:

7491 Connelley Drive
Hanover, Maryland 21076
Signal Phone 410-787-7667
Sign Phone 410-787-7670

The Contractor shall be responsible for the transportation, labor, equipment, tools and incidentals necessary to obtain and load any Administration furnished materials.

Materials not furnished by the Administration shall be furnished by the Contractor.

Removal and Disposal of Existing Material and Equipment. Remove concrete foundations specified in 207.03.01. All holes caused by this removal shall be backfilled, compacted and restored to surrounding conditions.

Remove all existing hard rubber detectors and handholes not shown on the Plans. The holes shall be backfilled, compacted and restored to surrounding conditions. The sidewalk where handholes are removed shall be reconstructed to the nearest tooled joint or expansion joint. The roadway where hard rubber detectors are removed shall be reconstructed in conformance with

Administration utility patch repair standards.

Disconnect existing inductive loop detectors and magnetic detectors not shown on the plans.

Dispose of all material not salvaged. Non-galvanized green painted structures may contain lead and the contractor will be responsible for proper disposal of such material.

Storage of Materials. Materials shall be bundled, stored, and protected in conformance with the manufacturers recommendations or as approved by the Engineer.

Maintenance of Materials and Equipment. The maintaining agency will continue maintenance of any existing signals until the Contractor places new equipment into operation.

When the work requires adjustments to the traffic control devices to maintain the minimum Administration standards, the adjustments to the traffic control devices shall be made within 4 hours of verbal notification by the Engineer. Failure to comply with this time period will result in the Administration performing adjustment and deducting the cost of the adjustment from the Contractor's payment.

Existing signals shall remain in their original condition until the new signals have been completed, satisfactorily tested and its operation accepted by the Engineer.

Maintain the continuous operation of all vehicular and pedestrian detectors. If any detector is damaged by the Contractor, it shall be repaired within 72 hours after notification by the Engineer.

All traffic signals and existing interconnect cable shall be operational and actuated as specified in the Contract Documents.

Plan the work to minimize interference with any existing traffic control device.

MEASUREMENT AND PAYMENT. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work for one or more of the items specified in the Contract Documents.

Equipment Turn On. Equipment Turn On will not be measured but the cost will be incidental to other pertinent items specified in the Contract Documents.

Pick-Up of Administration Furnished Materials. Pick-up of Administration Furnished Materials will not be measured but the cost will be incidental to other pertinent items specified in the Contract Documents.

Removal and Disposal of Existing Signal Material and Equipment. Removal and Disposal of Existing Signal Material and Equipment will be measured and paid for at the Contract unit

lump sum price.

Maintenance of Existing Signal Equipment. Materials storage, cable sealing and handling, adjustments to maintain minimum Administration standards on existing signals made necessary by new signal or geometric modifications and Contractor repair of any damaged detector caused as a result of Contractors error will not be measured but the cost will be incidental to other pertinent items specified in the Contract Documents.

CATEGORY 800
TRAFFIC

SIGNAL HEAD BACKPLATES

DESCRIPTION. Furnish and install signal head backplates, as specified in the Contract Documents or as directed by the Engineer.

MATERIALS. Signal Head backplates shall be vacuum formed with Acrylonitrile Butadiene Styrene (ABS) or High Density Polyethylene (HDPE). Provide U.V. stabilized backplates that are black in color, unless otherwise specified. The black color shall be consistent throughout the entire piece without varying shades and tones. Provide backplates that meet the applicable Underwriters Laboratory (UL) standards.

The backplates shall have a thickness of 0.125 in. with 3 in. corner radius and 5/8 in. flanges. It shall have a plastic sheet hair cell finish on the front side and a smooth finish on the backside. All hardware shall be stainless steel and shall include nuts, washers and screws, per manufacturer's recommendations. For installation on existing signal heads, provide split backplates.

For enhanced visibility, place an ASTM Type XI yellow retroreflective tape with a min. width of 1 in. and a max. width of 3 in. along the perimeter of the signal backplate.

CONSTRUCTION. Install signal head backplates as recommended by the manufacturer and as approved by the engineer.

MEASUREMENT AND PAYMENT. Signal head backplates will be measured and paid for at the contract unit price each. The payment will be full compensation for furnishing, and installing the backplates, hardware, labor, equipment, tools, and incidentals necessary to complete this work.

CATEGORY 800
TRAFFIC

SIGN LIGHTING MAINTENANCE SYSTEM

DESCRIPTION. Furnish and install sign lighting maintenance systems as specified in the Contract Documents, or as directed by the Engineer. Provide a system that eliminates or reduces the need for lane closures for sign lighting maintenance.

MATERIALS.

Metallic conduit and Fittings	921.07.01
Nonmetallic Conduit and Fittings	921.07.02
Flexible Conduit and Fittings	921.07.02
Electrical Cable and Wire	950.06
Cable and Wire Connectors	950.14

CONSTRUCTION. Sign lighting maintenance systems shall allow all luminaires, ballasts, power regulation systems, and electrical connections to be maintained from the shoulder, or right lane if no shoulder is present, without additional lane closures.

Provide a disconnect switch and electrical supply system for each sign lighting system. The electrical supply system shall provide electrical cable from the disconnect switch to each luminaire on the sign.

Arrange the electrical connections for the luminaires to allow each luminaire to be powered and tested while over the roadway shoulder. The electrical supply system shall use all circuits designated in the Contract Documents, and allow adjacent luminaires to operate on different circuits.

Sign lighting maintenance systems shall make use of the sign structures and luminaire supports as specified in the Contract Documents. Provide additional, or alternative structural supports as required to support the systems.

Sign lighting maintenance systems shall not obstruct the view of the sign faces, shall not require modification of the sign placement on the structure, and shall not require modification of the sign faces.

MEASUREMENT AND PAYMENT. Sign Lighting Maintenance Systems for sign structures will be measured and paid for at the contract unit price per each sign structure. The payment will be full compensation for the mounting hardware, supports, wiring, conduits, disconnect switch, cable supports, luminaires carriages, and all material, labor, equipment, tools, and incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

SIGN LUMINAIRES

DESCRIPTION. Furnish and install LED sign luminaires as specified in the contract documents or as directed by the Engineer.

MATERIALS. Sign luminaire shall have a color temperature of 3900 degrees Kelvin or higher and a Color Rendering Index (CRI) value greater than 65. Each sign luminaire shall be designed for a useful life of at least 11 years with a minimum L70 value of 50,000 hours of operation based on a 12 hour on, 12 hour off duty cycle.

All components of the luminaire must be rated for the full service life without maintenance.

Sign luminaires shall use no more than 135 watts and be designed to operate at the voltage specified in the contract documents. For 480 volt operation, an integral transformer may be provided to reduce the voltage. The power factor of the sign luminaire must be 0.9 or higher.

All components of the sign luminaire shall be UL approved and the complete luminaire assembly shall be compliant to UL 1598 for wet locations.

The sign luminaire shall be designed to mount on a standard mounting plate as detailed in the book of standards and on the standard carriage of a sign lighting maintenance system.

The sign luminaire lens/refractor shall be sealed to prevent intrusion of moisture for the full service life. Luminaire housings that have the potential to retain water shall be equipped with factory installed drain holes to meet the requirements of UL 1598. The lens/refractor must be constructed of a material that will not show visible yellowing due to UV exposure, or exposure to hydrocarbon emission, for the full service life.

CONSTRUCTION. Photometric calculations shall be provided with the catalog cuts for the sign luminaire verifying the sign illumination for each individual sign including both existing and proposed signs based on actual sign size, support offset below and in front of sign. Calculations shall be provided for a grid with vertical and horizontal spacing of 1 ft. The bottom of the grid will be 0.5 foot above the bottom edge of the sign and left edge 0.5 ft from the left side. A light loss factor (LLF) value of 0.7 shall be used for the calculation.

To be acceptable, the average initial illumination shall be 20 foot candles or greater with a maximum to minimum uniformity ratio no greater then 6 to 1.

MEASUREMENT AND PAYMENT. Sign Luminaires shall be measured and paid for at the contract unit price each for Sign Luminaires. The payment will be full compensation for the sign luminaire and drivers, mounting hardware, wiring, step down transformer, photometric calculations,

and all material, labor, equipment, tools, and incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

SQUARE PERFORATED TUBULAR STEEL POSTS

DESCRIPTION. Furnish and install square perforated tubular steel posts and square perforated tubular steel anchor bases for mounting traffic signs as specified in the contract documents, or as directed by the Engineer.

MATERIALS.

Steel Posts	A570 Grade 50
Galvanizing	A653 Designation G-90
Spray Galvanizing Compound	A780

Square tubular steel posts and square tubular steel anchor bases shall be formed from 12 gauge steel. All sides of the tubes shall have 7/16 in. die punched circular holes or perforated knock-outs, at 1 in. centers along their entire length.

The tubular steel posts shall be 2 in. square tubes 12 ft long.

Square tubular steel anchor bases shall be comprised of two telescoping tubes. The first shall be 2 -1/4 in. square, three ft long, formed from 12 gauge steel and shall snugly fit over the sign post. The second section shall be a 2-1/2 in. square, 18 in. long, formed from 12 gauge steel, and shall snugly fit over the 2-1/4 in. section.

CONSTRUCTION. Construct the square tubular steel anchor base assembly by placing the 18 in. base section over the 3 ft base section so that they are flush at the top and the holes are aligned. Drive the entire unit into the ground so that one or two rows of holes in the square perforated tubular steel base are exposed. Drive the base so that it remains plumb and provides the final sign assembly with the correct orientation.

Determine the finished length of the tubular steel posts by adding the total height of the signs to 8 ft, 2 in. Cut the sign post to the correct length, and apply cold spray galvanizing to the cut end. Bolt the signs to the top of the post, using tamper proof bolts or drive rivets. Lower the square tubular steel posts 8 in. into the base, and secure the post to the base using two corner bolts designed for this purpose.

MEASUREMENT AND PAYMENT. Square Perforated Tubular Steel Posts will be measured and paid for at the contract unit price per each. The payment will be full compensation for the sign post, corner bolts, and painting as required, and for all materials, labor, equipment, tools, and incidentals necessary to complete the work.

Square Tubular Steel Anchor Bases will be measured and paid for at the contract unit price per

each. The payment will be full compensation for both tubes comprising the base section, all excavation, and for all materials, labor, equipment, tools, and incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

SURGE SUPPRESSION

DESCRIPTION. Furnish and install power and telecommunications line surge suppression and transient noise reduction equipment in pad-mounted and pole-mounted field equipment cabinets, as specified in the Contract Documents or as directed by the Engineer. This work shall include all necessary hardware and electrical connections.

MATERIALS. All component parts shall be designed, manufactured, tested, and installed in compliance with the latest versions of the following codes and standards:

National Electrical Manufacturers Association (NEMA LS-1, 1992)
National Fire Protection Association (NFPA 20, 70, 75, & 780)
Underwriters Laboratories (UL 1449, Rev. 2)
International Standards Organization (ISO) - The manufacturer must be certified ISO 9001 for manufacturing design and service
Institute of Electrical and Electronic Engineers (ANSI/IEEE C62.11, C62.41 and C62.45)

CONSTRUCTION.

Power Surge Suppressors. Transient noise reduction and surge suppression filters shall be mounted as close to the load center as possible. The lead length between the unit and the load center connection point shall be 6 in., $\pm$ 1 in.. The surge unit may be mounted against the load center at a right angle and the leads fed through a close nipple to minimize this lead length. If this lead length cannot be achieved, the Contractor shall notify the Engineer and await further instructions.

(a) The surge protectors shall be parallel-wired in a split-phase configuration directly to the main bus terminals in the load center to protect all equipment inside the cabinet.

(b) Surge protectors shall be contained within a single compact NEMA 4X/IP66 Rated enclosure, suitable for mounting inside or outside a cabinet.

(c) Power surge units shall be equipped with red and green LED diagnostic indicators, and built-in audible alarm, as described below.

(d) Leads shall be as short and direct as possible, with a minimum of bends. “Slack loops” will not be permitted.

Locations. Split-phase power surge suppressors shall be provided for the Type 332/334 load center, and the load center inside the walk-in DMS housing.

Electrical. All figures typical at 77 F (25 C) unless otherwise stated.

(a) Split-Phase protection. L-N, L-G, L-L, N-G.

(b) Capacities.

(1) Surge Capacity: 160 kA (8/20μs).

(2) Current: Suitable for use on a circuit capable of delivering not more than 200,000 rms symmetrical amperes, 480 V maximum.

(3) Voltage: 140 volts AC.

(c) Standard Warranty. The unit shall carry a 10 year standard warranty, providing for the unlimited replacement of damaged units.

(d) EMI/RFI Attenuation. -75 dB maximum, 100 kHz to 100 MHz.

(e) Duty Cycle Performance (8/20μs).

(1) Rated 1 impulse @ 10,000 A >6,500 Impulses.

(2) 100 A infinite.

(3) Long duration current pulse (10/1,000μs) capability 3,600 A (tested).

(f) Unit Status Indicators. Green and Red indicators shall indicate the operating status of each unit.

(1) Green LED on, Red LED off: Power and Ground present, full protection in all modes, and all phases.

(3) Green LED off, Red LED off: Loss of Power or loss of ground.

(3) Green LED off, Red LED on: Protection fault (remote indication alarm via contacts & audible alarm).

(g) Audible Alarm. 90 dB.

(h) Ringwave. @ 200 A, 50 V.

(i) Remote Contacts. Form C (NC, NO, C) 125Vac, 3A rated.

(j) Thermal Protection. Thermal fusing shall be incorporated into each unit. Short circuit protection with 200kA AIC rating shall be included.

Miscellaneous.

(a) Operating frequency range. US standard power frequencies of 50 to 60 Hertz.

(b) Ambient environmental limits.

(1) Temperature: –40F to +185F – working.

(2) Humidity: 95% RH (non-condensing).

(c) Dimensions. The surge unit shall be housed in a compact NEMA 4x enclosure, with dimensions of 9.30 in. x 3.00 in. x 4.93 in. (236mm x 76mm x 125mm).

(d) Supplied Leads. #8 AWG for power, #22 for No/Nc contacts.

Certification. Catalog cuts submitted for power surge protectors shall certify that the devices are fully compliant with UL 1449, Rev. 2. The Engineer reviewing the catalog cuts will verify that the device is UL listed via the UL listing website.

Telephone Line Protection. One solid-state surge and transient noise suppressor shall be furnished and installed for each type of communications line (ISDN, T1, or DTMF) provided under this contract. The filter(s) shall utilize screw terminals for connecting the line to the suppressor. Units supplied shall meet all requirements of Article 800-32 of the NEC, and shall be UL 1283 listed.

Electrical Characteristics.

APPLICATION	T1	ISDN	ADSL
Nominal Line Voltage	6v	48v	150v
Maximum Line Volt.	8v	53v	170v
Min. Clamping Volt.	15v	60v	190v
Protection Level 8x20us impulse – 5kA	25v	70v	220v
Nominal Discharge Current 8x20us impulse – 10x	5kA	5kA	5kA
Max. Discharge Current 8x20us impulse – 1x	20kA	20kA	20kA
Lightning Current 10x350us – 2x	5kA	5kA	5kA
End of Life	Short Circuit	Short Circuit	Short Circuit

Standard Warranty. Two years, from the date of manufacture.

Documentation. The following must accompany all surge suppressors supplied:

(a) Instruction manuals.

(b) Maintenance manuals.

(c) Descriptive parts list with industry standard part numbers where applicable.

MEASUREMENT AND PAYMENT. Furnishing and installing surge suppressors will be not be measured but the cost will be incidental to the unit price for each pertinent contract item for field equipment cabinets or communications huts. The payment will be full compensation for the surge suppressor, interconnect cables, material, labor, and equipment, including all incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

TELECOMMUNICATIONS SERVICE PEDESTAL

DESCRIPTION. Furnish and install tubular, 10 in. diameter, PVC pedestals to be used as communication system demarcation points, as specified in the Contract Documents or as directed by the Engineer. The pedestals shall contain a flat, internal, backplane for mounting Network Interface Devices (NIDs) and splices. This work shall include all necessary hardware and electrical connections.

MATERIALS. Pedestals shall be constructed of green Polyvinyl Chloride (PVC).

All mounting hardware shall be aluminum of stainless steel
Security Locking bolt shall be 216 tool steel

CONSTRUCTION. Pedestals shall be tubular, with a diameter of 10 in., and an approximate length of 38 in. with the dome installed, and shall have the following features:

(a) 360 degrees access to cables and apparatus.

(b) 42 in. powder-coated steel or aluminum stake for mounting. The stake shall be an accessory from the pedestal manufacturer.

(c) Locking bolt for security, plus security hasp for padlock.

(d) Universal PVC backboard with aluminum ground plate.

(e) Two, 3 in. conduits with elbows for communications wires.

(f) All mounting hardware.

(g) Shroud option included for conductor protection.

(h) Service wire channel option included.

MEASUREMENT AND PAYMENT. Furnishing and installing Telecommunications Service Pedestals will be measured and paid for at the contract unit price for each. The payment will be full compensation for the pedestals, mounting stakes, conduit elbows, material, labor, and optional equipment specified, including all incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

TYPE 332/334 CABINETS

DESCRIPTION. Furnish and install Type 332/334 cabinets for Intelligent Transportation Systems (ITS) devices as specified in the Contract Documents or as directed by the Engineer.

MATERIALS. All materials and equipment forming part of Type 332/334 cabinets shall be new and approved by the Engineer.

Cabinet and door
Mounting hardware
Anchor bolts, nuts and washers
Conduit
Power service conditioning and distribution equipment
Environmental control equipment
LED Cabinet Lighting

CONSTRUCTION. The following applies to all Type 332/334 cabinets, including those supplied by the manufacturer with Dynamic Message Signs (DMS).

Cabinet: General.

(a) Fabricate assemblies of 0.060 in. minimum thickness aluminum or stainless steel sheet. Treat the metal surface with clear chromate.

(b) All bolts, nuts, washers, screws (size 8 or larger), hinges and hingepins shall be stainless steel unless otherwise specified. Size 6 and smaller hardware shall be cadmium plated.

(c) The enclosure, doors, lifting eyes, gasket channels, and all supports welded to the enclosure and doors shall be fabricated of 0.125 in. minimum thickness aluminum sheet.

(1) Bolted on supports shall be either the same material and thickness as the enclosure, or
(2) The input and power panels, and filter shell shall be fabricated of 0.080 in. minimum thickness aluminum sheet.

Cabinet Equipment.

(a) All Type 332/334 cabinets shall include the following components.

(1) Metal-encased load center, configured for 120/240 volt operation.
(2) 19 in. EIA equipment rack assembly.
(3) Service Panel.
(4) Power Surge Suppression module configured for 120/240 Volt operation (See SURGE SUPPRESSION).
(5) T-1 Phone Line Surge Suppressor (See SURGE SUPPRESSION).

(6) Front & rear LED traffic signal cabinet-style lighting
(7) Thermostatically-controlled fan cooling and cabinet heater.

(b) The following equipment shall be completely removable from the cabinet without removing any other equipment and using only a slotted or Phillips screw driver.

(1) Service Panel.
(2) T-1 Phone Line Surge Suppressor.
(3) All fuses, circuit breakers, switches (except Fan Fuse) and indicators shall be readily visible and accessible when the cabinet front door is open.

(c) All equipment in the cabinet, when required, shall be clearly and permanently labeled.

(1) The marker strips shall be made of material that can be easily and legibly written on using a pencil or ballpoint pen/marker.
(2) Marker strips shall be located immediately below the item they are to identify and be clearly visible with the items installed.

(d) All assemblies shall allow air circulation through the top and bottom unless otherwise specified.

(e) All assemblies and panels shall be mounted on the rack mounting rails per the cabinet detail.

(f) All conductors, terminals, and parts which could be hazardous to maintenance personnel shall be protected with suitable insulating material.

Housing Construction. The housing shall be rainproof with the top of the enclosure crowned to prevent standing water. It shall have single front and rear doors, each equipped with a lock.

(a) The cabinet exterior of the cabinet shall be unpainted, unless stated otherwise in the Contract Documents. All surfaces shall be free from dents, scratches, burrs, weld burns, or abrasions.

(b) All exterior seams for enclosure and doors shall be continuously welded and shall be smooth.

(1) All edges shall be filed to a radius of 0.03125 in. minimum. Exterior cabinet welds shall be done by gas Tungsten arc TIG process only.
(2) ER5356 aluminum alloy bare welding electrodes conforming to AWS A5.10 requirements shall be used for welding on aluminum.

(c) Procedures, welders and welding operators shall conform to the requirements and practices in AWS B3.0 and C5.6 for aluminum. Internal cabinet welds shall be performed using either a gas metal arc MIG or gas tungsten arc TIG process.

(d) The enclosure door frames shall be double flanged out on all four sides and shall have strikers to hold tension on and form a firm seal between the door gaskets and the frame. The dimension between the door edge and the enclosure external surface when the door is closed and locked shall be 0.156 (+/-0.08) in.

(e) Gaskets shall be provided on all door openings and shall be dust tight.

(1) Gaskets shall be 0.25 in. minimum thickness closed cell neoprene or silicone and shall be permanently bonded to the metal.
(2) If neoprene is used the mating surface of the gaskets shall be covered with a silicone lubricant to prevent sticking to the mating metal surface. A Gasket Top Channel shall be provided to support the top gasket on the door.

(f) Rack bottom support mounting angles shall be provided on either side, level with the bottom edge of the door opening, for horizontal support and bolt attachment.

(1) In addition, side rack supports shall be provided for the upper rack bolt attachments.
(2) Spacer brackets between the side rack supports and the rack shall be a minimum thickness of either 0.188 in. aluminum or 0.059 in. stainless steel.

(g) The housing shall be provided with 2 lifting eyes for placing the cabinet on its foundation. Each eye opening shall have a minimum diameter of 0.75 in. Each eye shall be able to support a weight load of 1000 lbs.

(1) All exterior bolt heads shall be tamper proof type.
(2) The housing shall not have a police door.
(3) The housing shall be equipped with metal hooks to hang a plastic envelope as specified herein.

(h) Door lock handles shall have provisions for padlocking in the closed position.

(1) Each handle shall be 0.75 in. minimum diameter stainless steel with a minimum 0.5 in. shank.
(2) The padlocking attachment shall be placed at 4.0 in. from the handle shank center to clear the lock and key. An additional 4.0 in. minimum gripping length shall be provided.

(i) The latching mechanism shall be a three-point draw roller type. The pushrods shall be turned edgewise at the outward supports and have a cross section of 0.25 in. thick by 0.75 in. wide, minimum.

(j) When the door is closed and latched, the door shall be locked.

(1) The locks and handles shall be on the right side of the front door and the left side of the rear door.
(2) The lock and lock support shall be rigidly mounted on the door.
(3) In the locked position, the bolt throw shall extend a minimum of 0.25 +/-0.03125 in. into the cam area.
(4) A seal shall be provided to prevent dust or water entry through the lock opening.

(k) The locks shall be compatible with the Administration's existing dead bolt cabinet locks, and key hole cover and be keyed for a number 2 key.

(1) One key shall be supplied with each lock.
(2) The keys shall be removable in the locked position only.
(3) The lock body, key receptacle, and keyhole cover shall be brass.

(l) The locks shall have rectangular, spring loaded bolts. The bolts shall have a 0.375 in. thick (tolerance: +/-0.035 in.).

(m) The center latch cam shall be fabricated of a minimum thickness 0.1875 in. steel or aluminum.

(1) The bolt surface shall horizontally cover the cam thickness.
(2) The cam shall be structured to only allow the door to open when the handle is moved toward the center of the door.

(n) Rollers shall have a minimum diameter of 0.875 in. with nylon wheels and steel ball bearings.

(o) The housing ventilation including intake, exhaust, filtration, fan assembly and environmental control are as follows:

(1) The front and rear doors shall be provided with louvered vents. The louvered vent depth shall be a maximum of 0.25 in.

(2) A removable and reusable air filter shall be housed behind the door vents.
(a) The filter shall be 16 in. wide by 12 in. high by 1 in. thick.
(b) The filter area shall cover the vent opening area.

(3) A filter shell shall be provided that fits over the filter providing mechanical support for the filter.
(a) The shell shall be louvered to direct the incoming air downward.
(b) The shell sides and top shall be bent over a minimum of 0.25 in. to house the filter.
(c) The filter in its shell shall be held firmly in place with a bottom bracket and a spring loaded upper clamp.

No incoming air shall bypass the filter.

The bottom filter bracket shall be formed into a water-proof sump with drain holes to the outside housing.

(p) The intake (including filter with shell) and exhaust areas shall pass a minimum of 60 cubic feet of air per minute for the Type 332/334 Cabinet.

(q) The housing shall be equipped with dual electric fans with ball or roller bearings and a capacity of at least 100 cubic feet of free air delivery per minute each. The fans shall be mounted within the housing with a finger guard, and vented.

(1) The fans shall be thermostatically controlled and shall be manually adjustable to turn on between 33 C and 65 C with a differential of not more than 6 C between automatic turn

on and off.

(2) The fan circuit shall be protected at 125 percent of the fan motor ampacity.

(3) The manual adjustment shall be graded in 10 C increment scale.

(r) The housing shall be equipped with a heater rated for traffic cabinet use installed in the bottom, and conforming to the following requirements.

(1) The heating element shall be rated at 500 watts and have a minimum output of 1700 BTU/hr.

(2) The heating element shall have a built-in quick response thermostat with sealed contacts with a temperature control range of 40 F to 100 F, and a built-in thermal cut-off to automatically turn off the heater in case of overheating.

(3) The heating element shall have a protective cover with vent holes to prevent damage to adjacent wires or burns to service personnel.

(s) Each cabinet shall be supplied with traffic cabinet-rated modular LED light assemblies, located vertically on both sides of the front and rear door frames to provide uniform illumination of the cabinet interior.

(1) Cool White: 5000K

(2) Operating Temperature: -10C to +40C Free air or cabinet mounted.

(3) 24 Volt

(4) 280 lumens per single module.

(5) Class 2 Power supply included.

(6) Switched to activate whenever either door is opened.

(7) UL-2108 Approved

(t) Hinges and Door Catches - Two-bolt per leave hinges shall be provided to bolt the enclosure to the door.

(1) The housing doors shall have 4 hinges.

(2) Each hinge shall be 3.5 in. minimum length and have a fixed pin.

(a) The pin ends shall be welded to the hinge and ground smooth.

(b) The pins and bolts shall be covered by the door edge and not accessible when the door is closed.

(u) Front and rear doors shall be provided with catches to hold the door open at both 90° and 180°, +/-10°.

(1) The catch minimum diameter shall be either 0.375 in. for plated steel or aluminum rods or 0.25 in. for Stainless steel.
(2) The catches shall be capable of holding the door open at 90 in a 60 mph wind acting at an angle perpendicular to the plane of the door.

(v) Each cabinet shall be supplied with a heavy duty plastic envelope to store site plans, wiring diagrams, schematics, etc.

(1) This envelope shall have metal grommets so that it hangs from the door hooks.
(2) The envelope shall have minimum dimensions of 10 in. x 15 in.

Rack Assembly. A standard EIA 19 in. rack assembly shall be installed inside the housing for mounting of the controller unit and cabinet assemblies.

(a) The EIA portion of the rack shall consist of 2 pairs of continuous, adjustable equipment mounting angles.

(b) The angle nominal thickness shall be either 0.1345 in. for plated steel or 0.105 in. for stainless steel.

(c) The angles shall be tapped with 10-32 threads with EIA universal spacing.

(d) The angles shall comply with Standard EIA RS-310-B and shall be supported at the top and bottom by either welded or bolted support angles to form a rigid framework.

(e) Clearance between the rack rails for mounting assemblies shall be 17.75 in.

(f) Two steel supporting angles extending from the front to the back rails shall be supplied to support the controller unit.

(1) The angles shall be designed to support a minimum of 50 lbs. each.
(2) The horizontal side of each angle shall be a minimum of 3 in.
(3) The angles shall be vertically adjustable.

(g) The rack assembly shall be bolted to the cabinet at 4 points, via the housing guide frame supports and associated spacer brackets, 2 at the top and 2 at the bottom of the rails.

(h) The rack frame shall be centered within the cabinet.

(i) Each cabinet rack shall be equipped with one fixed shelf and one pull-out drawer as described below. Shelves shall be the full width of the rack and 12 in. deep. Both shall be located below the main device controller (LCU for CCTV, and DMS controller for message signs).

(1) Shelves and pull-out drawers shall be constructed of 0.125 in. aluminum (minimum).
(2) The fixed shelf shall be located directly below the controller or LCU and attach to the rack assembly by using four (4) Phillips head screws to the front of the rack. It shall have a 1 in. lip turned up along the back edge of the shelf.
(3) The fixed shelf shall be designed to support a minimum of 50 lbs.
(4) The pull-out drawer (aka the "laptop shelf") shall be located below the fixed shelf and shall consist of a 2-inch deep storage compartment with a lift-up lid, hinged from the rear. The lid shall have a rubber or other non-skid surface for laptop computers or other diagnostic equipment.

Power Distribution. Type 332/334 cabinets shall be equipped with a metal-encased, split-phase load center, equipped with main breakers rated at 60 amperes for DMS, and 30 amperes for CCTV and Detectors. The panel shall be mounted on a 0.125 in. aluminum plate that spans the right side front and rear rack rails, and shall be located on the lower right-hand side of the cabinet, below the rack assembly.

(a) Main Breakers. The main breakers shall be double-pole type, so that an overload on either phase will disconnect the entire cabinet from the line.

(b) Branch Circuit Breakers. All branch circuit breakers shall be molded case single or double-pole, 120/240 volts AC, 10 000 ampere interruption capacity, supplied in a Q.O.U. mounting system. Circuit breakers shall be provided in all panel spaces as follows.

(1) Two 15-ampere and two 20-ampere single pole circuit breakers shall be provided for each side of the load center, unless the cabinet is to be used for a Dynamic Message Sign (DMS).
(2) Cabinets used for Dynamic Message Signs shall have one double-pole 40- ampere breaker, and four 15-ampere single-pole breakers (two per phase).

(c) GFI. One convenience Ground Fault Interrupter dual electrical outlet shall be provided on the cabinet wall adjacent to the load center. This outlet shall be wired to remain energized at all times. Circuit interruption shall occur on 6 ma of ground-fault current and shall not occur on less than 4 ma of ground-fault current.

(d) Main Power Surge Suppression. All Type 332/334 cabinets shall be provided with main input power surge suppression (See SURGE SUPRESSION). The surge suppression equipment shall be located adjacent to the load center.

Service Panel. All cabinets shall have an aluminum service panel, containing electrical outlets and other associated equipment.

(a) Viewed from the front door, the Service Panel shall be mounted on a 0.125 inch thick aluminum plate that is mounted between the left-side rack rails at the upper left-hand side of the cabinet.

(b) The service panel shall be equipped with a metal-encased box with two, grounded, duplex outlets.

(c) The outlet box shall be wired to one of the 15-ampere circuit breakers specified above.

Panels: Mechanical. All panels shall be fabricated from 0.125 in. sheet aluminum.

(a) All panels shall be drilled and tapped, as necessary, to mount the terminal blocks, handi-box outlets, and other devices described herein, as well as to mount the panels to the required locations inside the cabinet.

(b) Sharp edges or burrs caused by the cutting or drilling process shall be removed.

(c) Details for all panels shall be submitted with the cabinet catalog cuts, showing the locations of all devices to be mounted.

Cabinet Wiring.

(a) All conductors that carry AC power shall be encased in an appropriately-sized, continuous flexible metal conduit (sheath) from their origination point to their destination, as follows.

(1) Main Power: From a depth of at least 3 in. inside the main power conduit from the cabinet entry point to the Load Center.
(2) Branch Circuits: Between the load center and each individual circuit: GFCI outlet, service panel duplex outlets, and heater and fan circuit thermostats, and those thermostats and their respective components.

Flexible metal conduit shall be properly terminated at each panel or device box in accordance with the latest edition of the NEC.

(b) All conductors used in cabinet wiring shall terminate with properly sized non-insulated or clear insulated spring-spade type terminals except when soldered for a specific application.

(c) All conductors, except those which can be readily traced, shall be labeled. Labels attached to each end of the conductor shall identify the destination of the other end of the conductor.

(d) All conductors shall conform to the following color-code requirements.

(1) The neutral conductors of AC circuits shall be identified by a continuous white or gray color.
(2) The equipment grounding conductors shall be identified by a solid green color.
(3) The ungrounded AC+ conductors shall be identified by a solid black wire.

(e) All wiring harnesses and sheaths shall be neat, firm, and routed to minimize crosstalk and electrical interference.

(1) Cabling shall be routed to prevent conductors from being in contact with metal edges.
(a) Cabling shall be arranged so that any removable assembly may be removed without disturbing conductors not associated with that assembly.
(b) Adhesive-type cable clamps shall not be accepted.

(2) All cable assemblies consisting of three (3) or more wires/cables shall be wire wrapped.

Cabinet Installation.

(a) Mounting. Securely fasten Detector Cabinets-Type 332/334 on new or modified concrete bases, in pole-mounted configurations as shown on the Plans, or as directed by the Engineer. New foundations shall be incidental to the cabinet item.

(1) Bolted stainless steel connections shall be provided with lockwashers, locking nuts, or other approved means to prevent the connection nuts from loosening.
(2) Dissimilar materials shall be isolated from one another by stainless steel fittings.
(3) Cabinets shall have a continuous neoprene gasket between the base and the foundation to prevent the ingress of water and other contaminants.

(b) Power Connections. Make all power connections to the Type 332/334 cabinet.

(1) The neutral bus shall be isolated from the cabinet and equipment ground.
(2) The bus shall terminate at the neutral lug ultimately attached to the meter pedestal.

(c) Equipment Connections. Make all equipment connections within the Type 332/334 cabinet to provide the required operation.

Testing. After the equipment specified in the Contract Documents has been installed, and all and connecting cabling has been installed, a field test shall be conducted for each cabinet.

(a) The test is designed to demonstrate that all hardware, cable, and connections furnished and installed operate correctly and that all functions are in conformance with the Specifications.

(b) The field test will begin within 48 hours after the Engineer is advised by the Contractor that he is ready to begin the test.

(c) The test may begin when the Contractor is satisfied that all work has been completed at each cabinet location. After the cabinet and equipment has been placed in operation, demonstrate that all equipment furnished and installed operates as specified herein.

(d) Each cabinet and its associated equipment shall be tested for proper operation for 30 consecutive days.

(1) During the testing period, all Contractor-provided equipment in the cabinet shall operate without failures of any type.
(2) If any component malfunctions or fails to provide the capabilities specified herein, during

the 30-day test period, the replace or repair the defective equipment within 48 hours or notification by the Engineer.

(3) The cost of correcting component malfunctions shall be borne by the Contractor.

(4) After a component malfunction has been corrected to the satisfaction of the Engineer, a new 30-day test period shall be started.

(a) The 30-day test applies only to Contractor-furnished hardware.

(b) In the event of a failure of hardware furnished by others that prevents the 30- day test from continuing, the test shall be suspended until the non-Contractor furnished hardware has been repaired or replaced.

(c) The cost of correcting malfunctions in Contractor-furnished equipment shall be borne by the Contractor.

(e) After a component malfunction has been corrected to the satisfaction of the Engineer, a new 30-day test period shall be started.

(1) The 30-day test applies only to Contractor-furnished hardware.

(2) In the event of a failure of hardware furnished by others, or failure of detector hardware, that prevents the 30-day test from continuing, the 30-day test will be suspended until the other hardware failures are corrected, at which time the test will resume.

(f) Documentation. The equipment supplier shall provide three sets of operating manuals, service manuals, and maintenance instructions for all components of the system.

MEASUREMENT AND PAYMENT.

ITS Equipment Cabinets. This work will be measured and paid for at the contract unit price each for each Type 332/334 that is furnished, installed and accepted. The payment shall be full compensation for the Type 332/334 cabinet, concrete cabinet foundation, neoprene gasket, racks, assembly cables, connections, all testing, labor, tools, materials, painting (if necessary), and incidentals necessary to complete this work.

Dynamic Message Signs (DMS). Type 332/334 cabinets supplied by manufacturers with their DMS will not be measured separately, but the cost shall be incidental to the price bid for each DMS furnished and installed. The cost shall include the cabinet, concrete cabinet foundation, neoprene gasket, and all necessary equipment, including the sign controller, racks, assembly cables, connections, testing, labor, tools, materials, painting (if necessary) and incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

UTILITY CONNECTIONS AND UTILITY STAKEOUT

DESCRIPTION. Provide utility connections, and utility stakeout, as specified in the Contract Documents or as directed by the Engineer.

MATERIALS.

Disconnect Switches and Utility Connections 950.13.10

CONSTRUCTION. Arrange a meeting with the utility company representatives, Traffic Operations Division representatives, the Engineer and the District Utility Engineer, as specified in the Contract Documents to establish a schedule for utility connections before any equipment or material is installed.

Do not disconnect, de-energize, reconnect, tamper with, or otherwise handle any of a utility company's facilities. The Contractor shall be responsible for the utility service connections to the utility company's supplied point of service.

Make the necessary arrangements with the utility companies to insure having needed utilities available at the time of turn on. Any utility energization, connection or disconnection delays will not be considered a valid reason for any work time extension claim. Report difficulties in securing utility company services to the Engineer, at the earliest possible time.

Utility Stakeout. Notify the appropriate agencies listed in the Contract Documents, and those listed below a minimum of 72 hours (excluding weekends and holidays) prior to the Contractors anticipated beginning of any underground work.

(a) In Montgomery County, request Montgomery County (240-777-2100) to stakeout their ITS and signal facilities.

(b) Request the Statewide Operations Center (800-543-2515) to stake out SHA fibreoptic and communication cables.

(c) Request the Communications Division (410-747-8590) to stake out ITS devices.

(d) Request appropriate RME to stake out lighting.

(e) Notify the Hanover Complex Signal Shop (410-787-7652) of all requests for signal and ITS stakeouts.

Plan the work to minimize interference with any existing traffic control devices.

Existing equipment shall remain in its original condition until the new equipment has been completed, satisfactorily tested and its operation accepted by the Engineer.

MEASUREMENT AND PAYMENT.

Utility Connection. Utility Service Equipment Connections will be measured and paid for as specified in 807.04.01.

All utility company energization, connection or disconnection costs will be the responsibility of the Administration.

Utility Stakeout. Utility Stakeout will not be measured but the cost will be incidental to other pertinent items specified in the Contract Documents.

CATEGORY 800
TRAFFIC

WARRANTIES

DESCRIPTION. Provide equipment and system warranties on a per work assignment basis as specified in the Contract Documents. The Administration reserves the right to accept for maintenance self-standing subsystems in advance of a total systems-wide acceptance.

MATERIALS. Not Applicable.

CONSTRUCTION.

Contractor's Warranty. The Contractor shall provide a system performance assurance warranty program for all equipment furnished for a period of one year from the end of the system startup period.

Acceptance for maintenance will be predicated upon the completion of the Contractor's Warranty period.

This warranty shall apply to the entire system, and shall include the following.

(a) Two scheduled preventative maintenance checkups (at 6 months and the end of the warranty period).

(b) Emergency on-site maintenance or repair, completed within 24 hours of notification by Administration personnel.

(c) In the event the defective equipment cannot be repaired within 24 hours, the Contractor shall install "loaner" equipment to restore system operation until repairs are complete to the defective equipment.

(d) Any defective parts identified during the performance assurance warranty program shall be replaced at no cost to the Administration.

Manufacturers' Warranties. Manufacturers' standard warranties that extend beyond the Contractor's Warranty period shall automatically transfer to the Administration.

The Contractor shall inform the manufacturer of this requirement prior to purchase of the equipment, and provide a written agreement of compliance from the manufacturer to the Engineer.

MEASUREMENT AND PAYMENT. Warranties will not be measured, but the cost will be incidental to the contract unit price for the components of each pertinent system furnished and installed. The payment shall be full compensation for all testing, labor, tools, materials, and incidentals necessary to complete this work.

CATEGORY 800
TRAFFIC

WOOD POLES - CLASS II

DESCRIPTION. Furnish and install Class II wood poles as specified in the contract documents or as directed by the Engineer.

MATERIALS.

General.

Wood Poles	ANSI 05.1 Latest Revisions
Poles Conditioning	AWPA (American Wood-Preservers Association) Cl-79, latest Revision
Pole Preservatives	AWPA P8 or AWPA P9. Latest Revisions
Pole Branding	AWPA M6, latest revision
Steel Span Wire	950.09
Steel Guy Rod (Single Thimble Eye)	Diameter min. 1/2 in. - 5/8 in. 3 Bolt Clamp

Provide wood poles that are Southern Pine, Treatment Group C (steam conditioned) or treatment Group D (kiln-drying).

Provide flat roofed poles.

Perform surfacing and trimming prior to treatment.

Season the poles by air-seasoning, kiln-drying, steaming, heating in the preservative, or a combination of methods. Boulton drying is not permitted.

Shaving of all poles shall be full-length machine-shaved. The depth of cut shall not be more than necessary to remove inner bark.

There shall be no abrupt changes in the contour of the pole surface between the groundline and above the ground sections.

The lower 2 ft of poles may be trimmed to remove wood fibers causing butt flare, provided sufficient sapwood remains to obtain the minimum penetration requirements.

The following defects are prohibited:

(a) Cross Breaks (cracks).

(b) Decay, except as permitted under "decayed knots".

(c) Dead streaks.

(d) Holes, open or plugged, except holes for test purposes, which shall be plugged.

(e) Hollow butts or tops, except as permitted under hollow pith centers and defective butts.

(f) Marine borer damage

(g) Nails, spikes, and other metal not specifically authorized by this specification. All other foreign material is prohibited.

(h) Ring knots, a ring of knots consisting of four or more knots in a 3 in. section of the pole

(i) Bark knots, a knot that is undergrown and partially encased with outer bark, in excess of 3 in. diameter.

(j) Knot cluster, two or more knots grouped together as a unit with the fibers of the wood deflected around the entire unit

(k) Decayed Knots -Type II "decayed Knots" where depth of decay exceeds 1/2 in.

(l) Short Crook - A localized deviation from straightness which, within any section 5 ft or less in length, is more than 1/4 the mean diameter of the crooked section.

(m) Pole Sweep. A straight line joining the surface of the pole at the top and ground line, shall not be separated from the surface of the pole by more than 1 in. for each ten ft of pole length.

(n) Indentations, attributed to loading or handling slings, that are 1/4 in. or more deep over 20 percent or more of the pole circumference, or indentations which result from careless handling more than 1/2 in. deep at any point.

(o) Spiral grain (twist grain) exceeds one complete twist in any 20 ft.

Pole Preservative Treatment. Poles may be heated in oil-type preservatives at atmospheric pressure to facilitate penetration of preservative.

Poles to be impregnated with the preservative by application of the standard empty cell (Rueping) process shall be performed in accordance with the standard "Poles - Preservative Treatment by Pressure Processes" (AWPA C4, latest revision).

No material other than poles shall be treated with poles.

The minimum net retention of Pentachlorophenol, as determined from 20 boring samples taken from any charge, shall not be less than the following.

Minimum Retention:	(lbs. Penta/cu. ft.)
Zone Assayed	0.5 - 2.0 in.
Retention	0.45

Retention of Pentachlorophenol shall be determined by AWPA A5, latest revision.

CONSTRUCTION. The following marking and code letter information shall be legibly and permanently burn branded with characters not less than 5/8 in. high. The markings shall be placed squarely on the face of the pole at 10 ft above the pole butt end and in the butt end of each pole in the following order:

(1) Suppliers Brand.

(2) Plant Designation.

(3) Month and Year of Treatment.

(4) Code Letters; "SP" denoting Southern Pine and the preservative code, such as "P" for Pentachlorophenol in Petroleum (AWPA M-6).

(5) Retention and Assay, such as "45-A".

(6) Class and Length.

MEASUREMENT AND PAYMENT. Class II Wood Poles shall be measured and paid for at the contract unit price per each. The payment will be full compensation for the poles, anchors and guy rods all guy cables and connectors, labor, tools, materials, and incidentals necessary to complete this work.

CATEGORY 800
TRAFFIC

SECTION 802 — GALVANIZED STEEL BEAM SIGN POSTS

802.02 MATERIALS.

ADD: The following to the end of the materials list.

Structural Tubing	A500, Grade B

802.04 MEASUREMENT AND PAYMENT.

DELETE: The first sentence in section 802.04.

INSERT: The following.

Galvanized Steel Beam Sign Posts and Structural Tubing Sign Posts will be measured and paid for at the Contract unit price per linear foot for the various sizes of posts specified in the Contract Documents.

CATEGORY 800
TRAFFIC

SECTION 806 — LUMINAIRES AND LAMPS

806.03 CONSTRUCTION.

806.03.05 Luminaire Photometric Data and Calculations.

(b) Photometric Calculations.

ADD: The following after the seventh paragraph, "For Light Emitting … no greater than 4 to 1."

For Light Emitting Diode (LED) Underpass Luminaires, correction factors shall be applied for the lumen retention at 50 000 hours. The illuminance shall not decrease by more than 30 percent at 50 000 hours, which results in a Lamp Lumen Depreciation (LLD) factor of 0.70. Apply an additional factor of 0.9 for Luminaire Dirt Depreciation (LDD), to obtain a total maintenance factor of 0.63 for calculations. Provide a luminaire mounting height of 17.5 ft with light centers directly over the edge line of the roadway. Assume four luminaires in a straight line, parallel to the roadway, spaced at 40 ft each. Perform calculations for illuminance and luminance based on a R3 class pavement. The calculation grid shall be based on one 12 ft lane and shall be placed between the center two luminaires. Calculate two lines of points for the each lane. The first and the second line of calculation points shall be 4 ft from the left and 4 ft from the right edge lines, respectively. Start each line of calculation points directly under the second luminaire and continue every 5 ft until directly under the third luminaire. Each line shall have 9 points, and a total of 18 points shall be calculated. To be acceptable, the average maintained illuminance of all 18 points shall be 4.0 ft candles or greater with an average to minimum uniformity ratio no greater than 1.5 to 1.

ADD: The following after the last sentence in the paragraph for (d) Fixed Aim LED Luminaires.

(e) Underpass LED Luminaires. LED Underpass Luminaires shall be a complete lighting device consisting of a cast aluminum housing, LED arrays, LED drivers, terminal blocks, mounting hardware, associated hardware, all necessary wiring, and an optical assembly that provides an Illuminating Engineering Society of North America (IESNA) Type II, Type III, Type IV, or Type V distribution as specified in the contract documents. If no distribution type is specified, then the Luminaire must have an IESNA Type III distribution. Glare control optics shall be utilized when available. LED Underpass Luminaires should meet the requirements of a Full Cutoff distribution as defined by IESNA. For 480 volt operation, an integral transformer shall be provided to reduce the voltage.

806.04 MEASUREMENT AND PAYMENT.

ADD: The following after the second paragraph.

LED Underpass Luminaires will be measured and paid for at the Contract unit price per each. The payment will be full compensation for the LED Underpass Luminaire and drivers, mounting hardware, wiring, integral transformer, and all materials, labor, equipment, tools, and incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

SECTION 807 — ELECTRICAL SERVICE EQUIPMENT

DELETE: 807.03.02 Base Mounted Metered Service Pedestal in its entirety

INSERT: The following.

807.03.07 Base Mounted Metered Service Pedestal. Base Mounted Metered Service Pedestals shall consist of a base-mounted aluminum pedestal containing a 200 Amp 2 pole main circuit breaker for service disconnect, branch circuit breakers; and integral meter socket. The pedestal shall have the option of being ordered with the meter socket facing to the front or back, as shown in the Contract Documents. All conduit stub-outs shall extend 6 in. beyond the edge of the foundation and shall be arranged as shown in the contract documents.

Design the Base Mounted Metered Service Pedestal for pad mounting using 18-in. long anchor bolts. The pedestal shall measure 16 in. wide, 17 in. deep, and 48 in. tall. The post and meter socket shall meet NEMA 3R. Provisions shall be provided to padlock the customer service side door closed to protect the circuit breakers, and to install a utility company seal to secure the meter. The meter shall be protected by a hinged hood.

Main circuit breakers shall consist of an industrial-grade, F-frame style circuit breaker. Branch circuit breakers shall consist of industrial grade, QC-style circuit breakers mounted on non-energized clips. Internal cables between the terminal block and the breakers shall be number 4 AWG THHN.

Unless otherwise specified in the Contract Documents, provide breakers as follows:

(a) 1 - 100-amp double-pole breaker
(b) 1 - 60-amp double-pole breaker
(c) 1 - 30-amp double-pole breaker
(d) 1 - 60-amp single-pole breaker
(e) 2 - 30-amp single-pole breakers

Breakers shall be arranged to provide an equal total load per phase.

Base Mounted Metered Service Pedestals shall be UL508 listed "Suitable for Service Equipment," and shall be acceptable to the local utility companies for use as a service connection.

807.04 MEASUREMENT AND PAYMENT.

DELETE: 807.04.03 in its entirety

INSERT: The following.

807.04.03. Base Mounted Metered Service Pedestal will be measured and paid for at the Contract unit price per each. The payment will be full compensation for all enclosures, panel boards, circuit breakers, internal wiring, wiring devices, meter sockets, meter, shunts, cover plates, wiring and all materials, labor, equipment, tools, concrete, and incidentals necessary to complete the work. Concrete foundation for the Base Mounted Metered Service Pedestal shall be incidental to the Base Mounted Metered Service Pedestal.

CATEGORY 800
TRAFFIC

SECTION 810 — ELECTRICAL CABLE, WIRE AND CONNECTORS

810.03 CONSTRUCTION.

810.03.03 Preassembled Cable Duct.

DELETE: The second paragraph beginning "After backfilling…or a rubber device." in its entirety.

INSERT: The following.

After backfilling, demonstrate that the conductors move freely within the duct by pulling the conductors out a minimum length of 2 ft. Pulling Tension shall conform to 810.03.02. Then, pull the cable back to its original position and install the cable duct end seals. Completely seal cable duct ends using a waterproof removable sealing compound, a molded plastic device, or a rubber device. After installation of the cable duct end seals, but prior to installing connector kits or splices, perform electrical circuit testing as specified in 820.03.02 (b) and record the results. Record the length of cable, locations of both ends of the cable duct, and the insulation resistance on a form acceptable to the Engineer, and forward the form to the Engineer.

810.04 MEASUREMENT AND PAYMENT.

810.04.01.

ADD: The following after the last sentence in 810.04.01.

Cable end duct seals will not be measured, but their cost will be incidental to the linear foot cost for the duct cable. Preassembled Cable Duct that has not had the required electrical tests performed and reported to the engineer will not be measured or paid for.

CATEGORY 800
TRAFFIC

SECTION 811 — ELECTRICAL HAND HOLES, MANHOLES, PULL AND JUNCTION BOXES

811.02. MATERIALS.

811.02.02 Manholes.

ADD: The following at the end of the list of materials.

PVC Underdrain	905

811.03 CONSTRUCTION.

811.03.01 Hand Holes and Manholes.

DELETE: The first paragraph "Install hand holes…other sealer as directed"

INSERT: The following.

Install hand holes and manholes flush to drain with the finished grade. Mix, place and test concrete as specified in section 420. Install aggregate or 6 in. PVC drain as required. Outlet the underdrains into drainage structures whenever possible. Outlets that empty into a drainage structure shall be at least 9 in. above the normal flow line in the structure and be constructed of solid smooth wall underdrain outlet pipe. Maintain at least 18 in. of cover over the pipe. Rodent screens are not required when an underdrain outfalls into a drainage structure. When outfalled into a slope or ditch, slope the outlet pipe at least 3 percent. Use solid smooth wall PVC pipe as specified in section 905. Excavate and backfill in accordance with Section 809.03. When installing hand holes and manholes in sidewalks, remove and reinstall the sidewalk to the nearest joint. Fill or patch spaces between conduit and the hand hole and manhole wall with concrete or other sealer as directed.

ADD: The following.

811.03.03 Adjusting Handhole or Manhole to Grade and Replace Frame and Cover. Remove existing handhole or manhole frame and cover. Adjust vertical elevation of concrete or brick handhole or manhole by removing material or installing additional bricks or concrete. Install frame and cover. Mix, place and test concrete as specified in Section 420 to be level with final grade. Install concrete collar.

For locations where handholes or manholes are installed in sidewalk, the handhole shall not create a vertical step of 0.25 in. or greater.

811.04 MEASUREMENT AND PAYMENT

ADD: The following at the end of the paragraph.

The 6 in. PVC drain shall be measured and paid for at the contract unit price per linear foot. Excavation for the 6 in. PVC drain shall be incidental to the linear foot bid item.

Adjust Handhole or Manhole to Grade and Replace Frame and Cover will be measured and paid for at the Contract unit price per each. The payment will be full compensation for all remove of existing frame and cover, adjusting vertical elevation of existing handhole or manhole, concrete repair of existing handhole or manhole, excavation, aggregate, concrete, concrete collar, frame, cover, bolts, bricks, pipes, backfill, sealer, and for all materials, labor, equipment, tools, and incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

SECTION 814 — SIGNAL HEADS

814.01 DESCRIPTION.

ADD: The following after the first paragraph.

Furnish and install Aluminum and Polycarbonate 8 in. and 12 in. vehicle traffic control signal heads and hardware with LED Green, Yellow, and Red indications, as specified in the Contract Documents or as directed by the Engineer. All signal housing shall have a black face and yellow housing.

814.02 MATERIALS.

ADD: The following to the end of the list of materials.

LED Traffic Signal Modules	"Section 800 LED TRAFFIC SIGNAL MODULES"
ALL Red and Green Traffic Signals	COMAR 14.26.03
(LED or Incandescent)	(Certification of compliance with Maryland Energy Efficiency Standards)

814.04 MEASUREMENT AND PAYMENT.

ADD: The following after the first paragraph.

Aluminum and Polycarbonate LED Signal heads will be measured and paid for at the contract unit price per each section of signal head type and size as specified in the Contract Documents. The LED signal heads will have the LED module fitted into the housing assembly. The payment will be full compensation for the housing, LED signal module, and, mounting hardware, assembly, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

SECTION 816 — TRAFFIC CONTROL DEVICE CABINETS AND EQUIPMENT

816.04 MEASUREMENT AND PAYMENT.

DELETE: 816.04.02 in its entirety.

INSERT: The following.

816.04.02 Concrete foundations for Traffic Control Devices and Equipment will not be measured and paid for, but will be incidental to the pertinent traffic control cabinet item.

CATEGORY 800
TRAFFIC

SECTION 819 — STEEL SPAN WIRE

819.01 DESCRIPTION.

DELETE: The description paragraph in its entirety.

INSERT: The following.

Furnish and install steel span wire for signal head or sign mountings, interconnect runs, backguying, overhead communications cable pole to pole guying, overhead communications cable slack, span overhead communications cable, false dead ends or for tethering purposes.

819.03 CONSTRUCTION.

DELETE: The paragraph "Attach the span wire…free end of 2 ft."

INSERT: The following.

Attach the span wire to the signal structure by wrapping two full turns of the span wire around the structures at the specified height leaving a free end of 2 ft.

ADD: The following after the third paragraph.

Install overhead communications cable steel span wire back guying, pole to pole guying, false dead ending and slack spans on all utility owned poles in accordance with the utility pole owners requirements. Install ram head type guy hooks for overhead communications cable steel span wire back guying, pole to pole guying, false dead ending and slack spans on all utility owned poles. Use wrap type guy grips to terminate the ends of overhead communications cable steel span wire back guying, pole to pole guying, false dead ending and slack spans. Strandvise devices shall not be used to terminate the steel span wire ends of overhead communications cable steel span wire back guying, pole to pole guying, false dead ending and slack spans.

CATEGORY 800
TRAFFIC

SECTION 822 — REMOVE AND RELOCATE EXISTING SIGNS AND SIGN STRUCTURES

DELETE: 822.04.02 in its entirety

INSERT: The following.

822.04.02 Remove Signs from Existing Overhead Structure will be measured and paid for at the Contract unit price per square foot area of the sign. Removal of sign and sign luminaire supports, luminaires, catwalks, sign lighting maintenance system, conduit and cable will not be measured but the cost will be incidental to the Contract unit price for removing the signs.

CATEGORY 900
MATERIALS

SECTION 900 – GEOSYNTHETIC REINFORCEMENT FOR REINFORCED SOIL SLOPE

GEOSYNTHETIC REINFORCEMENT. Geosynthetic material for the Reinforced Soil Slopes (RSS) shall be a geotextile or geogrid. The material shall be manufactured from high strength polypropylene (PP), high density polyethylene (HDPE), or high tenacity polyester (PET). The material shall have a high resistance to damage during construction, to ultraviolet (UV) degradation, and to all forms of chemical and biological degradation. The Geosynthetic Reinforcement used for the RSS shall be in conformance with the design and construction requirements specified and the minimum properties listed below.

GEOTEXTILE. Geotextile may be woven or nonwoven, possess a high tensile strength, shall meet the following requirements:

Geotextile Property	ASTM Test Method	Minimum Geotextile Property requirements
Tensile Strength	D 4595	-
Seam Strength	D 4884	-
Puncture Resistance	D 6241	-
Ultraviolet(UV) Radiation Stability	D 4355	70% (for polypropylene and polyethylene) and 50% (for polyester) strength retained min. after 500 hours in a xenon arc device
Apparent Opening Size (AOS)	D 4751	-
Water Permittivity	D 4491	-

GEOGRID. Geogrid shall be a regular network of integrally connected polymer tensile elements with aperture geometry sufficient to permit significant mechanical interlock with surrounding soil or rock. The geogrid structure shall be dimensionally stable and able to retain its geometry under construction stresses. The long chain polymers in the geogrid tensile elements not including coatings shall consist at least 95% by mass of the material of polyolefins or polyesters. The material shall be free from defects, cuts and tears. An allowable tensile strength of 3000 lbs/ft for the geogrid is required.

The summation of the geogrid joint strengths determined in accordance with Geosynthetic Research Institute test method GRI: GG2 occurring in a 12 inch length of grid in the direction of loading (perpendicular to the RSS face) shall be greater than or equal to the ultimate strength (T_{ult}) of the grid element to which they are attached. For this determination, T_{ult} is to be

determined using Geosynthetic Research Institute test method GRI: GG1. If the joint spacing is greater than or equal to 12 inches, two joints shall be included in this summation of joint strengths.

GEOSYNTHETIC TESTING: In addition to the tests specified above, the following tests shall be used where applicable.

Geoynthetic property	**Geosynthetic type**	**Type of Testing**	**Remark**
Ultimate tensile strength, T_{ult}	Geotextile	ASTM D 4595	Ultimate strength values based upon Minimum Average Roll Values (MARV) determined in conformance with D 4759
	Geogrid	GRI: GG1	-
Creep Testing	Geotextile	ASTM D 5262	Test conducted for a minimum duration of 10,000 hours
	Geogrid		
Joints, Seam, and Connections	Geotextile	ASTM D 4884	-
	Geogrid	GRI: GG2	
Pullout Resistance	Geotextile	GRI – GT7	Pullout resistance of the geosynthetic defined by the lower value of: **(a)** the ultimate tensile load required to generate outward sliding of the reinforcement through the soil mass; or **(b)** the tensile load which produces a 1.5 inch displacement.
	Geogrid	GRI - GG5	
Ultraviolet(UV) Radiation Stability	Geotextile	D 4355	-
	Geogrid		

DETERMINATION OF ALLOWABLE TENSILE STRENGTH

Allowable Tensile Strength. Allowable tensile strength (Ta) of the geosynthetic shall be determined using partial factors of safety approach. The Allowable Tensile Strength shall be determined using the following formula:

$$T_a = T_{ult} / (FS_{CR} \times FS_{ID} \times FS_{CD} \times FS_{BD} \times FS_{JNT})$$

Where:

T_a = Allowable tensile strength,(plf)

T_{ult} = Ultimate tensile strength, (plf)
FS_{CR} = Partial factor of safety for creep deformation, (dimensionless);
FS_{ID} = Partial factor of safety for installation damage, (dimensionless);
FS_{CD} = Partial factor of safety for chemical degradation, (dimensionless);
FS_{BD} = Partial factor of safety for biological degradation, (dimensionless);
FS_{JNT} = partial factor of safety for joints (Seams and connection), (dimensionless).

Partial factors of safety shall be developed from the test results provided with the geosynthetic material certification. The following limitations shall also apply:

Creep. The partial factor of safety for creep shall be based on actual testing. The use of a default value for the partial factor of safety for creep shall not be allowed unless approved by the Engineer.

Durability. The combined chemical and biological durability factor used in design shall not be less than 1.2. Polymer and filler and additives used for geosynthetic shall not be susceptible to biological degradation by micro organisms such as fungi.

Joints, Seams, and Connections. The value of FS_{JNT} shall be the ratio of the unjointed specimen strength to the jointed specimen strength.

Partial Factor of Safety Values. The partial factors of safety values below shall be used as default factors for the computation of allowable tensile strength, as determined.

INSTALLATION DAMAGE	CREEP	CHEMICAL DEGRADATION	BIOLOGICAL DEGRADATION	JOINT/SEAM DAMAGE
3.0	5.0	2.0	1.3	2.0

CERTIFICATION. Provide certification in conformance with TC 1.03 that the geosynthetic reinforcement material conforms or exceeds the material properties specified and the construction and design requirements specified. The Contractor may be required to supply test data from an Administration-approved laboratory to support the certified values submitted.

The certification package shall conform to TC 1.02 and include the following:

(a) Polymer and additive composition of the geosynthetic, including polymer and additive composition of any coating materials.

(b) Practical applications of material use with descriptions and photos.

(c) Limitations of the material.

(d) Sample long-term design strength and interaction values, and index property specifications including coating thickness if applicable.

(e) Manufacturer's Quality Control plan including properties, test methods, frequency of testing, tolerances and method of resolution for out-of-specification material.

(f) The details of the secondary reinforcement, including material type, spacing, properties, and construction details.

(g) Local supplier.

(h) Laboratory test results shall document the following:

i. Creep performance over a range of load levels, for minimum duration of 10 000 hours. Along with comprehensive literature review, documenting extrapolation of creep data to a 75 year design life.

ii. A literature review documenting values for partial factor of safety for installation damage and extrapolation techniques and chemical resistance of all material components of the geosynthetic and values for partial factor of safety for chemical degradation. Along with documentation for biological resistance of all material components of the geosynthetic and values for partial factor of safety for biological degradation.

iii. The ultimate strength and supporting laboratory testing data.

iv. Joint (seam and connections) strength values for partial factor of safety for joints and seams, along with documentation showing long-term pullout interaction coefficients for various soil types or project specific soils.

v. Direct sliding coefficients for various soil types or project site specific soils.

vi. The apparent opening size for geosynthetic reinforcement.

SECTION 900
MATERIALS

SECTION 902 — PORTLAND CEMENT CONCRETE AND RELATED PRODUCTS

902.10 PORTLAND CEMENT CONCRETE.

ADD: The following after 902.10.10 Price Adjustment.

902.10.11 Concrete Chloride Content. C1218. Water soluble chloride ion content contributed from the water, aggregates, cementitious materials and admixtures used shall not exceed the maximum chloride ion content listed in the table below.

Maximum Water Soluble Chloride Content percent by weight of cement	
Non Reinforced Concrete	N/A
Reinforced Concrete	0.15
Prestressed Concrete	0.06

902.11 MORTAR FOR GROUT.

ADD: The following after 902.11 (e).

902.11.01 Chloride Ion Content. C1218. Refer to Items (a), (b) and (c) above. Water soluble chloride ion content for each lot of grout shall not exceed 0.06 percent by weight of cement when tested. Chloride ion content shall be independently tested prior to placement.

Perform chloride ion concentration testing on the grout (before the addition of water) at least once per project and a minimum of every 40 000 lb of material produced.

CATEGORY 900
MATERIALS

SECTION 908 — REINFORCING STEEL

INSERT: the following after paragraph 908.12.

908.13 Low Carbon Chromium Bars.

A1035, Type CM or CS, Grade 100 or 120. Low carbon chromium bars may be used in lieu of epoxy powder coated plain or deformed bars. Deformed low carbon chromium bars shall meet A615 for cross sectional area and deformations.

CATEGORY 900
MATERIALS

SECTION 908 — REINFORCING STEEL

908.11 STEEL STRAND.

DELETE: The sentence.

INSERT: The following.

M 203, Grade 270 Low Relaxation Strand.

CATEGORY 900
MATERIALS

DELETE: SECTION 909 — METALS in its entirety.

INSERT: The following.

SECTION 909 — METALS

909.01 CERTIFICATION. TC-1.03. The metal producer shall furnish certification as specified. Certification shall include actual mill test results and the chemical and physical properties of the finished metal products.

909.02 STRUCTURAL STEEL. Structural steel shall meet the following:

(a) M 270, Zone 2. All primary load carrying members shall meet the supplementary toughness requirements.

(b) Primary load carrying members are as follows or as specified.

(1) Finger joint steel from which saw tooth configurations have been cut, all stringers, cover plates, bearing stiffeners, splice plates, pins and pin links for straight rolled steel beam bridges; all flanges, webs, bearing stiffeners, splice plates, pins and pin links for straight steel girder bridges.

(2) Curved rolled steel beam and steel girder bridges; all diaphragms, cross frames, lateral bracing, including connection plates to main stringers.

909.03 STEEL FOR MISCELLANEOUS USE. A 36, A 572 or A 709, Grade 36 or 50. Steel for bearings on structures shall conform to A 709, Grade 50.

909.04 WELDING MATERIALS. AWS D1.5 or D1.1 per design criteria.

909.05 GRAY IRON CASTINGS. A 48, Class 30B.

909.06 STEEL STUD SHEAR DEVELOPERS. AWS D1.5 or D1.1 per design criteria.

909.07 BOLTS, NUTS, AND WASHERS FOR GENERAL USE. Galvanize all per F2329 when required. High temperature galvanizing not allowed.

(a) Bolts, A 307.
(b) Anchor bolts F1554, Grade 36.
(c) Washers, F 436.
(d) Nuts, A 563, Grade A.

909.08 HIGH STRENGTH FASTENERS, BOLTS, NUTS, AND WASHERS. F3125, Grade A325, Type 1 or 3. High temperature galvanizing is not allowed.

(a) Galvanize Type 1 per F 2329 when required.
(b) Use A325, Type 3 on weathering steel.
(c) Washers and nuts shall meet A325 -Table 1.

Perform rotational capacity testing on all high strength fasteners per MSMT 710.

909.09 ANCHOR BOLTS, NUTS, WASHERS FOR TRAFFIC SIGNALS, HIGHWAY LIGHTING, AND SIGNS.

(a) F 1554, Grade 55 S1.

(b) Anchor bolts, galvanized for the full length of the threads and at least 3 in. below the threads.

(c) Nuts, heavy hex, A 194, Grade 2H or A 563, Grade DH.

(d) Flat washers, heavy washers, F 436.

(e) Galvanized per F 2329. High-temperature galvanizing is not acceptable.

909.10 CAST WASHERS. Cast washers, ogee washers, and special cast washers per A 48. Hot dipped galvanized per A 153.

909.11 HARDWARE. F1667. Spikes, wood screws, staples, brads, lag screws, carriage bolts, and other parts under general hardware shall be composed of carbon steel.

909.12 STEEL FORMS. A 653, Designation SS, Grades 33 through 80S. Steel bridge deck forms and deck form supports that remain in place shall be fabricated as specified. Steel forms shall be coated per Coating Designation G 165. The minimum thickness of uncoated steel shall be 0.0359 in.

CATEGORY 900
MATERIALS

SECTION 915 — PRODUCTION PLANTS

915.02 ASPHALT PLANTS

DELETE: The second sentence in 915.02 (f)(2).

915.02.03 Responsibilities of the Administration.

DELETE: Dispute Resolution in its entirety.

INSERT: The following.

Dispute Resolution. Following is the procedure to resolve conflicts resulting from discrepancies between test results from the Office of Materials Technology's (OMT) Asphalt Technology Division or their designated AASHTO accredited third-party testing laboratory and the producer.

Verification. The producer and/or Project Engineer will provide a written dispute to OMT'S ATD Chief describing the nature of the dispute along with any pertinent information. Also provide OMT's Deputy Director for Material Quality with a copy of the written dispute.

The written dispute must be filed within five business days after receiving QA data from OMT. If the dispute was filed by the producer only, then OMT will inform the Project Engineer. The dispute will only be considered for review if test results are outside the multi-lab or operating tolerance limits for any particular test of concern.

ATD's Assistant Division Chiefs will review the pertinent information and report to the Chief. The Chief will report the findings of their review to the producer. This process will take three business days from the day written notification was received. This level will identify if further investigation or retesting is required.

Check Testing. Check testing will be performed on a split sample from the next day's production by the producer and OMT's Central Laboratory to determine any sampling/testing errors. The Producer and/or OMT can witness the testing performed by each laboratory if requested.

Verification and Check Testing will be completed within three to five business days from the day of the agreement and will focus on the questionable test results. If the issue is still not resolved, refer to Third-party Testing.

Third-party Testing. The producer and OMT will employ an AASHTO accredited laboratory to perform testing using split of the original sample. The lab whose test results vary the most from the test performed by the third-party lab will pay for the testing. The new test results will replace the original test results in the pay factor calculations. Third-party results will be considered binding unless the dispute is resolved without third-party testing, then mutually agreed upon test results will be considered binding. Testing shall be completed by the third-party testing laboratory within ten (10) business days of sample receipt.

Dispute Resolution Process for Discrepancies Related to Non-Test Results: The resolution process for non-test related disputes (pay factor calculations, turnaround times or mix design approvals) of sufficient magnitude to impact payment is as follows:

(a) When a non-test related dispute arises, the producer or Project Engineer will file a written dispute with the ATD Chief describing the nature of the dispute along with the pertinent information. The OMT Deputy Director of Material Quality will be copied on all written disputes. The written dispute must be filed within five business days from when the issue arises.

(b) The ATD Chief or Deputy Director of Material Quality will appoint a panel of three members to provide recommendations to resolve the dispute. The panel will include a member selected by the asphalt industry.

(c) The panel will make recommendations to the ATD Chief within five business days from the appointment.

(d) The ATD Chief or Deputy Director of Material Quality will decide the disposition of the dispute based on the panel's recommendations.

(e) A written report from the panel describing all subsequent actions and final disposition of the dispute shall be included in the project records.

(f) The process will be completed within ten business days from the date of notification. If subsequent disputes arise on the same issue, the written report will be included as a resource during the resolution process.

DELETE: SECTION - 915.03 PORTLAND CEMENT CONCRETE PLANTS in its entirety.

INSERT: The following.

915.03 PORTLAND CEMENT CONCRETE PLANTS. M 157, except as modified herein, including the applicable requirements of 915.01

915.03.01 Aggregate Storage. All aggregate used in portland cement concrete shall be maintained at a uniform moisture content in excess of its saturated surface dry condition. Water used shall meet 921.01.

915.03.02 Moisture Probes. Moisture probes may be used in place of actual daily moisture testing of fine aggregate. Calibrate and maintain moisture probes per the manufacturer's recommendations.

(a) Perform actual moisture tests for fine aggregate weekly and as directed. When the actual tests of the fine aggregate indicate a difference of greater than 0.5 percent free moisture than the moisture probe readings, immediately perform a second actual test.

(b) If the second test indicates a moisture difference of greater than 0.5 percent, recalibrate the moisture probe and verify. Records of all calibrations and weekly tests shall be maintained and made available.

915.03.03 Mixing Temperatures. The plant shall be equipped with approved methods of heating and cooling the mix. The temperature of the plastic concrete shall meet 902.10.03. The temperature of the cementitious materials and water during mixing shall not exceed 170 F.

915.03.04 Load Tickets. M 157. Provide an approved computer generated batch ticket indicating the pertinent information for each load in duplicate. The ticket shall indicate maximum allowable water and maximum water allowed for jobsite slump adjustment.

Distribute load tickets as specified in 915.03.06 (c)(2). The producer's copy shall be readily available for inspection upon request. Issue a Form 116 for each load in the event a computer generated batch ticket cannot be provided.

915.03.05 Mixers and Agitators. M 157 except as follows.

(a) Operate drums during transit at agitating speed only. Mixing during transit is prohibited.

(b) Add at least 85 percent of design water requirement at the plant through the certified plant water meter.

(c) Water for slump adjustment may be added at the plant through truck water system under the supervision of the certified concrete technician, provided the maximum specified water/cement ratio is not exceeded.

(d) A maximum of 3 gal of water per cubic yard of concrete may be added at the point of discharge provided it does not exceed the maximum specified water/cement ratio.

(e) No water may be added after partial discharge of the load.

(f) Loading of mixers or agitators that contain wash water in the drum is prohibited.

(g) When the concrete is specified or permitted to be produced by volumetric batching and continuous mixing, the batching and mixing unit shall meet C 685. Calibration shall meet MSMT 558.

(h) The minimum mixing time is 75 seconds for stationary mixers not subject to mixer performance tests.

915.03.06 Certified Concrete Plant. The producer shall be responsible for quality control of plant operations to ensure that the material meets as specified. The quality control process will be subject to unannounced periodic inspection by representatives of the Concrete Technology Division (CTD). Full participation in the inspection by the plant's certified technician is required.

Initial and Annual Inspection. Any plant initially setting up and annually thereafter will be subject to a comprehensive inspection to determine whether the plant equipment and personnel meet all applicable requirements. The Administration will accept certification that the plant facilities meet all applicable requirements from either of the following:

(a) National Ready Mixed Concrete Association (NRMCA) Plant Certification Program. The Administration will review NRMCA Plant Certification Data and annually issue a written Plant Certification Approval. The Administration will perform QA visits as needed to validate the plant certification.

(b) A Professional Engineer registered in the State of Maryland with at least 5 years operational or technical experience in concrete production. The Administration will review the Engineer's inspection report and issue a written Plant Certification Approval.

(c) The Administration will conduct the inspections only if (a) and (b) are not feasible or applicable. The cost for inspection will be charged to a current Contract if applicable or to the ready mix producer if a current Contract is unavailable.

Responsibilities of the Concrete Producer.

(a) Notification. Notify CTD one working day prior to producing materials for Administration projects. Notify CTD at least five working days in advance of scheduling the comprehensive inspection.

(b) Quality Control. Have the certified concrete plant technician present while concrete is being batched and delivered to Administration projects. This technician shall supervise concrete production.

(1) Develop and use an acceptable Quality Control Plan (QCP) that addresses all elements necessary for plant quality control. Submit the QCP for review and approval at the time of the annual comprehensive inspection. The QCP shall include the names, qualifications and responsibilities of a Quality Control Manager and Quality Control Technicians.

(2) Control tests shall be performed by or under the direct supervision of the certified concrete plant technician. The technician shall perform moisture tests, adjust proportions of aggregate for free moisture, complete and sign batch or approved delivery tickets, and ensure quality control of the batching operations.

(3) Concrete Plant Technician certification will be awarded upon satisfactory completion of examinations administered by the Administration.

(4) Supply all necessary test equipment.

(5) Sampling and testing shall meet the procedures and frequencies outlined in the Material Quality Assurances Processes, Details and Frequencies manual.

(c) Reports. The following reports shall be processed by the producer.

(1) Administration Form 113, daily. Provide a copy for the producer's plant file for review.

(2) Load Tickets for each load. Provide a copy for the project and producer's file.

(3) Administration forms for all concrete materials sampled at the plant.

(4) Test Worksheets for all tests performed daily at the plant.

(5) Provide a Monthly Production Report to CTD via e-mail to concrete@sha.state.md.us by the 10th of each month. Report the total cubic yards and the total weight of each type of supplementary cementitious material used in concrete production for Administration projects for the previous calendar month.

(d) Inspectors Office. The producer shall provide an onsite office meeting the basic requirements of Section 103 Type A - Engineers Office for the exclusive use of SHA Engineers and Inspectors, as approved by the Engineer. The requirement for a mobile office trailer is waived.

Responsibilities of the Administration.

(a) Comprehensive Inspection and Acceptance Inspection and Testing.

(1) The Quality Control Manager will be notified immediately to correct any deficiencies found during an Administration inspection to the satisfaction of the Engineer. Production will be suspended for deficiencies where the quality of the product is affected, as determined by the Administration.

(2) If critical deficiencies are found or consecutive inspections reveal identical or additional deficiencies, a Non-Compliance Report (NCR) will be issued to the Quality Control Manager detailing the findings and actions to be taken by the producer.

(3) The Administration reserves the right to assign an Inspector to monitor operations for a maximum of five Administration production days. If at the end of this period the quality control process is not satisfactory, a NCR will be issued and plant approval will be rescinded. The plant shall be recertified before Administration production can continue.

(b) Recertification of Concrete Plant. Documentation of corrective action shall be submitted to the CTD by a professional engineer registered in the State of Maryland. A comprehensive inspection will be conducted by the Administration to recertify the concrete plant once the documentation is approved.

(c) Independent Assurance Audits (IAA). The Administration will evaluate the equipment and the proficiency of QC technicians through audits performed on a random basis. The QC technician shall cooperate with the IAA technician in the evaluations.

(d) Technician Certification. Conducted per the Mid-Atlantic Region Certification Program (MARTCP) and the Maryland Technician Certification Program.

DELETE: SECTION - 915.05 CERTIFIED PRECAST CONCRETE PLANTS in its entirety.

INSERT: The following.

915.05 CERTIFIED PRECAST CONCRETE PLANTS Shall meet the applicable requirements of 915.01, 915.03 and the following.

Certified Precast Concrete Plant. The producer shall be responsible for quality control of plant operations to ensure that the material meets specification requirements. The quality control process will be subject to unannounced periodic inspection by representatives of the Concrete Technology Division (CTD). Full participation in the inspection by the plant's certified technician will be required.

All plants producing precast concrete items of any description for Administration contracts shall be certified as appropriate by one or more of the following at the time of their Annual Inspection:

(a) The American Concrete Pipe Association (ACPA)

(b) The National Precast Concrete Association (NPCA)

(c) The Precast/Prestressed Concrete Institute (PCI).

Plants may be required to hold multiple certifications in order to produce a variety of products.

Initial and Annual Inspection. The Administration will perform comprehensive initial and annual inspections on all plants to ensure that the plant equipment and personnel meets all applicable specification requirements. The Administration will accept certification that the plant facilities meet all applicable requirements from a professional engineer registered in the State of Maryland with at least 5 years operational or technical experience in concrete production. Final acceptance and approval will be as determined by the Administration.

The cost for inspection will be charged to a current Contract if applicable or to the precast producer if a current Contract is unavailable.

915.05.01 Responsibilities of the Precast Concrete Producer.

(a) Notification. Notify CTD 14 days prior to producing any precast items for each Administration project. Notify CTD at least five working days in advance of scheduling the comprehensive inspection.

(b) Quality Control. Have the certified quality control technician present while concrete is being batched and cast. The technician shall supervise all aspects of precast concrete production.

(c) Quality Control Procedures. Quality control procedures shall be detailed in the Quality Control Plan and include the following:

(1) The method of inspecting reinforcement steel placement and forms prior to pouring concrete.

(2) The method of curing the concrete.

(3) The method of maintaining accurate quality control records.

(4) Samples of documents approved by the Engineer.

(5) Patching procedures.

(6) Methods of preparing the concrete units for shipment.

(7) A method of identifying each piece as tested and approved by quality control.

(d) When required, the producer shall submit a repair procedure for the precast product for approval that conforms to PCI Manual 137 and all other applicable specifications. All materials used for repairs shall be supplied from approved sources.

(e) Develop and use an acceptable Quality Control Plan (QCP) that addresses all elements necessary for plant quality control. Submit the QCP for review and approval at the time of the annual comprehensive inspection. The QCP shall include the names, qualifications and responsibilities of a Quality Control Manager and Quality Control Technicians.

(1) All precast concrete products shall meet the Standards or approved working drawings. All materials shall be from an Administration approved source and meet all applicable specifications.

(2) The plan shall indicate how the producer intends to handle all of its materials.

(3) Sample and testing frequency and certification of materials shall meet the Material Quality Assurances Processes, Details and Frequencies manual.

(4) The producer shall submit a repair procedure for approval conforming to PCI Manual 137 and all other applicable specifications. All materials used for repairs shall be supplied from approved sources.

(f) Quality Control Technician. Certified Quality Control Technicians shall hold the following certifications:

(1) Maryland State Highway Administration – Office of Materials Technology Certified Concrete Plant Technician (Certified Plant Technician)

(2) American Concrete Institute (ACI) Level I

Technicians shall also hold one of the following certifications as required:

(1) PCI Level I,

(2) NPCA Production & Quality School (PQS) Level I,

(3) ACPA Q-Cast Certified Technician.

(g) Test Equipment and Facilities. Supply all necessary test equipment and provide Administration-approved facilities suitable for conducting the various tests required. Off-site test facilities shall be approved by the Engineer.

(h) Reports. The following reports shall be processed by the producer:

(1) Load Tickets for each load. Provide a copy for producer's file for review.

(2) Administration Forms for all concrete materials sampled at the plant.

(3) Test Worksheets for all tests performed daily at the plant.

(4) Provide a Monthly Production Report to CTD via e-mail to concrete@sha.state.md.us by the 10th of each month. Report the total cubic yards and the total weight of each type of supplementary cementitious material used in concrete production and the total number of precast items shipped to Administration projects for the previous calendar month.

(i) Inspectors Office. The producer shall provide an onsite office meeting the basic requirements of Section 103 Type A - Engineers Office for the exclusive use of SHA Engineers and Inspectors, as approved by the Engineer. The requirement for a mobile office trailer is waived.

915.05.02 Responsibilities of the Administration

(a) Comprehensive Inspection.

(b) Verification Testing.

(1) Verification of certification will be performed a minimum of once per year at the Administration's discretion.

(2) The Administration reserves the right to discontinue acceptance of precast units if verification indicates that materials or test procedures do not meet the Contract Documents.

(c) Acceptance Inspection and Testing.

(1) If deficiencies are found during an Administration inspection, the Quality Control Manager will be notified immediately to correct the deficiencies to the satisfaction of the Engineer. Production will be suspended for critical deficiencies where the quality of the product is affected as determined by the Administration.

(2) If critical deficiencies are found or consecutive inspections reveal identical or additional deficiencies, the Engineer will issue a Non-Compliance Report (NCR) to the Quality Control Manager detailing the findings and actions to be taken by the producer.

(3) The Administration reserves the right to assign an Inspector to monitor plant operations for a maximum of five Administration production days. If at the end of this period the quality control process is not satisfactory, a NCR will be issued and plant approval will be rescinded. The plant shall be recertified before Administration production can continue.

(d) Recertification of Precast Concrete Plant. Documentation of corrective action shall be submitted to the CTD by a Professional Engineer registered in the State of Maryland. After approval of the

corrective action documentation, a comprehensive inspection will be conducted to recertify the concrete plant.

(e) Independent Assurance Audits (IAA). The Administration will evaluate the equipment and the QC technicians' proficiency through audits performed on a random basis. The QC technician shall cooperate with the IAA technician in the evaluations.

(f) Technician Certification. Conducted per the Mid-Atlantic Region Technician Certification Program (MARTCP) and the Maryland Technician Certification Program.

CATEGORY 900
MATERIALS

DELETE: SECTION 924 — RESERVED.

INSERT: The following.

SECTION 924 — COLD PATCH MATERIALS

924.01 DESCRIPTION. Cold Patch Materials (CPM), including Water-Activated Cold Patch Material (WACPM), are high performance asphalt patching materials used to repair potholes, deteriorated concrete, and asphalt pavement in all seasons. The material shall be capable of making permanent repairs with minimal effort and with minimal disruption to traffic.

CPM/WACPM are produced by approved manufacturers using specially formulated binders. The CPM material may be produced in bulk and stockpiled or packaged in buckets or bags weighing 40 to 50 lb, or packaged as approved. The WACPM is produced and packaged in buckets or bags weighing 35 to 60 lb. Select from the Qualified Products List (QPL).

924.02 MATERIALS.

Aggregates	M 29 T 11 T 2
Binder	D244 D402 T 59 T 78

924.02.01 Binder. Binder shall provide aggregate coverage per TP 40. No additives, modifiers, or extra ingredients may be introduced into the liquid oil blend after shipment. Binder shall meet a maximum of 0.1 percent volume by weight of the original sample when tested to 500 F (260 degrees C) per T 59 or, the binder shall contain no more than 6.0 milliliters of oil distillate when tested per D244, D402 or T 78, depending on the type of binder used. The residual binder content shall be approximately 5 to 9 percent of the mix.

924.03 MIX PERFORMANCE REQUIREMENTS. Cold Patch Material patches shall remain in place when paved over and shall not adversely affect the final surface. The material shall not require primer or tack and shall be compatible with asphalt and/or concrete at a minimum thickness of 1/2 in. The material must be capable of filling potholes in wet or dry conditions in ambient temperatures as low as to 5 F and up to 100 F.

The material shall permanently adhere to deteriorated concrete or bituminous pavement until the surrounding pavement fails. Removal shall not be required when the surface is overlaid with asphalt.

The Administration reserves the right to sample composite material or mixture at any time.

WACPM Job Mix Formula. The job mix formula shall establish a single percentage of aggregate passing each required sieve, a single percentage of binder to be added to the aggregate and a range of add water required to activate strength.

Submit results of the proposed job mix formula to the Office of Materials Technology through the Engineer for approval. The report shall show that all materials were tested and meet the following.

Aggregate Gradation				
Sieve Size	**Percent Passing**			
	4.0mm (1/8")	6.0mm (1/4")	9.0mm (3/8")	12.0mm ½"
½"	100	100	100	95-100
3/8"	100	100	85-100	65-85
#4	90-98	80-100	35-60	38-60
#8	60-70	20-55	15-35	25-45
#16	40-57	12-32	14-25	10-20
#200	4-9	3-6	3-6	3-6

Job Mix Formula Analysis		
Test	**Test Designation**	**Specification Limits**
Gradation	T 30	Report
Particle Coating	T 195	>95%
Asphalt Content	T 308	5.0 – 9.0%
Draindown	T 305	≤8%

924.03.01 Storage. CPM/WACPM furnished in bags or containers shall be stored in accordance with the manufacturer's recommendations. CPM/WACPM shall remain workable in storage for at least six months.

CPM may also be furnished from stockpiled material that has been stored outside

924.03.02 Usage. CPM shall be uniformly mixed and require no mixing prior to use. The material shall be capable of being poured or shoveled into a hole. The material shall require minimal pothole preparation consisting of removing most of the water and debris as possible from the pothole. The material shall be capable of displacing any water remaining in the hole. The material shall be placed and compacted in accordance with the manufacturer's recommendations. The material shall not ravel nor adhere to tires when opened to traffic.

924.03.03 Quality Control Plan (QCP). Submit a Quality Control Plan (QCP) that includes the following.

(a) Description of Material.

(b) Contact Personnel.

(c) Safety Data Sheets (SDS).

(d) Technical Data Sheets, including VOC content.

(e) Job Mix Formula.

(f) QC Material Sampling Process.

(g) Storage Requirements.

The QCP shall also state that if a test result indicates that a shipment is not in compliance with specifications, the following shall apply.

(a) Immediately notify the Administration of the shipment in question.

(b) Identify the material.

(c) Cease shipment until material complies with specifications.

(d) Notify the Administration prior to resuming shipment.

(e) Implement any mutually agreed upon procedures for the disposition of the material.

In the event a mutual agreement is not achieved, the Administration shall have final authority in the decision on specification compliance.

924.04 CERTIFICATION. Provide certification that the material meets requirements per TC 1.03 and the following.

(a) A guarantee the material conforms to the Materials, Binder, Mix Performance and Storage requirements and COMAR environmental regulations.

(b) Employ an unaffiliated AASHTO-accredited laboratory to perform all testing for certification.

Acceptance testing will be completed on delivered material as determined. Each delivery shall be considered one lot. The material may be subject to a workability evaluation either in the lab or

in the field. Non-conforming materials will be rejected whether in-place or not. Remove all CPM inventory on hand that fails to meet requirements and replace.

Replacement Warranty. Material that does not remain workable in storage for at least six months shall be replaced. Product that does not perform in normal pothole patches for at least twelve months will be evaluated for performance. Material that consistently fails to meet requirements will be removed from the QPL.

CATEGORY 900
MATERIALS

SECTION 950 — TRAFFIC MATERIALS

950.06 ELECTRICAL CABLE AND WIRE.

ADD: After 950.06.09 Electric Service Wire.

950.06.10 Fiber Optic Cable. The fiber optic cable shall be of a loose tube construction and consist of single-mode or multi-mode fibers, as specified in the Contract Documents. The individual fibers shall possess the following features:

(a)	Type.	(Single Mode) Step Index (Multi-Mode) Graded Index
(b)	Core diameter.	(Single Mode) 8.3 microns, nominal (Multi-Mode) 62.5 microns ±3 microns
(c)	Cladding Diameter.	(Single and Multi-Mode) 125 microns ±2 microns
(d)	Core-to-cladding offset.	(Single and Multi-Mode) ± 0.8microns ±2 microns
(e)	Coating Diameter.	(Single Mode) 245 microns ±10 microns (Multi-Mode) 250 microns ±15 microns
(f)	Colored Fiber Diameter.	(Single and Multi-Mode) 250 microns, nominal
(g)	Cladding non-circularity.	(Single and Multi-Mode) < 1.0 percent
(h)	Proof/Tensile Test.	(Single and Multi-Mode) 100 kpsi, min.

(i) Attenuation.

(Single-Mode):

(1)	@ 1310 nm:	< 0.5 dB/km
(2)	@ 1550 nm:	< 0.4 dB/km

(Multi-Mode):

(1)	@ 850 nm:	< 3.75 dB/km
(2)	@ 1300 nm:	< 1.5 dB/km

(j) Attenuation Uniformity.

(Single Mode): No point discontinuity > 0.10 db at 1310 nm or at 1550 nm.
(Multi-Mode): No point discontinuity > 0.10 db at 750 nm or at 850 nm.

(k) Attenuation at water peak.

(Single-Mode): 2.1 db/km @ 1383 nm $\pm$ 3 nm
(Multi-Mode): 2.1 db/km @ 783 nm $\pm$ 3 nm

(l) Chromatic Dispersion (Single and Multi-Mode).

Zero Dispersion Wavelength: 1332 nm to 1354 nm
Zero Dispersion Slope: 0.097 PS/(NM^2km)

(m) Cutoff Wavelength.

(Single-Mode): $\leq$ 1250 nm
(Multi-Mode): NOT APPLICABLE

(n) Mode-Field Diameter (Petermann II)(Single Mode),(Multi-Mode-NOT APPLICABLE).

(1) 9.30 $\pm$ 0.50 um @ 1310 nm
(2) 10.50 $\pm$ 1.00 um @ 1550 nm3 of 7

CONSTRUCTION. Individual fibers shall be loose-tube buffered with an interstitial gel filling to prevent water intrusion in the event the conduit leaks or the cable is direct-buried. Each fiber buffer jacket shall be color coded, with a distinctly different color from other fibers in the cable.

Fiber optic cable installed in conduit shall conform to the following minimum requirements.

(a) Structure. Concentric, with dielectric central strength member and aramid reinforcement.

(b) Jacket. Medium-density Polyethylene outer, containing carbon black to prevent light penetration.

(c) Filling. Non-hygroscopic water blocking compound to prevent water and moisture penetration.

(d) Maximum tension.

(1) Installation (pulling) : 600 lbs.
(2) Long-Term (Installed): 200 lbs.

(e) Minimum Bend Radii.

(1) During installation: 20 times the outer diameter of the cable.
(2) Long Term: 10 times the outer diameter of the cable.

(f) Installation. All cables to be installed in a given conduit or duct facility shall be pulled as a unit.

(1) Cables shall be pulled in conduit with a cable grip designed to provide a firm hold on the exterior covering of the cable, and with heat shrinkable end caps placed on the cable ends.

(2) Establish voice communications between the cable feeding location and the cable pulling equipment prior to commencing pulling.

(3) The cable reels shall be set up on the same side of the manhole as the conduit section in which the cable is to be placed.

(4) The reel shall be leveled and brought into proper alignment with the conduit section so that the cable will pass from the top of the reel in a long smooth bend into the duct without twisting.

(a) The cable shall not be pulled from the bottom of the reel.

(b) The cable shall be fed by manually rotating the reel.

(g) Pulling. Cable shall not be pulled through any intermediate junction box, pull box, manhole, or any other opening in the conduit, unless specifically approved by the Project Engineer.

(1) The necessary length of cable to be installed shall be pulled from manhole, manhole or cabinet to the immediate next downstream manhole, manhole or cabinet.

(2) The remaining length of cable to be installed in the next conduit shall be carefully stored in a manner, which ensures that no damage to the cable shall occur.

(3) Cable shall be stored in a manner that allows that length of cable to be safely pulled into the next conduit or duct.

(4) Cable shall enter a manhole, or cabinet directly from the cable reel or storage stack, and shall be pulled directly out of the immediate downstream manhole or cabinet.

(h) Splicing. All cables shall run continuously from the field equipment cabinet or the environmental vault to their destination. Splicing of cable in conduit, pull boxes, junction boxes, manholes, or other locations are not permitted, unless approved in writing by the Engineer.

(i) Feeding cable. An approved cable feeder guide shall be used between the cable reel or storage stack and the face of the duct to protect the cable, and to guide the cable into the duct as it is fed from the reel or the storage stack.

(1) The dimensions and set-up of the feeder guide shall be such that the cable does not bend at any location to a radius less than the cable's minimum allowable bending radius.

(2) This minimum bending radius of the cable shall not be exceeded at anytime during cable installation.

(3) Cable shall not be pulled over edges or corners, over or around obstructions, or through unnecessary curves or bends.

(j) Slack. Cables shall be looped in and out of cabinets, manholes and manholes to provide a minimum of twenty-five (25) ft of slack and the least amount of stress on fibers.

(k) Storage. Ensure that the cable is not damaged during storage or installation.

(1) The cable shall not be stepped on by workmen or run over by any vehicle or equipment.

(2) The cable shall not be pulled along the ground or over or around obstructions.

(l) Pulling Tension. The allowable pulling tension shall be the cable manufacturer's recommended pulling tension for that cable for pulling by the outer jacket, or 80 percent of the manufacturer's maximum pulling tension for pulling by the outer jacket, whichever is smaller. Ensure that the allowable pulling tension is not exceeded at anytime during cable installation. To ensure the pulling tensions are not exceeded employ the following methods when pulling cable:

(1) Pulling the cable by hand.

(2) Attaching an approved strain gauge to the pulling line at the cable exit location, and at a sufficient distance from the take-up device, such that the strain gauge can be read throughout the entire cable pulling operation.

(m) Lubricant. An approved lubricant, in the amount recommended by the cable manufacturer, shall be used to facilitate pulling the cable.

(1) The cable shall be lubricated as it is fed from the cable reel or storage stack into the cable feeder.

(2) An approved cable lubricator (funnel) shall be placed around the cable just ahead of the cable feeder to facilitate proper lubrication of the cable.

(3) After the cable has been installed, the exposed cable in a manhole, or cabinet shall be

wiped clean of cable lubricant with a cloth before leaving the manhole or cabinet.

(n) Contractor's Qualifications. At least 30 days prior to the installation of fiber optics cable, submit to the Project Engineer documentation indicating the qualifications and experience of the personnel to be involved in the installation and termination of the fiber optics cables.

(1) Said documentation shall include names, addresses, and telephone numbers of the three network owners, who may be contacted by the Administration regarding these installations.

(2) No fiber optic cable shall be installed until the installation personnel have been approved by the Project Engineer in accordance with the minimum requirements specified above.

(3) Personnel involved in the installation and termination of the fiber optics cables shall meet the following minimum requirements:

(a) 3 years experience in the installation of fiber optic cables, including splicing, terminating, and testing of multi-mode and single-mode fibers.

(b) 3 networks where fiber optic cables are installed in outdoor conduits, and the networks have been in continuous satisfactory operation for at least 2 years.

(o) Fiber Cable Documentation. Before any communications cable installation is performed, the provide the Engineer with 4 copies of the cable manufacturer's recommended and maximum pulling tensions for each cable size and type.

(1) These pulling tensions shall be specified for pulling from the cable's outer jacket.

(2) Included with these pulling tensions shall be a list of the minimum allowable cable bending radius and the cable manufacturer's approved pulling lubricants and guidelines for their application. Only these lubricants will be permitted.

(p) Above-Ground Cable Markers. Four-foot high plastic cable marker posts with 12 in. long steel in-ground bases shall be installed above the underground fiber cable. Posts shall be installed above all trench lines and directional bores at the following locations: As specified in the Contract Documents.

(1) Between manholes.

(2) At locations where the conduit changes direction but there is no manhole.

(3) At any location where the conduit passes under a roadway or other structure.

(q) Terminations. All fibers used shall be terminated at each cable end in the appropriate connector for the terminating equipment.

(1) All unused fibers in each cable shall be terminated in the same connectors as the active fibers, unless otherwise specified in the Contract Documents.

(2) No fibers shall be left without a connector, unless otherwise specified in the Contract Documents.

(3) The connector loss for complete connection to the terminal equipment shall not exceed 1.5 dB.

CATEGORY 900
TRAFFIC MATERIALS

SECTION 950.06 — ELECTRICAL CABLE AND WIRE

950.06.03 Cable Duct.

DELETE: The last sentence of 950.06.03.

INSERT: The following.

Provide type XHHW cable, rated for 600 volts.

CATEGORY 900
MATERIALS

SECTION 950 — TRAFFIC MATERIALS

950.12 LUMINAIRES AND LAMPS

ADD: The following after the last sentence of the second paragraph.

A Light Emitting Diode (LED) Underpass Luminaire shall be a complete lighting device consisting of a cast aluminum housing, LED arrays, LED drivers, terminal blocks, integral transformer, associated hardware, all necessary wiring, and an optical assembly.

950.12.01 Luminaire Construction.

DELETE: The fourth paragraph in (d) "Provide LED Roadway Luminaire drivers… input high voltage surge protection."

INSERT: The following.

> Provide LED Roadway Luminaire drivers that are Solid State (electronic) type with an input voltage range from 120-277VAC (±10 percent), input frequency of 60Hz, minimum power factor of 90 percent at full load, Total Harmonic distortion less than 20 percent, case temperature rated for -40˚C to 50˚C, and contain 3 kV input high voltage surge protection.

ADD: The following after the last sentence of the last paragraph in (d).

(e) Design LED Underpass Luminaires for an operational life of at least eleven years with 70 percent lumen maintenance value of 50 000 hours (L70) at an average operating time of 12 hours per night. The illuminance shall not decrease by more than 30 percent over the minimum operational life of eleven years. All components of the LED Underpass Luminaire must be rated for the full service life without maintenance.

Provide LED Underpass Luminaires that use no more than 95 watts and are designed to operate at all voltages from 120 volt to 480 volt. For 480 volt operation, an integral transformer shall be provided to reduce the voltage. The power factor of the LED Underpass Luminaire shall be 0.90 or higher. The Correlated Color Temperature (CCT) shall be less than 4500 K and the Color Rendering Index (CRI) shall be greater than 65.

All components of the LED Underpass Luminaire shall be UL approved. The luminaires shall be UL listed for wet locations. The LED Underpass Luminaire housing and lens/refractor shall be sealed to prevent intrusion of moisture for the full service life and comply with Ingress Protection Rating IP-65 or greater. The lens/refractor shall be constructed of a material that will not show visible yellowing due to UV exposure, or exposure to hydrocarbon emission, for the full service life.

05-30-17

The LED Underpass Luminaire shall be 3G vibration rated.

Provide LED Underpass Luminaire drivers that are Solid State (electronic) type with an input voltage range from 120-277VAC (±10 percent), input frequency of 60Hz, minimum power factor of 90 percent at full load, Total Harmonic distortion less than 20 percent, case temperature rated for -30˚C to 50˚C.

LED Underpass Luminaire on board circuitry shall include a Surge Protection Device (SPD) to withstand high repetition noise transients as a result of utility line switching, nearby lightning strikes, and other interference. The SPD shall protect the luminaries from damage and failure for transient peak voltages up to 10kV and transient peak currents up to 10kA.

Complete all photometric testing of the LED Underpass Luminaires as specified in IESNA technical memorandums LM-63, LM-79 and LM-80. Perform all testing and calculations using photopic values. No correction for scotopic values will be permitted.

Design the LED Underpass Luminaire to mount as specified in contract documents. Mounting hardware shall be in accordance with manufacturer recommendations. All hardware shall be stainless steel. Include mounting hardware as required per Contract Documents or as directed by the Engineer.

For placement on the Qualified Product's List, the product evaluation application must be submitted on the Administration's Maryland Product Evaluation List (MPEL). After submittal, a minimum of 2 luminaires must be provided for evaluation. The Luminaires will be evaluated for 90 days, and returned to the supplier, if desired. The evaluation will be for general durability and suitability of the luminaires. All shipping costs will be the responsibility of the supplier.

950.12.02

ADD: The following after the last sentence of the section.

Refer to section 950.12.01 (e) for required lamp wattages and rated lamp life for LED Underpass Luminaires.

CATEGORY 900
TRAFFIC MATERIALS

SECTION 950.15 — TRAFFIC SIGNAL HEADS

DELETE: The table and section titled Hardware in its entirety.

INSERT: The following.

ITEM	DESCRIPTION	A	B	C	D
1	Aluminum Alloy - Casting	A 319	A 380	A 713	6063 T6
2	Yield Strength, ksi	18	23	25	25
3	Tensile Strength, ksi	27	47	35	30
4	Brinell Hardness	70	80	75	73
5	Elongation (% in 2 in.)	1.5	4	3	12
6	Stainless Steel	A 316	-	-	-
7	Galvanized Steel	A 157	A 153	G 60	-
8	Steel-Flat Sheet	16 gauge	-	-	-
9	Coating	*	Anodized Finish	-	-
10	Brass	CZ120	-	-	-

*The signal head housing shall be yellow in conformance with Federal Standards 595, Color Chip No. 13538. The signal head door and visor shall be optical flat (dull) black Federal Standards 595, Color Chip No. 37038. Aluminum signal heads shall be painted using fusion bonded polyester coating method.

Hardware.

(a) Hub plate shall conform to A, 1 through 5 and 9B.

(b) Span wire hanger clamp shall conform to C, 1 thru 5.

(c) Balance adjuster body shall conform to 10A.

(d) Balance adjuster eyebolt and hardware shall conform to 6A, 7A, and 7B.

(e) 2-way lower arm shall conform to 7C and 8A.

(f) 2-way tri-stud arm shall conform to A, 1 thru 5.

(g) Span wire entrance fitting shall conform to C, 1 thru 5.

(h) Mast arm mount signal bracket (1-way, 2-way, and 5-section) shall conform to 1A and 1D.

(i) Side pole upper and lower arm assembly shall conform to 1B thru 5B or 1D thru 5D.

The maximum allowable play or space between the sides of the eyebolt and span wire clamp shall be 0.062 in.

ADD: The following under Electrical.

(f) Terminal blocks screws shall be of the captive type secured by fasteners on the reverse side of the terminal block. Terminal block screws shall be a # 10 size.

(g) Male spade terminal ends shall be furnished for each position on the terminal block angled at 45 degrees and perpendicular to the terminal block face.

CATEGORY 900
MATERIALS

SECTION 951 — PAVEMENT MARKING MATERIALS

DELETE: SECTION 951.07 – SNOWPLOWABLE RAISED PAVEMENT MARKERS (SRPM) AND RECESSED PAVEMENT MARKERS in its entirety.

INSERT: The following.

951.07 SNOWPLOWABLE RAISED AND NON-SNOWPLOWABLE RAISED PAVEMENT MARKERS. Snowplowable Raised Pavement Markers (SRPM) include markers installed in steel or polycarbonate holders or by direct application into a groove. Non-Snowplowable Raised Markers (NSRPM) are used with temporary pavement markings.

951.07.01. Pavement Marker Reflector Lenses. Pavement marker reflector lenses shall be 4.00 x 2.00 x 0.46 in. The slope of the reflecting surface shall be 30 degrees and the area of each reflecting surface shall be 1.7in.^{2}. The outer surface of the shell shall be smooth except in identification areas. All pavement marker reflector lens shall be imprinted with the manufacturer's name and the model number.

(a) Lenses for SRPMs with Holders. D 4383. Pavement marker reflector lenses shall be comprised of materials with adequate chemical, water and UV resistance for the intended use capable of being installed in a steel casing or recessed polycarbonate holder and shall conform as specified The reflector lens shall contain one or two prismatic reflective faces to reflect incident light from opposite directions. The reflector lens shall be in the shape of a shallow frustum of a pyramid. The bottom of the reflector lens shall be equipped with either an elastomeric pad to permit its attachment to the surface of the holder or the manufacturer's recommended adhesive may be used. The surfaces of the lens faces shall provide extremely durable abrasion resistance. Holders for the markers shall be either a steel casting or a plastic holder that is recessed in a groove.

(b) Lenses for Direct SRPMs without Holders. D 4383. Pavement marker reflector lenses be comprised of materials with adequate chemical, water and UV resistance for the intended use and shall conform as specified. The reflector lens shall contain one or two prismatic reflective faces to reflect incident light from opposite directions. The reflector lens shall be in the shape of a shallow frustum of a pyramid. The housing for the lens shall be designed for application directly to the pavement in the specified groove

951.07.02 SRPM Adhesive. M 237, Type IV. Use to fasten the SRPM holders and Direct SRPMs to the pavement as specified. Rapid set adhesives shall not be used. The surface of all marker lenses shall be free of gloss or substances that will inhibit bonding of the adhesive.

951.07.03 SRPM Holders

(a) Steel Casting. D4380. A 536, Grade 80-55-06, hardened to 51 to 55 R_C per E18. Casting dimensions shall be a minimum of 9.25 x 5.86 x 1.69 in. and shall not exceed

10.5 x 7.25 x 1.69 in. Steel holders shall be capable of holding the marker above the pavement. Both ends of the steel holder shall be shaped to deflect a snow plow blade. The bottom of the steel holder shall incorporate two parallel keels and an accurately shaped web designed to fit into a grooved surface. The installed height shall not exceed 0.25 in. above the road surface.

The surface of the keel and web shall be free of scale, dirt, oil, grease or any other substance that may reduce its bond to the epoxy adhesive. The casting shall be imprinted with the manufacturer's name and the model number.

(b) Polycarbonate. A polycarbonate plastic material with dimensions of 5.00" x 3.00" x 0.70" capable of holding a SRPM lens recessed in a 1/8" groove below the pavement surface. The polycarbonate holder shall have tabs capable of extending out onto the pavement for the purpose of proper positioning. The surface of the housing shall be free of dirt, oil, grease or any other substance that may reduce its bond to the epoxy adhesive.

951.07.01.04 Reflector Lens Adhesive. Used to fasten the reflector lens to the holder in accordance with the manufacturer's recommendations.

951.07.02 Non Snowplowable Raised Markers. D 4280. NSRPMs. shall be comprised of materials with adequate chemical, water and UV resistance for the intended use and shall conform as specified. The reflector lens shall contain one or two prismatic reflective faces to reflect incident light from opposite directions. The reflector lens shall be in the shape of a shallow frustum of a pyramid. The bottom of the reflector lens shall be equipped with either a pressure-sensitive elastomeric pad to permit its attachment to the surface or be capable of being installed using a hot bitumen adhesive per the manufacturer's recommendations.

951.07.03 Field Evaluation. SRPMs shall be evaluated on the National Transportation Product Evaluation Program's (NTPEP) North Test Deck. NSRPMs may be field evaluated on any NTPEP Test Deck. SRPMs and NSRPMs that perform satisfactorily throughout the evaluation period will be placed on the Administration's Qualified Products List (QPL). Random testing of samples will be performed and conformance will be determined by the Office of Materials Technology (OMT).

951.07.04 Quality Assurance Sampling. Refer to 549.03.02.

951.07.05 Material Shipment. SRPMs and NSRPMs shall be shipped in containers sealed by the manufacturer. The label on each container shall include the following.

(a) Manufacturer's Name.

(b) Place of Manufacture.

(c) Color of Material and Component Type.

(d) Date of Manufacture (month-year).

(e) Batch and Lot Identification Number.

(f) Size/quantity of lot represented.

951.07.06 Certification. Furnish certification for all SRPMs and NSRPMs per TC-1.03. All SRPMs and NSRPMs supplied shall conform to the identical composition of the samples submitted for NTPEP evaluation. Identify SRPMs and NSRPMs by referring to the code used on the test deck SRPMs and NSRPMs that fail to conform will be rejected.

The manufacturer shall also provide the following.

(a) Material Safety Data Sheets for all materials submitted for testing and use.

(b) A facility capable of producing the SRPMs and RPMs in the quantity and quality required.

(c) A laboratory capable of performing the required tests; subject to Administration approval.

CATEGORY 900
MATERIALS

SECTION 951 — PAVEMENT MARKING MATERIALS

951.09.01 Requirements

DELETE: The first sentence in in its entirety.

INSERT: The following.

951.09.01 Requirements M 247, Type I.

ADDENDUM RECEIPT VERIFICATION FORM

COMAR 21.05.02.08 requires that all addenda issued be acknowledged, therefore before Price Proposals may be considered responsive, the Maryland State Highway Administration must receive verification that all Price Proposals considered the contents of all Contract Documents and all Addenda issued, as applicable, for this project.

I do solemnly declare and affirm under the penalties of perjury that this bid was prepared by this firm, including all subcontractors and suppliers, with consideration of all the information contained in the as advertised Contract Documents and all Addenda issued, as applicable.

☐ NO ADDENDA WERE ISSUED

☐ ADDENDUM NO. _1_ to _____
(Must be filled in by the Proposer – if only one Addendum enter 1 in the blank space provided)

Date: _____

By: _____
(print name of Authorized Representative)

_____
(signature of Authorized Representative)

Proposers are advised that the following:

ADDENDUM RECEIPT
VERIFICATION FORM
and the
PROPOSAL FORM PACKET
shall be completed,
and submitted in a sealed envelope
clearly marked
“SEALED PRICE PROPOSAL”
and the
CONTRACT NUMBER
on the outside of the envelope

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
PROPOSAL FORM

Proposal by _____
Name

_____
Address (Street and/or P.O. Box)

_____
City State Zip

( ) ( )
A.C. Phone No. A.C. Fax No.

to furnish and deliver all materials and to do and perform all work, in conformance with the Standard Specifications, revisions thereto, General Provisions and the Special Provisions in this contract to MD 32 from Linden Church Road to I-70 located in, Howard County, Maryland, for which Request for Proposals will be received until 12:00 o'clock noon on Thursday, September 20, 2018, this work being situated as follows:

3

Maryland Department of Transportation
State Highway Administration
Office of Procurement and Contract Management
707 N. Calvert Street
Baltimore, Maryland 21202

In response to the advertisement by the Administration, requesting proposals for the work in conformance with the Contract Documents, now on file in the office of the Administration. I/We hereby certify that I/we am/are the only person, or persons, interested in this bid proposal as principals, and that an examination has been made of the work site, the Specifications, and Request for Proposals, including the Special Provisions contained herein. I/We propose to furnish all necessary machinery, equipment, tools, labor and other means of construction, and to furnish all materials required to complete the project at the following unit price or lump sum price.

ITEM NO. CCS NO.	APPROXIMATE QUANTITIES	DESCRIPTION OF ITEMS	SECTION	UNIT PRICE DOLLARS	 CENTS	AMOUNTS DOLLARS	 CENTS
1001 100000	LUMP SUM	. DESIGN BUILD LUMP SUM PRICE	XXX	LUMP SUM			
1002 110500	405,000	EACH OF PRICE ADJUSTMENT FOR DIESEL FUEL	XXX SP	1	00	405,000	00
1003 130900	4,000	HOURS OF ON-THE-JOB TRAINING	XXX	0	80	3,200	00

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STATE CONTRACT - HO7565370
FEDERAL CONTRACT - AC-NHPP-118-1(69)N Page 2 - 1 of 5

ITEM NO. CCS NO.	APPROXIMATE QUANTITIES	DESCRIPTION OF ITEMS	SECTION	UNIT PRICE DOLLARS	 CENTS	AMOUNTS DOLLARS	 CENTS
3001 300000	2	EACH OF . SEVERE WEATHER EVENT	XXX	46,000	00	92,000	00
3002 388130	13	EACH OF QUARTERLY EROSION AND SEDIMENT CONTROL INCENTIVE	308 SP	8,000	00	104,000	00
3003 388135	LUMP SUM	FINAL EROSION AND SEDIMENT CONTROL INCENTIVE	308 SP	104,000	00	104,000	00

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ITEM NO. CCS NO.	APPROXIMATE QUANTITIES	DESCRIPTION OF ITEMS	SECTION	UNIT PRICE DOLLARS	UNIT PRICE CENTS	AMOUNTS DOLLARS	AMOUNTS CENTS
5001 504600	550,000	EACH OF PRICE ADJUSTMENT FOR ASPHALT BINDER	504	1	00	550,000	00
5002 504605	536,357	EACH OF PAYMENT ADJUSTMENT FOR PAVEMENT DENSITY	504	1	00	536,357	00
5003 504615	536,357	EACH OF PAYMENT ADJUSTMENT FOR ASPHALT MIXTURE	504	1	00	536,357	00
5004 535100	175,000	EACH OF PAVEMENT SURFACE PROFILE PAY ADJUSTMENT	535 SP	1	00	175,000	00

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ITEM NO. CCS NO.	APPROXIMATE QUANTITIES	DESCRIPTION OF ITEMS	SECTION	UNIT PRICE DOLLARS	 CENTS	AMOUNTS DOLLARS	 CENTS
7001 700000	5,750	LINEAR FEET OF . STREAM RESTORATION INCENTIVE	XXX	595	00	3,421,250	00

«M_52»

STATE CONTRACT - HO7565370
FEDERAL CONTRACT - AC-NHPP-118-1(69)N

ITEM NO. CCS NO.	APPROXIMATE QUANTITIES	DESCRIPTION OF ITEMS SECTION	UNIT PRICE DOLLARS CENTS	AMOUNTS DOLLARS CENTS
		AGGREGATE AMOUNT AT UNIT PRICES ALTERNATE A IS USING BID 1001-1003, 3001-3003, 5001-5004, 7001		
		THIS PROPOSAL SHALL BE FILLED IN BY THE BIDDER WITH PRICES IN NUMERALS AND EXTENSIONS SHALL BE MADE BY HIM.		

«M_52»

GENERAL MATERIAL REQUIREMENTS

CONVICT PRODUCED MATERIALS

Section 1019 of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) clarifies that materials produced by convict labor after July 1, 1991 may not be used for Federal-aid highway construction projects unless produced at a prison facility producing convict made materials for Federal-aid construction projects prior to July 1, 1987.

CONTRACT PROVISION BUY AMERICA

This section only applies to projects partially or totally financed with Federal funds. The Contractor shall comply with Section 165 of the Surface Transportation Assistance Act of 1982 as amended by Section 1041(a) and 1048(a) of the Intermodal Surface Transportation Efficiency Act of 1991 (codified by SAFETEA-LU, §1903 as 23 U.S.C 313) with regard to the furnishing and coating of iron and steel products.

The Contract, if awarded, will be awarded to the responsive and responsible bidder who submits the lowest total bid for the Contract based on furnishing Domestic Products unless such bid exceeds the lowest total bid based on furnishing Foreign Products by more than twenty five percent (25%). Foreign Products will not be permitted to be used as a substitution for Domestic ones after the bid has been awarded.

Furnish steel or iron construction materials, including coating, for permanently incorporated work according to 23 CFR 635.410 and as follows:

(a) All manufacturing processes of steel or iron materials in a product, including coating; and any subsequent process that alters the steel or iron material's physical form or shape, changes its chemical composition, or the final finish; are to occur within the United States (One of the 50 States, the District of Columbia, Puerto Rico, or in territories and possessions of the U.S.). Manufacturing begins with the initial melting and mixing, and continues through the coating stage. The processes include rolling, extruding, machining, bending, grinding, drilling, welding, and coating. The action of applying a coating to steel or iron is deemed a manufacturing process. Coating includes epoxy coating, galvanizing, aluminizing, painting, and any other coating that protects or enhances the value of steel or iron. Any process from the original reduction from ore to the finished product constitutes a manufacturing process for iron.

(b) The following are considered to be steel manufacturing processes:

(1) Production of steel by any of the following processes:

(a) Open hearth furnace.
(b) Basic oxygen.
(c) Electric furnace.
(d) Direct reduction.

(2) Rolling, heat treating, and any other similar processing.

(3) Fabrication of the products:

(a) Spinning wire into cable or strand.
(b) Corrugating and rolling into culverts.
(c) Shop fabrication.

(c) The manufacturing process for a steel/iron product is considered complete when the product is ready for use as an item (e.g., fencing, posts, girders, pipe, manhole cover, etc.) or could be incorporated as a component of a more complex product through a further manufacturing process (e.g., prestressed concrete girders, reinforced concrete pipe, traffic control devices, bearing pads, etc.). A product containing both steel and/or iron components, may be assembled outside the United States and meet Buy America requirements if the constituent steel and iron components (in excess of the minimal amounts permitted) were manufactured domestically and are not modified at the assembly location prior to final assembly.

(d) If domestically produced steel billets or iron ingots are exported outside of the U.S., as defined above, for any manufacturing process then the resulting product does not conform to the Buy America requirements. Additionally, products manufactured domestically from foreign source steel billets or iron ingots do not conform to the Buy America requirements because the initial melting and mixing of alloys to create the material occurred in a foreign country.

(e) Due to a nationwide waiver, Buy America does not apply to raw materials (iron ore and alloys), scrap (recycled steel or iron), and pig iron or processed, pelletized, and reduced iron ore.

(f) For the Buy America provisions to apply, the steel or iron product must be permanently incorporated into the project. If an item is rendered as a "donated material" in accordance with 23 U.S.C. 323 – Donations and Credits, it will have to comply with Buy America requirements. While States and local governments may receive a credit for donated material, this material must generally comply with Buy America requirements. Buy America does not apply to temporary steel items, e.g., temporary sheet piling, temporary bridges, steel scaffolding and falsework. Further, Buy America does not apply to materials which remain in place at the contractor convenience.

(g) Certifications which document that steel and iron have been manufactured and that coatings for iron or steel have been applied in the United States shall be provided to the Contractor by the manufacturer. The Contractor shall provide the required certifications to the Engineer prior to such items being incorporated into the permanent work. Certifications shall extend to materials utilized in manufactured and fabricated products purchased by the Contractor.

(h) Products manufactured of foreign steel or iron materials may be used, provided the cost of such products as they are delivered to the project does not exceed 0.1% of the total contract amount, or $2,500, whichever is greater. If a supplier or fabricator wishes to use a partial fabrication process where domestic and foreign source components are assembled at a domestic location, the "as delivered cost" of the foreign components should include any transportation, assembly and testing costs required to install them in the final product.

ALTERNATE BID
USING FOREIGN PRODUCTS

When a bidder elects to utilize Foreign Products on one or more items, the following summation indicating the Total Bid using Foreign Products must be completed in addition to the individual item bid tabulations.

The following instructions are given to the bidder in completing the Total Bid summation using Foreign Products:

1 - The "Bid Total" for the initial bid using Domestic Products shall be shown on line (1).

2 - The subtotal for Item Amounts using Domestic Products shall be shown on line (2), for those items which the Contractor elects to use Foreign Products.

3 - The subtotal for Item Amounts using Foreign Products shall be shown on line (3).

4 - The total Bid, utilizing Foreign Products shall be shown on line (4). The value is obtained by subtracting subtotal (2) from the Total Bid (1) and then adding subtotal (3).

Bid Total for Bid 1 using Domestic items	Line (1)_____
Total of Domestic Items	Line (2) -_____
Total of Foreign Items	Line (3) +_____
Bid Total using Foreign Items	Line (4)_____

ALTERNATE BID - USING FOREIGN PRODUCTS
BIDDER'S INSTRUCTIONS

When the bidder elects to submit a bid for one or more items using Foreign Products, the following form must be used. For each item that Foreign Products are contemplated, the appropriate "Item Numbers", "Approximate Quantities", "Description of Items", "Unit Price or Lump Sum Price", "Item Amount Domestic" and "Item Amount Foreign" shall be tabulated below as specified in the initial bid. The bidder shall indicate the unit price in dollars and cents and show the total cost of the item for each item that utilizes Foreign Products. When all items utilizing Foreign Products have been listed, the bidder shall indicate on Page 6 of 45 the subtotals of the Item Amounts for Domestic Products in Line (2) and for Foreign Products in Line (3).

Item Nos.	Approximate Quantities	Description of Items	Unit Price or Lump Sum Dollars.Cts.	Items Amount Domestic Dollars.Cts.	Items Amount Foreign Dollars.Cts.

NOTICE

All bidders shall complete and submit with their bid the Bid/Proposal Affidavit below.

BID/PROPOSAL AFFIDAVIT

A. AUTHORIZED REPRESENTATIVE AND AFFIANT

I HEREBY AFFIRM THAT:

I, _____ (print name), possess the legal authority to make this Affidavit.

B. CERTIFICATION REGARDING COMMERCIAL NONDISCRIMINATION

The undersigned bidder hereby certifies and agrees that the following information is correct: In preparing its bid on this project, the bidder has considered all proposals submitted from qualified, potential subcontractors and suppliers, and has not engaged in "discrimination" as defined in §19-103 of the State Finance and Procurement Article of the Annotated Code of Maryland. "Discrimination" means any disadvantage, difference, distinction, or preference in the solicitation, selection, hiring, or commercial treatment of a vendor, subcontractor, or commercial customer on the basis of race, color, religion, ancestry, or national origin, sex, age, marital status, sexual orientation, sexual identity, genetic information or an individual's refusal to submit to a genetic test or make available the results of a genetic test, disability, or any otherwise unlawful use of characteristics regarding the vendor's, supplier's, or commercial customer's employees or owners. "Discrimination" also includes retaliating against any person or other entity for reporting any incident of "discrimination". Without limiting any other provision of the solicitation on this project, it is understood that, if the certification is false, such false certification constitutes grounds for the State to reject the bid submitted by the bidder on this project, and terminate any contract awarded based on the bid. As part of its bid or proposal, the bidder herewith submits a list of all instances within the past 4 years where there has been a final adjudicated determination in a legal or administrative proceeding in the State of Maryland that the bidder discriminated against subcontractors, vendors, suppliers, or commercial customers, and a description of the status or resolution of that determination, including any remedial action taken. Bidder agrees to comply in all respects with the State's Commercial Nondiscrimination Policy as described under Title 19 of the State Finance and Procurement Article of the Annotated Code of Maryland.

C. AFFIRMATION REGARDING BRIBERY CONVICTIONS

I FURTHER AFFIRM THAT:

Neither I, nor to the best of my knowledge, information, and belief, the above business (as is defined in Section 16-101(b) of the State Finance and Procurement Article of the Annotated Code of Maryland), or any of its officers, directors, partners, controlling stockholders, or any of its employees directly involved in the business's contracting activities, including obtaining or performing contracts with public bodies, has been convicted of, or has had probation before judgment imposed pursuant to Criminal Procedure Article, §6-220, Annotated Code of Maryland, or has pleaded nolo contendere to a charge of, bribery, attempted bribery, or conspiracy to bribe in violation of Maryland law, or of the law of any other state or federal law, except as follows (indicate the reasons why the affirmation cannot be given and list any conviction, plea, or imposition of probation before judgment with the date, court, official or administrative body, the sentence or disposition, the name(s) of person(s) involved, and their current positions and responsibilities with the business):

_____
_____
_____.

D. AFFIRMATION REGARDING OTHER CONVICTIONS

I FURTHER AFFIRM THAT:

Neither I, nor to the best of my knowledge, information, and belief, the above business, or any of its officers, directors, partners, controlling stockholders, or any of its employees directly involved in the business's contracting activities including obtaining or performing contracts with public bodies, has:

(1) Been convicted under state or federal statute of:
(a) a criminal offense incident to obtaining, attempting to obtain, or performing a public or private contract; or

(b) fraud, embezzlement, theft, forgery, falsification or destruction of records, or receiving stolen property;

(2) Been convicted of any criminal violation of a state or federal antitrust statute;

(3) Been convicted under the provisions of Title 18 of the United States Code for violation of the Racketeer Influenced and Corrupt Organization Act, 18 U.S.C. §1961, et seq., or the Mail Fraud Act, 18 U.S.C. §1341, et seq., for acts in connection with the submission of bids or proposals for a public or private contract;

(4) Been convicted of a violation of the State Minority Business Enterprise Law, Section 14-308 of the State Finance and Procurement Article of the Annotated Code of Maryland;

(5) Been convicted of a violation of the Section 11-205.1 of the State Finance and Procurement Article of the Annotated Code of Maryland;

(6) Been convicted of conspiracy to commit any act or omission that would constitute grounds for conviction or liability under any law or statute described in subsection (1) through (5) above;

(7) Been found civilly liable under a state or federal antitrust statute for acts or omissions in connection with the submission of bids or proposals for a public or private contract;

(8) Been found in a final adjudicated decision to have violated the Commercial Nondiscrimination Policy under Title 19 of the State Finance and Procurement Article of the Annotated Code of Maryland with regard to a public or private contract; or

(9) Been convicted of a violation of one or more of the following provisions of the Internal Revenue Code:
- (a) §7201, Attempt to Evade or Defeat Tax;
- (b) §7203, Willful Failure to File Return, Supply Information, or Pay Tax,
- (c) §7205, Fraudulent Withholding Exemption Certificate or Failure to Supply Information,
- (d) §7206, Fraud and False Statements, or
- (e) §7207 Fraudulent Returns, Statements, or Other Documents;

(10) Been convicted of a violation of 18 U.S.C. §286 Conspiracy to Defraud the Government with Respect to Claims, 18 U.S.C. §287, False, Fictitious, or Fraudulent Claims, or 18 U.S.C. §371, Conspiracy to Defraud the United States;

(11) Been convicted of a violation of the Tax-General Article, Title 13, Subtitle 7 or Subtitle 10, Annotated Code of Maryland;

(12) Been found to have willfully or knowingly violated State Prevailing Wage Laws as provided in the State Finance and Procurement Article, Title 17, Subtitle 2, Annotated Code of Maryland, if:

- (a) A court:
  - (i) Made the finding; and
  - (ii) Decision became final; or
- (b) The finding was:
  - (i) Made in a contested case under the Maryland Administrative Procedure Act; and
  - (ii) Not overturned on judicial review;

(13) Been found to have willfully or knowingly violated State Living Wage Laws as provided in the State Finance and Procurement Article, Title 18, Annotated Code of Maryland, if:

(a) A court:

(i) Made the finding; and

(ii) Decision became final; or

(b) The finding was:

(i) Made in a contested case under the Maryland Administrative Procedure Act; and

(ii) Not overturned on judicial review;

(14) Been found to have willfully or knowingly violated the Labor and Employment Article, Title 3, Subtitles 3, 4, or 5, or Title 5, Annotated Code of Maryland, if:

(a) A court:

(i) Made the finding; and

(ii) Decision became final; or

(b) The finding was:

(i) Made in a contested case under the Maryland Administrative Procedure Act; and

(ii) Not overturned on judicial review; or

(15) Admitted in writing or under oath, during the course of an official investigation or other proceedings, acts or omissions that would constitute grounds for conviction or liability under any law or statute described in §§B and C and subsections D(1) — (14) above, except as follows (indicate reasons why the affirmations cannot be given, and list any conviction, plea, or imposition of probation before judgment with the date, court, official or administrative body, the sentence or disposition, the name(s) of the person(s) involved and their current positions and responsibilities with the business, and the status of any debarment):

_____

_____

_____.

E. AFFIRMATION REGARDING DEBARMENT

I FURTHER AFFIRM THAT:

Neither I, nor to the best of my knowledge, information, and belief, the above business, or any of its officers, directors, partners, controlling stockholders, or any of its employees directly involved in the business's contracting activities, including obtaining or performing contracts with public bodies, has ever been suspended or debarred (including being issued a limited denial of participation) by any public entity, except as follows (list each debarment or suspension providing the dates of the suspension or debarment, the name of the public entity and the status of the proceedings, the name(s) of the person(s) involved and their current positions and responsibilities with the business, the grounds of the debarment or suspension, and the details of each person's involvement in any activity that formed the grounds of the debarment or suspension):

_____

_____

_____.

F. AFFIRMATION REGARDING DEBARMENT OF RELATED ENTITIES

I FURTHER AFFIRM THAT:

(1) The business was not established and it does not operate in a manner designed to evade the application of or defeat the purpose of debarment pursuant to Sections 16-101, et seq., of the State Finance and Procurement Article of the Annotated Code of Maryland; and

(2) The business is not a successor, assignee, subsidiary, or affiliate of a suspended or debarred business, except as follows (you must indicate the reasons why the affirmations cannot be given without qualification):

_____

_____

_____.

G. SUB-CONTRACT AFFIRMATION

I FURTHER AFFIRM THAT:

Neither I, nor to the best of my knowledge, information, and belief, the above business, has knowingly entered into a contract with a public body under which a person debarred or suspended under Title 16 of the State Finance and Procurement Article of the Annotated Code of Maryland will provide, directly or indirectly, supplies, services, architectural services, construction related services, leases of real property, or construction.

H. AFFIRMATION REGARDING COLLUSION

I FURTHER AFFIRM THAT:

Neither I, nor to the best of my knowledge, information, and belief, the above business has:

(1) Agreed, conspired, connived, or colluded to produce a deceptive show of competition in the compilation of the accompanying bid or offer that is being submitted;

(2) In any manner, directly or indirectly, entered into any agreement of any kind to fix the bid price or price proposal of the bidder or offeror or of any competitor, or otherwise taken any action in restraint of free competitive bidding in connection with the contract for which the accompanying bid or offer is submitted.

I. CERTIFICATION OF TAX PAYMENT

I FURTHER AFFIRM THAT:

Except as validly contested, the business has paid, or has arranged for payment of, all taxes due the State of Maryland and has filed all required returns and reports with the Comptroller of the Treasury, the State Department of Assessments and Taxation, and the Department of Labor, Licensing, and Regulation, as applicable, and will have paid all withholding taxes due the State of Maryland prior to final settlement.

J. CONTINGENT FEES

I FURTHER AFFIRM THAT:

The business has not employed or retained any person, partnership, corporation, or other entity, other than a bona fide employee, bona fide agent, bona fide salesperson, or commercial selling agency working for the business, to solicit or secure the Contract, and that the business has not paid or agreed to pay any person, partnership, corporation, or other entity, other than a bona fide employee, bona fide agent, bona fide salesperson, or commercial selling agency, any fee or any other consideration contingent on the making of the Contract.

K. CERTIFICATION REGARDING INVESTMENTS IN IRAN

(1) The undersigned certifies that, in accordance with State Finance and Procurement Article, §17-705, Annotated Code of Maryland:

(a) It is not identified on the list created by the Board of Public Works as a person engaging in investment activities in Iran as described in State Finance and Procurement Article, §17-702, Annotated Code of Maryland; and

(b) It is not engaging in investment activities in Iran as described in State Finance and Procurement Article, §17-702, Annotated Code of Maryland.

(2) The undersigned is unable to make the above certification regarding its investment activities in Iran due to the following activities: _____

L. CONFLICT MINERALS ORIGINATED IN THE DEMOCRATIC REPUBLIC OF CONGO (FOR SUPPLIES AND SERVICES CONTRACTS)

I FURTHER AFFIRM THAT:

The business has complied with the provisions of State Finance and Procurement Article, §14-413, Annotated Code of Maryland governing proper disclosure of certain information regarding conflict minerals originating in the Democratic Republic of Congo or its neighboring countries as required by federal law.

M. I FURTHER AFFIRM THAT:

Any claims of environmental attributes made relating to a product or service included in the bid or proposal are consistent with the Federal Trade Commission's Guides for the Use of Environmental Marketing Claims as provided in 16 CFR §260, that apply to claims about the environmental attributes of a product, package, or service in connection with the marketing, offering for sale, or sale of such item or service.

N. ACKNOWLEDGEMENT

I ACKNOWLEDGE THAT this Affidavit is to be furnished to the Procurement Officer and may be distributed to units of: (1) the State of Maryland; (2) counties or other subdivisions of the State of Maryland; (3) other states; and (4) the federal government. I further acknowledge that this Affidavit is subject to applicable laws of the United States and the State of Maryland, both criminal and civil, and that nothing in this Affidavit or any contract resulting from the submission of this bid or proposal shall be construed to supersede, amend, modify or waive, on behalf of the State of Maryland, or any unit of the State of Maryland having jurisdiction, the exercise of any statutory right or remedy conferred by the Constitution and the laws of Maryland with respect to any misrepresentation made or any violation of the obligations, terms and covenants undertaken by the above business with respect to (1) this Affidavit, (2) the contract, and (3) other Affidavits comprising part of the contract.

I DO SOLEMNLY DECLARE AND AFFIRM UNDER THE PENALTIES OF PERJURY THAT THE CONTENTS OF THIS AFFIDAVIT ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE, INFORMATION, AND BELIEF.

Date: _____

By: _____ (print name of Authorized Representative and Affiant)

_____ (signature of Authorized Representative and Affiant)

COMPREHENSIVE SIGNATURE PAGE 1 OF 2

THE BIDDER IS HEREBY NOTIFIED THAT THIS DOCUMENT SHALL BE SIGNED IN INK IN ORDER FOR THE BID TO BE ACCEPTED. BY SIGNING, THE BIDDER CERTIFIES THAT HE/SHE WILL COMPLY IN EVERY ASPECT WITH THESE SPECIFICATIONS.

FURTHER, I DO SOLEMNLY DECLARE AND AFFIRM UNDER THE PENALTIES OF PERJURY THAT THE CONTENTS OF THIS AFFIDAVIT (PARAGRAPHS A-N) ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE, INFORMATION, AND BELIEF.

This bid form shall be filled out legibly in ink or typed. The bid, if submitted by an individual, shall be signed by an individual; if submitted by a partnership, shall be signed by such member or members of the partnership as have authority to bind the partnership; if submitted by a corporation the same shall be signed by the President and attested by the Secretary or an Assistant Secretary. If not signed by the President as aforesaid, there must be attached a copy of that portion of the By-Laws, or a copy of a Board resolution, duly certified by the Secretary, showing the authority of the person so signing on behalf of the corporation. In lieu thereof, the corporation may file such evidence with the Administration, duly certified by the Secretary, together with a list of the names of those officers having authority to execute documents on behalf of the corporation, duly certified by the Secretary, which listing shall remain in full force and effect until such time as the Administration is advised in writing to the contrary. In any case where a bid is signed by an Attorney in Fact the same must be accompanied by a copy of the appointing document, duly certified.

IF AN INDIVIDUAL:

NAME: _____

_____
Street and/or P.O. Box

_____ _____ _____ _____
City State Zip Code Fed ID or SSN

_____(SEAL)_____
Signature Date

_____
Print Signature

WITNESS: _____
Signature

_____
Print Signature

COMPREHENSIVE SIGNATURE PAGE 2 OF 2

IF A PARTNERSHIP:

NAME OF PARTNERSHIP:_____

_____
Street and/or P.O. Box

_____ _____ _____ _____
City State Zip Code Fed ID or SSN

BY:_____(SEAL) _____
Signature Date

_____
Print Signature

TITLE:_____ WITNESS:_____
Signature

_____
Print Signature

IF A CORPORATION:

NAME OF CORPORATION:_____

_____
Street and/or P.O. Box

_____ _____ _____ _____
City State Zip Code Fed ID or SSN

STATE OF INCORPORATION:_____

BY:_____(SEAL) _____
Signature Date

_____
Print Signature

TITLE:_____ WITNESS:_____
Secretary's Signature

_____
Print Signature

MDOT DBE FORM A
FEDERALLY-FUNDED CONTRACTS
CERTIFIED DBE UTILIZATION AND FAIR SOLICITATION AFFIDAVIT
PAGE 1 OF 2

This affidavit must be included with the bid/ proposal. If the bidder/offeror fails to accurately complete and submit this affidavit as required, the bid shall be deemed not responsive or the proposal shall be deemed not susceptible of being selected for award.

In connection with the bid/proposal submitted in response to Solicitation No. HO7565370, I affirm the following:

1. DBE Participation (PLEASE CHECK ONLY ONE)

☐ I have met the overall certified Disadvantaged Business Enterprise (DBE) participation goal of **Sixteen** percent (**16**%). I agree that this percentage of the total dollar amount of the Contract for the DBE goal will be performed by certified DBE firms as set forth in the DBE Participation Schedule - Part 2 of the MDOT DBE Form B (Federally-Funded Contracts).

OR

☐ I conclude that I am unable to achieve the DBE participation goal. I hereby request a waiver, in whole or in part, of the goal. Within 10 business days of receiving notice that our firm is the apparent awardee or as requested by the Procurement Officer, I will submit a written waiver request and all required documentation in accordance with COMAR 21.11.03.11. For a partial waiver request, I agree that certified DBE firms will be used to accomplish the percentages of the total dollar amount of the Contract as set forth in the DBE Participation Schedule - Part 2 of the MDOT DBE Form B (Federally-Funded Contracts).

2. Additional DBE Documentation

I understand that if I am notified that I am the apparent awardee or as requested by the Procurement Officer, I must submit the following documentation within 10 business days of receiving such notice: (a) Outreach Efforts Compliance Statement (MDOT DBE Form C - Federally-Funded Contracts); (b) Subcontractor Project Participation Statement (MDOT DBE Form D - Federally-Funded Contracts); (c) DBE Waiver Request documentation per COMAR 21.11.03.11 (if waiver was requested); and (d) Any other documentation required by the Procurement Officer to ascertain bidder's responsibility/ offeror's susceptibility of being selected for award in connection with the certified DBE participation goal.

MDOT DBE FORM A
FEDERALLY-FUNDED CONTRACTS
CERTIFIED DBE UTILIZATION AND FAIR SOLICITATION AFFIDAVIT
PAGE 2 OF 2

I acknowledge that if I fail to return each completed document (in 2 (a) through (d)) within the required time, the Procurement Officer may determine that I am not responsible and therefore not eligible for contract award or not susceptible of being selected for award.

3. Information Provided to DBE firms

In the solicitation of subcontract quotations or offers, DBE firms were provided not less than the same information and amount of time to respond as were non-DBE firms.

4. Products and Services Provided by DBE firms

I hereby affirm that the DBEs are only providing those products and services for which they are MDOT certified.

I solemnly affirm under the penalties of perjury that the information in this affidavit is true to the best of my knowledge, information and belief.

_____	_____
Company Name	Signature of Representative
_____	_____
Address	Printed Name and Title
_____	_____
City, State and Zip Code	Date

MDOT DBE FORM B
FEDERALLY-FUNDED CONTRACTS
DBE PARTICIPATION SCHEDULE

PART 1 – INSTRUCTIONS FOR DBE PARTICIPATION SCHEDULE

PARTS 2 AND 3 MUST BE INCLUDED WITH THE BID/PROPOSAL. IF THE BIDDER/OFFEROR FAILS TO ACCURATELY COMPLETE AND SUBMIT PART 2 WITH THE BID/PROPOSAL AS REQUIRED, THE BID SHALL BE DEEMED NOT RESPONSIVE OR THE PROPOSAL SHALL BE DEEMED NOT SUSCEPTIBLE OF BEING SELECTED FOR AWARD.

***** STOP *****

FORM INSTRUCTIONS
PLEASE READ BEFORE COMPLETING THIS FORM

1. Please refer to the Maryland Department of Transportation (MDOT) DBE Directory at www.mdot.state.md.us to determine if a firm is certified for the appropriate North American Industry Classification System ("NAICS") Code **and** the product/services description (specific product that a firm is certified to provide or specific areas of work that a firm is certified to perform). For more general information about NAICS, please visit www.naics.com. Only those specific products and/or services for which a firm is certified in the MDOT Directory can be used for purposes of achieving the DBE participation goal.

2. In order to be counted for purposes of achieving the DBE participation goal, the firm `must be certified for that specific NAICS ("DBE" for Federally-funded projects designation after NAICS Code). **WARNING:** If the firm's NAICS Code is in **graduated status**, such services/products **will not be counted** for purposes of achieving the DBE participation goals. Graduated status is clearly identified in the MDOT Directory (such graduated codes are designated with the word graduated after the appropriate NAICS Code).

3. Examining the NAICS Code is the **first step** in determining whether a DBE firm is certified and eligible to receive DBE participation credit for the specific products/services to be supplied or performed under the contract. The **second step** is to determine whether a firm's Products/Services Description in the DBE Directory includes the products to be supplied and/or services to be performed that are being used to achieve the DBE participation goal.

4. If you have any questions as to whether a firm is MDOT DBE certified, or if it is certified to perform specific services or provide specific products, please call MDOT's Office of Minority Business Enterprise at 1-800-544-6056 or send an email to mbe@mdot.state.md.us.

MDOT DBE FORM B
FEDERALLY-FUNDED CONTRACTS
DBE PARTICIPATION SCHEDULE
PART 1 – INSTRUCTIONS FOR DBE PARTICIPATION SCHEDULE
PAGE 2 OF 4

5. The Contractor's subcontractors are considered second-tier subcontractors. Third-tier contracting used to meet a DBE goal is to be considered the exception and not the rule. The following two conditions must be met before MDOT, its Modal Administrations and the Maryland Transportation Authority may approve a third-tier contracting agreement: (a) the bidder/offeror must request in writing approval of each third-tier contract arrangement, and (b) the request must contain specifics as to why a third-tier contracting arrangement should be approved. These documents must be submitted with the bid/proposal in Part 2 of this DBE Participation Schedule.

6. For each DBE firm that is being used as supplier/wholesaler/regular dealer/broker/manufacturer, please follow these instructions for calculating the **amount of the subcontract for purposes of achieving the DBE participation goal**:

   A. Is the firm certified as a broker of the products/supplies? If the answer is YES, please continue to Item C. If the answer is NO, please continue to Item B.

   B. Is the firm certified as a supplier, wholesaler, regular dealer, or manufacturer of such products/supplies? If the answer is YES, continue to Item D. If the answer is NO, continue to Item C only if the DBE firm is certified to perform trucking/hauling services under NAICS Codes 484110, 484121, 484122, 484210, 484220 and 484230. If the answer is NO and the firm is not certified under these NAICS Codes, then no DBE participation credit will be given for the supply of these products.

   C. For purposes of achieving the DBE participation goal, you may count only the amount of any reasonable fee that the DBE firm will receive for the provision of such products/supplies - not the total subcontract amount or the value (or a percentage thereof) of such products and/or supplies. For Column 3 of the DBE Participation Schedule, please divide the amount of any reasonable fee that the DBE firm will receive for the provision of such products/services by the total Contract value and insert the percentage in Line 3.1.

   D. Is the firm certified as a manufacturer (refer to the firm's NAICS Code and specific descrition of products/services) of the products/supplies to be provided? If the answer is NO please continue to Item E If the answer is YES, for purposes of achieving the DBE participation goal, you may count the total amount of the subcontract. For Column 3 of the DBE Participation Schedule, please divide the total amount of the subcontract by the total Contract value and insert the percentage in Line 3.1.

MDOT DBE FORM B
FEDERALLY-FUNDED CONTRACTS
DBE PARTICIPATION SCHEDULE
PART 1 – INSTRUCTIONS FOR DBE PARTICIPATION SCHEDULE
PAGE 3 OF 4

E. Is the firm certified as a supplier, wholesaler and/or regular dealer? If the answer is YES and the DBE firm is furnishing and installing the materials and is certified to perform these services, please divide the total subcontract amount (including full value of supplies) by the total Contract value and insert the percentage in Line 3.1. If the answer is YES and the DBE firm is only being used as a supplier, wholesaler and/or regular dealer or is not certified to install the supplies/materials, for purposes of achieving the DBE participation goal, you may only count sixty percent (60%) of the value of the subcontract for these supplies/products (60% Rule). To apply the 60% Rule, first divide the amount of the subcontract for these supplies/products only (not installation) by the total Contract value. Then, multiply the result by sixty percent (60%) and insert the percentage in Line 3.2.

7. For each DBE firm that **is not** being used as a supplier/wholesaler/regular dealer/broker/manufacturer, to calculate the **amount of the subcontract for purposes of achieving the DBE participation goal**, divide the total amount of the subcontract by the total Contract value and insert the percentage in Line 3.1.

   Example: $ 2,500 (Total Subcontract Amount) ÷ $10,000 (Total Contract Value) x 100 = 25%.

8. Please note that for USDOT-funded projects, a DBE prime may count towards its DBE participation goal work performed by its own forces. Include information about the DBE prime in Part 2.

9. **WARNING:** The percentage of DBE participation, computed using the dollar amounts in Column 3 for all of the DBE firms listed in Part 2, MUST at least equal the DBE participation goal as set forth in MDOT DBE Form A – Federally-Funded Contracts for this solicitation. If the bidder/offeror is unable to achieve the DBE participation goals, then the bidder/offeror must request a waiver in Form A or the bid will be deemed not responsive, or the proposal not susceptible of being selected for award. You may wish to use the Goal Worksheet shown below to assist you in calculating the percentage and confirming that you have met the applicable DBE participation goal.

MDOT DBE FORM B
FEDERALLY-FUNDED CONTRACTS
DBE PARTICIPATION SCHEDULE
PART 1 – INSTRUCTIONS FOR DBE PARTICIPATION SCHEDULE
PAGE 4 OF 4

GOAL WORKSHEET	
Total DBE Firm Participation (Add percentages in Column 3 for all DBE firms listed in DBE Participation Schedule)	(A) _____%
The percentage amount in Box A above should be equal to the percentage amount in Box E below.	
Add *Countable* Subcontract Amounts (see 6 through 8 of Instructions) for all DBE firms listed in DBE Participation Schedule, and insert in Box B	(B) $_____
Insert the Total Contract Amount in Box C	(C) $_____
Divide Box B by Box C and Insert in Box D	(D) =_____
Multiply Box D by 100 and insert in Box E	(E) =_____%

MDOT DBE FORM B
FEDERALLY-FUNDED CONTRACTS
DBE PARTICIPATION SCHEDULE
PART 2 – DBE PARTICIPATION SCHEDULE

PARTS 2 AND 3 MUST BE INCLUDED WITH THE BID/PROPOSAL. IF THE BIDDER/OFFEROR FAILS TO ACCURATELY COMPLETE AND SUBMIT PART 2 WITH THE BID/PROPOSAL AS REQUIRED, THE BID SHALL BE DEEMED NOT RESPONSIVE OR THE PROPOSAL SHALL BE DEEMED NOT SUSCEPTIBLE OF BEING SELECTED FOR AWARD.

PAGE __ OF ___

Prime Contractor	Project Description	Solicitation Number

LIST INFORMATION FOR EACH CERTIFIED DBE SUBCONTRACTOR YOU AGREE TO USE TO ACHIEVE THE DBE PARTICIPATION GOAL.

COLUMN 1	COLUMN 2	COLUMN 3 Unless the bidder/offeror requested a waiver in MDOT DBE Form A – Federally Funded Contracts for this solicitation, the cumulative DBE participation for all DBE firms listed herein must equal at least the DBE participation goal set forth in Form A.
NAME OF DBE SUBCONTRACTOR AND TIER	**CERTIFICATION NO.**	FOR PURPOSES OF ACHIEVING THE DBE PARTICIPATION GOAL, refer to sections 6, 7 and 8 in Part 1 - Instructions. State the percentage amount of the products/services in Line 3.1, except for those products or services where the DBE firm is being used as a wholesaler, supplier, or regular dealer. For items of work where the DBE firm is being used as a supplier, wholesaler and/or regular dealer, complete Line 3.2 using the 60% Rule.
☐ Please check if DBE firm is a third-tier contractor (if applicable). Please submit written documents in accordance with Section 5 of Part 1 - Instructions	**Certification Number:** _____	3.1. **TOTAL PERCENTAGE TO BE PAID TO THE SUBCONTRACTOR** (STATE THIS PERCENTAGE AS A PERCENTAGE OF THE TOTAL CONTRACT VALUE- EXCLUDING PRODUCTS/SERVICES FROM SUPPLIERS, WHOLESALERS OR REGULAR DEALERS). _____% (Percentage for purposes of calculating achievement of DBE Participation goal) 3.2 **TOTAL PERCENTAGE TO BE PAID TO THE SUBCONTRACTOR FOR ITEMS OF WORK WHERE THE DBE FIRM IS BEING USED AS A SUPPLIER, WHOLESALER AND/OR REGULAR DEALER)** (STATE THE PERCENTAGE AS A PERCENTAGE OF THE TOTAL CONTRACT VALUE AND THEN APPLY THE 60% RULE PER SECTION 6(E) IN PART 1 - INSTRUCTIONS). _____% Total percentage of Supplies/Products x _____60% (60% Rule) _____% (Percentage for purposes of calculating achievement of DBE Participation goal)

☐Please check if Continuation Sheets are attached.

MDOT DBE FORM B
FEDERALLY-FUNDED CONTRACTS
DBE PARTICIPATION SCHEDULE
CONTINUATION SHEET

PAGE __ OF ___

Prime Contractor	Project Description	Solicitation Number

LIST INFORMATION FOR EACH CERTIFIED DBE SUBCONTRACTOR YOU AGREE TO USE TO ACHIEVE THE DBE PARTICIPATION GOAL.

COLUMN 1	**COLUMN 2**	COLUMN 3 Unless the bidder/offeror requested a waiver in MDOT DBE Form A – Federally Funded Contracts for this solicitation, the cumulative DBE participation for all DBE firms listed herein must equal at least the DBE participation goal set forth in Form A.
NAME OF DBE SUBCONTRACTOR AND TIER	**CERTIFICATION NO.**	FOR PURPOSES OF ACHIEVING THE DBE PARTICIPATION GOAL, refer to sections 6, 7 and 8 in Part 1 - Instructions. State the percentage amount of the products/services in Line 3.1, except for those products or services where the DBE firm is being used as a wholesaler, supplier, or regular dealer. For items of work where the DBE firm is being used as a supplier, wholesaler and/or regular dealer, complete Line 3.2 using the 60% Rule.
☐ Please check if DBE firm is a third-tier contractor (if applicable). Please submit written documents in accordance with Section 5 of Part 1 - Instructions	**Certification Number:** _____	3.1. **TOTAL PERCENTAGE TO BE PAID TO THE SUBCONTRACTOR** (STATE THIS PERCENTAGE AS A PERCENTAGE OF THE TOTAL CONTRACT VALUE- EXCLUDING PRODUCTS/SERVICES FROM SUPPLIERS, WHOLESALERS OR REGULAR DEALERS). _____% (Percentage for purposes of calculating achievement of DBE Participation goal) 3.2 **TOTAL PERCENTAGE TO BE PAID TO THE SUBCONTRACTOR FOR ITEMS OF WORK WHERE THE DBE FIRM IS BEING USED AS A SUPPLIER, WHOLESALER AND/OR REGULAR DEALER)** (STATE THE PERCENTAGE AS A PERCENTAGE OF THE TOTAL CONTRACT VALUE AND THEN APPLY THE 60% RULE PER SECTION 6(E) IN PART 1 - INSTRUCTIONS). _____% Total percentage of Supplies/Products x _____60% (60% Rule) _____% (Percentage for purposes of calculating achievement of DBE Participation goal)

☐ Please check if Continuation Sheets are attached.

MDOT DBE FORM B
FEDERALLY-FUNDED CONTRACTS
DBE PARTICIPATION SCHEDULE

PART 3 – CERTIFICATION FOR DBE PARTICIPATION SCHEDULE

PARTS 2 AND 3 MUST BE INCLUDED WITH THE BID/PROPOSAL AS DIRECTED IN THE SOLICITATION.

I hereby affirm that I have reviewed the Products and Services Description (specific product that a firm is certified to provide or areas of work that a firm is certified to perform) set forth in the MDOT DBE Directory for each of the DBE firms listed in Part 2 of this DBE Form B for purposes of achieving the DBE participation goal that was identified in the DBE Form A that I submitted with this solicitation, and that the DBE firms listed are only performing those products/services/areas of work for which they are certified. I also hereby affirm that I have read and understand the form instructions set forth in Part 1 of this DBE Form B.

The undersigned Prime Contractor hereby certifies and agrees that it has fully complied with the State Minority Business Enterprise law, State Finance and Procurement Article §14-308(a)(2), Annotated Code of Maryland which provides that, except as otherwise provided by law, a contractor may not identify a certified minority business enterprise in a bid or proposal and:

(1) fail to request, receive, or otherwise obtain authorization from the certified minority business enterprise to identify the certified minority business enterprise in its bid or proposal;

(2) fail to notify the certified minority business enterprise before execution of the contract of its inclusion of the bid or proposal;

(3) fail to use the certified minority business enterprise in the performance of the contract; or

(4) pay the certified minority business enterprise solely for the use of its name in the bid or proposal.

I solemnly affirm under the penalties of perjury that the contents of Parts 2 and 3 of MDOT DBE Form B are true to the best of my knowledge, information and belief.

_____

Company Name Signature of Representative

_____

Address Printed Name and Title

_____

City, State and Zip Code Date

MDOT MBE/DBE FORM E
GOOD FAITH EFFORTS GUIDANCE AND DOCUMENTATION

PART 1 – GUIDANCE FOR DEMONSTRATING GOOD FAITH EFFORTS TO MEET MBE/DBE PARTICIPATION GOALS

In order to show that it has made good faith efforts to meet the Minority Business Enterprise (MBE)/Disadvantaged Business Enterprise (DBE) participation goal (including any MBE subgoals) on a contract, the bidder/offeror must either (1) meet the MBE/DBE Goal(s) and document its commitments for participation of MBE/DBE Firms, or (2) when it does not meet the MBE/DBE Goal(s), document its Good Faith Efforts to meet the goal(s).

I. Definitions

MBE/DBE Goal(s) – "MBE/DBE Goal(s)" refers to the MBE participation goal and MBE participation subgoal(s) on a State-funded procurement and the DBE participation goal on a federally-funded procurement.

Good Faith Efforts – The "Good Faith Efforts" requirement means that when requesting a waiver, the bidder/offeror must demonstrate that it took all necessary and reasonable steps to achieve the MBE/DBE Goal(s), which, by their scope, intensity, and appropriateness to the objective, could reasonably be expected to obtain sufficient MBE/DBE participation, even if those steps were not fully successful. Whether a bidder/offeror that requests a waiver made adequate good faith efforts will be determined by considering the quality, quantity, and intensity of the different kinds of efforts that the bidder/offeror has made. The efforts employed by the bidder/offeror should be those that one could reasonably expect a bidder/offeror to take if the bidder/offeror were actively and aggressively trying to obtain DBE participation sufficient to meet the DBE contract goal. Mere *pro forma* efforts are not good faith efforts to meet the DBE contract requirements. The determination concerning the sufficiency of the bidder's/offeror's good faith efforts is a judgment call; meeting quantitative formulas is not required.

Identified Firms – "Identified Firms" means a list of the DBEs identified by the procuring agency during the goal setting process and listed in the federally-funded procurement as available to perform the Identified Items of Work. It also may include additional DBEs identified by the bidder/offeror as available to perform the Identified Items of Work, such as DBEs certified or granted an expansion of services after the procurement was issued. If the procurement does not include a list of Identified Firms or is a State-funded procurement, this term refers to all of the MBE Firms (if State-funded) or DBE Firms (if federally-funded) the bidder/offeror identified as available to perform the Identified Items of Work and should include all appropriately certified firms that are reasonably identifiable.

Identified Items of Work – "Identified Items of Work" means the bid items identified by the procuring agency during the goal setting process and listed in the procurement as possible items of work for performance by MBE/DBE Firms. It also may include additional portions of items of work the bidder/offeror identified for performance by MBE/DBE Firms to increase the likelihood that the MBE/DBE Goal(s) will be achieved. If the procurement does not include a list of Identified Items of Work, this term refers to all of the items of work the bidder/offeror identified as possible items of work for performance by MBE/DBE Firms and should include all reasonably identifiable work opportunities.

MBE/DBE Firms – For State-funded contracts, "MBE/DBE Firms" refers to certified **MBE** Firms. Certified MBE Firms can participate in the State's MBE Program. For federally-funded contracts, "MBE/DBE Firms" refers to certified **DBE** Firms. Certified DBE Firms can participate in the federal DBE Program.

II. Types of Actions MDOT will Consider

The bidder/offeror is responsible for making relevant portions of the work available to MBE/DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available MBE/DBE subcontractors and suppliers, so as to facilitate MBE/DBE participation. The following is a list of types of actions MDOT will consider as part of the bidder's/offeror's Good Faith Efforts when the bidder/offeror fails to meet the MBE/DBE Goal(s). This list is not intended to be a mandatory checklist, nor is it intended to be exclusive or exhaustive. Other factors or types of efforts may be relevant in appropriate cases.

A. Identify Bid Items as Work for MBE/DBE Firms

1. Identified Items of Work in Procurements

(a) Certain procurements will include a list of bid items identified during the goal setting process as possible work for performance by MBE/DBE Firms. If the procurement provides a list of Identified Items of Work, the bidder/offeror shall make all reasonable efforts to solicit quotes from MBE Firms or DBE Firms, whichever is appropriate, to perform that work.

(b) Bidders/Offerors may, and are encouraged to, select additional items of work to be performed by MBE/DBE Firms to increase the likelihood that the MBEDBE Goal(s) will be achieved.

2. Identified Items of Work by Bidders/Offerors

(a) When the procurement does not include a list of Identified Items of Work, bidders/offerors should reasonably identify sufficient items of work to be performed by MBE/DBE Firms.

(b) Where appropriate, bidders/offerors should break out contract work items into economically feasible units to facilitate MBE/DBE participation, rather than perform these work items with their own forces. The ability or desire of a prime contractor to perform the work of a

contract with its own organization does not relieve the bidder/offeror of the responsibility to make Good Faith Efforts.

B. Identify MBE Firms or DBE Firms to Solicit

1. DBE Firms Identified in Procurements

(a) Certain procurements will include a list of the DBE Firms identified during the goal setting process as available to perform the items of work. If the procurement provides

a list of Identified DBE Firms, the bidder/offeror shall make all reasonable efforts to solicit those DBE firms.

(b) Bidders/offerors may, and are encouraged to, search the MBE/DBE Directory to identify additional DBEs who may be available to perform the items of work, such as DBEs certified or granted an expansion of services after the solicitation was issued.

2. MBE/DBE Firms Identified by Bidders/Offerors

(a) When the procurement does not include a list of Identified MBE/DBE Firms, bidders/offerors should reasonably identify the MBE Firms or DBE Firms, whichever is appropriate, that are available to perform the Identified Items of Work.

(b) Any MBE/DBE Firms identified as available by the bidder/offeror should be certified in the appropriate program (MBE for State-funded procurements or DBE for federally-funded procurements)

(c) Any MBE/DBE Firms identified as available by the bidder/offeror should be certified to perform the Identified Items of Work.

C. Solicit MBE/DBEs

1. Solicit <u>all</u> Identified Firms for all Identified Items of Work by providing written notice. The bidder/offeror should:

(a) provide the written solicitation at least 10 days prior to bid opening to allow sufficient time for the MBE/DBE Firms to respond;

(b) send the written solicitation by first-class mail, facsimile, or email using contact information in the MBE/DBE Directory, unless the bidder/offeror has a valid basis for using different contact information; and

(c) provide adequate information about the plans, specifications, anticipated time schedule for portions of the work to be performed by the MBE/DBE, and other requirements of the contract to

assist MBE/DBE Firms in responding. (This information may be provided by including hard copies in the written solicitation or by electronic means as described in C.3 below.)

2. "All" Identified Firms includes the DBEs listed in the procurement and any MBE/DBE Firms you identify as potentially available to perform the Identified Items of Work, but it does not include MBE/DBE Firms who are no longer certified to perform the work as of the date the bidder/offeror provides written solicitations.

3. "Electronic Means" includes, for example, information provided *via* a website or file transfer protocol (FTP) site containing the plans, specifications, and other requirements of the contract. If an interested MBE/DBE cannot access the information provided by electronic means, the bidder/offeror must make the information available in a manner that is accessible by the interested MBE/DBE.

4. Follow up on initial written solicitations by contacting DBEs to determine if they are interested. The follow up contact may be made:

(a) by telephone using the contact information in the MBE/DBE Directory, unless the bidder/offeror has a valid basis for using different contact information; or

(b) in writing *via* a method that differs from the method used for the initial written solicitation.

5. In addition to the written solicitation set forth in C.1 and the follow up required in C.4, use all other reasonable and available means to solicit the interest of MBE/DBE Firms certified to perform the work of the contract. Examples of other means include:

(a) attending any pre-bid meetings at which MBE/DBE Firms could be informed of contracting and subcontracting opportunities;

(b) if recommended by the procurement, advertising with or effectively using the services of at least two minority focused entities or media, including trade associations, minority/women community organizations, minority/women contractors' groups, and local, state, and federal minority/women business assistance offices listed on the MDOT Office of Minority Business Enterprise website; and

(c) effectively using the services of other organizations, as allowed on a case-by-case basis and authorized in the procurement, to provide assistance in the recruitment and placement of MBE/DBE Firms.

D. Negotiate With Interested MBE/DBE Firms

Bidders/Offerors must negotiate in good faith with interested MBE/DBE Firms.

1. Evidence of negotiation includes, without limitation, the following:

(a) the names, addresses, and telephone numbers of MBE/DBE Firms that were considered;

(b) a description of the information provided regarding the plans and specifications for the work selected for subcontracting and the means used to provide that information; and

(c) evidence as to why additional agreements could not be reached for MBE/DBE Firms to perform the work.

2. A bidder/offeror using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration.

3. The fact that there may be some additional costs involved in finding and using MBE/DBE Firms is not in itself sufficient reason for a bidder's/offeror's failure to meet the contract DBE goal, as long as such costs are reasonable. Factors to take into consideration when determining whether a MBE/DBE Firm's quote is excessive or unreasonable include, without limitation, the following:

(a) the dollar difference between the MBE/DBE subcontractor's quote and the average of the other subcontractors' quotes received by the bidder/offeror;

(b) the percentage difference between the MBE/DBE subcontractor's quote and the average of the other subcontractors' quotes received by the bidder/offeror;

(c) the percentage that the DBE subcontractor's quote represents of the overall contract amount;

(d) the number of MBE/DBE firms that the bidder/offeror solicited for that portion of the work;

(e) whether the work described in the MBE/DBE and Non-MBE/DBE subcontractor quotes (or portions thereof) submitted for review is the same or comparable; and

(f) the number of quotes received by the bidder/offeror for that portion of the work.

4. The above factors are not intended to be mandatory, exclusive, or exhaustive, and other evidence of an excessive or unreasonable price may be relevant.

5. The bidder/offeror may not use its price for self-performing work as a basis for rejecting a MBE/DBE Firm's quote as excessive or unreasonable.

6. The "average of the other subcontractors' quotes received by the" bidder/offeror refers to the average of the quotes received from all subcontractors, except that there should be quotes from at least three subcontractors, and there must be at least one quote from a MBE/DBE and one quote from a Non-MBE/DBE.

7. A bidder/offeror shall not reject a MBE/DBE Firm as unqualified without sound reasons based on a thorough investigation of the firm's capabilities. For each certified MBE/DBE that is rejected as unqualified or that placed a subcontract quotation or offer that the bidder/offeror concludes is not acceptable, the bidder/offeror must provide a written detailed statement listing the reasons for this conclusion. The bidder/offeror also must document the steps taken to verify the capabilities of the MBE/DBE and Non-MBE/DBE Firms quoting similar work.

(a) The factors to take into consideration when assessing the capabilities of a MBE/DBE Firm, include, but are not limited to the following: financial capability, physical capacity to perform, available personnel and equipment, existing workload, experience performing the type of work, conduct and performance in previous contracts, and ability to meet reasonable contract requirements.

(b) The MBE/DBE Firm's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the efforts to meet the project goal.

E. Assisting Interested MBE/DBE Firms

When appropriate under the circumstances, the decision-maker will consider whether the bidder/offeror:

1. made reasonable efforts to assist interested MBE/DBE Firms in obtaining the bonding, lines of credit, or insurance required by MDOT or the bidder/offeror; and

2. made reasonable efforts to assist interested MBE/DBE Firms in obtaining necessary equipment, supplies, materials, or related assistance or services.

III. Other Considerations

In making a determination of Good Faith Efforts the decision-maker may consider engineering estimates, catalogue prices, general market availability and availability of certified MBE/DBE Firms in the area in which the work is to be performed, other bids or offers and subcontract bids or offers substantiating significant variances between certified MBE/DBE and Non-MBE/DBE costs of participation, and their impact on the overall cost of the contract to the State and any other relevant factors.

The decision-maker may take into account whether a bidder/offeror decided to self-perform subcontract work with its own forces, especially where the self-performed work is Identified Items of Work in the procurement. The decision-maker also may take into account the

performance of other bidders/offerors in meeting the contract. For example, when the apparent successful bidder/offeror fails to meet the contract goal, but others meet it, this reasonably raises the question of whether, with additional reasonable efforts, the apparent successful bidder/offeror

could have met the goal. If the apparent successful bidder/offeror fails to meet the goal, but meets or exceeds the average MBE/DBE participation obtained by other bidders/offerors, this, when viewed in conjunction with other factors, could be evidence of the apparent successful bidder/offeror having made Good Faith Efforts.

IV. Documenting Good Faith Efforts

At a minimum, a bidder/offeror seeking a waiver of the MBE/DBE Goal(s) or a portion thereof must provide written documentation of its Good Faith Efforts, in accordance with COMAR 21.11.03.11, within 10 business days after receiving notice that it is the apparent awardee. The written documentation shall include the following:

A. Items of Work (Complete Good Faith Efforts Documentation Form E, Part 2)

A detailed statement of the efforts made to select portions of the work proposed to be performed by certified MBE/DBE Firms in order to increase the likelihood of achieving the stated MBE/DBE Goal(s).

B. Outreach/Solicitation/Negotiation

1. The record of the bidder's/offeror's compliance with the outreach efforts prescribed by COMAR 21.11.03.09C(2)(a) through (e) and 49 C.F.R. Part 26, Appendix A. **(Complete Outreach Efforts Compliance Statement)**

2. A detailed statement of the efforts made to contact and negotiate with MBE/DBE Firms including:

(a) the names, addresses, and telephone numbers of the MBE/DBE Firms who were contacted, with the dates and manner of contacts (letter, fax, email, telephone, etc.) **(Complete Good Faith Efforts Form E, Part 3, and submit letters, fax cover sheets, emails, etc. documenting solicitations)**; and

(b) a description of the information provided to MBE/DBE Firms regarding the plans, specifications, and anticipated time schedule for portions of the work to be performed and the means used to provide that information.

C. Rejected MBE/DBE Firms (Complete Good Faith Efforts Form E, Part 4)

1. For each MBE/DBE Firm that the bidder/offeror concludes is not acceptable or qualified, a detailed statement of the reasons for the bidder's/offeror's conclusion, including the steps taken to verify the capabilities of the MBE/DBE and Non-MBE/DBE Firms quoting similar work.

2. For each certified MBE/DBE Firm that the bidder/offeror concludes has provided an excessive or unreasonable price, a detailed statement of the reasons for the bidder's/offeror's

conclusion, including the quotes received from all MBE/DBE and Non-MBE/DBE firms bidding on the same or comparable work. **(Include copies of all quotes received.)**

3. A list of MBE/DBE Firms contacted but found to be unavailable. This list should be accompanied by a Minority Contractor Unavailability Certificate signed by the MBE/DBE contractor or a statement from the bidder/offeror that the MBE/DBE contractor refused to sign the Minority Contractor Unavailability Certificate.

D. Other Documentation

1. Submit any other documentation requested by the Procurement Officer to ascertain the bidder's/offeror's Good Faith Efforts.

2. Submit any other documentation the bidder/offeror believes will help the Procurement Officer ascertain its Good Faith Efforts.

MDOT MBE/DBE FORM E
GOOD FAITH EFFORTS GUIDANCE AND DOCUMENTATION

PART 2 – CERTIFICATION REGARDING GOOD FAITH EFFORTS DOCUMENTATION

PAGE __ OF ___

Prime Contractor	Project Description	Solicitation Number

PARTS 3, 4, AND 5 MUST BE INCLUDED WITH THIS CERTIFICATE ALONG WITH ALL DOCUMENTS SUPPORTING YOUR WAIVER REQUEST.

I hereby request a waiver of (1) the Minority Business Enterprise (MBE) participation goal and/or subgoal(s), (2) the Disadvantaged Business Enterprise (DBE) participation goal, or (3) a portion of the pertinent MBE/DBE participation goal and/or MBE subgoal(s) for this procurement.[1] I affirm that I have reviewed the Good Faith Efforts Guidance MBE/DBE Form E. I further affirm under penalties of perjury that the contents of Parts 3, 4, and 5 of MDOT MBE/DBE Form E are true to the best of my knowledge, information and belief.

_____ _____
Company Name Signature of Representative

_____ _____
Address Printed Name and Title

_____ _____
City, State and Zip Code Date

[1] MBE participation goals and subgoals apply to State-funded procurements. DBE participation goals apply to federally-funded procurements. Federally-funded contracts do not have subgoals.

MDOT MBE/DBE FORM E
GOOD FAITH EFFORTS GUIDANCE AND DOCUMENTATION

PART 3 – IDENTIFIED ITEMS OF WORK BIDDER/OFFEROR MADE AVAILABLE TO MBE/DBE FIRMS

PAGE __ OF ___

Prime Contractor	Project Description	Solicitation Number

Identify those items of work that the bidder/offeror made available to MBE/DBE Firms. This includes, where appropriate, those items the bidder/offeror identified and determined to subdivide into economically feasible units to facilitate the MBE/DBE participation. For each item listed, show the anticipated percentage of the total contract amount. It is the bidder's/offeror's responsibility to demonstrate that sufficient work to meet the goal was made available to MBE/DBE Firms, and the total percentage of the items of work identified for MBE/DBE participation equals or exceeds the percentage MBE/DBE goal set for the procurement. Note: If the procurement includes a list of bid items identified during the goal setting process as possible items of work for performance by MBE/DBE Firms, the bidder/offeror should make all of those items of work available to MBE/DBE Firms or explain why that item was not made available. If the bidder/offeror selects additional items of work to make available to MBE/DBE Firms, those additional items should also be included below.

Identified Items of Work	Was this work listed in the procurement?	Does bidder/offeror normally self-perform this work?	Was this work made available to MBE/DBE Firms? If no, explain why?
	□ Yes □ No	□ Yes □ No	□ Yes □ No
	□ Yes □ No	□ Yes □ No	□ Yes □ No
	□ Yes □ No	□ Yes □ No	□ Yes □ No
	□ Yes □ No	□ Yes □ No	□ Yes □ No
	□ Yes □ No	□ Yes □ No	□ Yes □ No
	□ Yes □ No	□ Yes □ No	□ Yes □ No

☐ Please check if Additional Sheets are attached.

MDOT MBE/DBE FORM E
GOOD FAITH EFFORTS GUIDANCE AND DOCUMENTATION

PART 4 – IDENTIFIED MBE/DBE FIRMS AND RECORD OF SOLICITATIONS

PAGE __ OF ___

Prime Contractor	Project Description	Solicitation Number

Identify the MBE/DBE Firms solicited to provide quotes for the Identified Items of Work made available for MBE/DBE participation. Include the name of the MBE/DBE Firm solicited, items of work for which bids/quotes were solicited, date and manner of initial and follow-up solicitations, whether the MBE/DBE provided a quote, and whether the MBE/DBE is being used to meet the MBE/DBE participation goal. MBE/DBE Firms used to meet the participation goal must be included on the MBE/DBE Participation Schedule, Form B. Note: If the procurement includes a list of the MBE/DBE Firms identified during the goal setting process as potentially available to perform the items of work, the bidder/offeror should solicit all of those MBE/DBE Firms or explain why a specific MBE/DBE was not solicited. If the bidder/offeror identifies additional MBE/DBE Firms who may be available to perform Identified Items of Work, those additional MBE/DBE Firms should also be included below. Copies of all written solicitations and documentation of follow-up calls to MBE/DBE Firms must be attached to this form. If the bidder/offeror used a Non-MBE/DBE or is self-performing the identified items of work, Part 4 must be completed.

Name of Identified MBE/DBE Firm & MBE Classification	**Describe Item of Work Solicited**	**Initial Solicitation Date & Method**	**Follow-up Solicitation Date & Method**	**Details for Follow-up Calls**	**Quote Rec'd**	**Quote Used**	**Reason Quote Rejected**
Firm Name: _____ **MBE Classification (Check only if requesting waiver of MBE subgoal.)** ☐ African American-Owned ☐ Hispanic American- Owned ☐ Asian American-Owned ☐ Women-Owned ☐ Other MBE Classification _____		Date: □ Mail □ Facsimile □ Email	Date: □ Phone □ Mail □ Facsimile □ Email	Time of Call: Spoke With: □ Left Message	□ Yes □ No	□ Yes □ No	□ Used Other MBE/DBE □ Used Non-MBE/DBE □ Self-performing
Firm Name: _____ **MBE Classification (Check only if requesting waiver of MBE subgoal.)** ☐ African American-Owned ☐ Hispanic American- Owned ☐ Asian American-Owned ☐ Women-Owned ☐ Other MBE Classification _____		Date: □ Mail □ Facsimile □ Email	Date: □ Phone □ Mail □ Facsimile □ Email	Time of Call: Spoke With: □ Left Message	□ Yes □ No	□ Yes □ No	□ Used Other MBE/DBE □ Used Non-MBE/DBE □ Self-performing

☐Please check if Additional Sheets are attached.

MDOT MBE/DBE FORM E
GOOD FAITH EFFORTS GUIDANCE AND DOCUMENTATION

PART 5 – ADDITIONAL INFORMATION REGARDING REJECTED MBE/DBE QUOTES

PAGE __ OF ___

Prime Contractor	Project Description	Solicitation Number

This form must be completed if Part 3 indicates that a MBE/DBE quote was rejected because the bidder/offeror is using a Non-MBE/DBE or is self-performing the Identified Items of Work. Provide the Identified Items Work, indicate whether the work will be self-performed or performed by a Non-MBE/DBE, and if applicable, state the name of the Non-MBE/DBE. Also include the names of all MBE/DBE and Non-MBE/DBE Firms that provided a quote and the amount of each quote.

Describe Identified Items of Work Not Being Performed by MBE/DBE (Include spec/section number from bid)	Self-performing or Using Non-MBE/DBE (Provide name)	Amount of Non-MBE/DBE Quote	Name of Other Firms who Provided Quotes & Whether MBE/DBE or Non-MBE/DBE	Amount Quoted	Indicate Reason Why MBE/DBE Quote Rejected & Briefly Explain
	□ Self-performing □ Using Non-MBE/DBE _____	$_____	_____ □ MBE/DBE □ Non-MBE/DBE	$_____	□ Price □ Capabilities □ Other
	□ Self-performing □ Using Non-MBE/DBE _____	$_____	_____ □ MBE/DBE □ Non- MBE/DBE	$_____	□ Price □ Capabilities □ Other
	□ Self-performing □ Using Non-MBE/DBE _____	$_____	_____ □ MBE/DBE □ Non- MBE/DBE	$_____	□ Price □ Capabilities □ Other

☐Please check if Additional Sheets are attached.

INFORMATION REQUIRED TO BE SUBMITTED FOR FEDERALLY ASSISTED CONTRACTS:

(a) Each bidder shall provide the following information:

NAME OF FIRM:_____

_____
Street and/or P.O. Box

_____
City State Zip Code

____ DBE ____ Non-DBE Age of the firm ____ years
Annual gross receipts per last calendar year _____<$500,000 ____$500,000-1,000,000
____$1,000,000-3,000,000 ____$3,000,000-5,000,000 ____$5,000,000-10,000,000
____>$10,000,000

(b) Each bidder shall provide the following information for each firm quoting or considered as subcontractors and/or suppliers:

NAME OF FIRM:_____

_____
Street and/or P.O. Box

_____
City State Zip Code

____ DBE ____ Non-DBE Age of the firm ____ years
Annual gross receipts per last calendar year _____<$500,000 ____$500,000-1,000,000
____$1,000,000-3,000,000 ____$3,000,000-5,000,000 ____$5,000,000-10,000,000
____> $10,000,000

NAME OF FIRM:_____

_____
Street and/or P.O. Box

_____
City State Zip Code

____ DBE ____ Non-DBE Age of the firm ____ years
Annual gross receipts per last calendar year _____<$500,000 ____$500,000-1,000,000
____$1,000,000-3,000,000 ____$3,000,000-5,000,000 ____$5,000,000-10,000,000
____> $10,000,000

NAME OF FIRM:____

____
Street and/or P.O. Box

____
City State Zip Code

_____ DBE _____ Non-DBE Age of the firm _____ years
Annual gross receipts per last calendar year _____<$500,000 _____$500,000-1,000,000
_____$1,000,000-3,000,000 _____$3,000,000-5,000,000 _____$5,000,000-10,000,000
_____> $10,000,000

NAME OF FIRM:____

____
Street and/or P.O. Box

____
City State Zip Code

_____ DBE _____ Non-DBE Age of the firm _____ years
Annual gross receipts per last calendar year _____<$500,000 _____$500,000-1,000,000
_____$1,000,000-3,000,000 _____$3,000,000-5,000,000 _____$5,000,000-10,000,000
_____> $10,000,000

NAME OF FIRM:____

____
Street and/or P.O. Box

____
City State Zip Code

_____ DBE _____ Non-DBE Age of the firm _____ years
Annual gross receipts per last calendar year _____<$500,000 _____$500,000-1,000,000
_____$1,000,000-3,000,000 _____$3,000,000-5,000,000 _____$5,000,000-10,000,000
_____> $10,000,000

Submit additional copies of this page as page 43A of 45, 43B of 45, etc. as necessary, and place them as the last pages in the Invitation for Bids. Place an "X" for "NO" on the last copy. Any additional Copies: ______ NO _____ YES

EXTRA WORK, CONTRACT TIME, BONDING, LIQUIDATED DAMAGES, AND PROPOSAL GUARANTY

EXTRA WORK. It is further proposed to do all "Extra Work" which may be required to complete the work contemplated at unit prices or lump sum prices to be agreed upon in writing prior to starting such extra work, or if such prices or sums cannot be agreed upon, to perform such work on a Force Account basis as specified in TC-7.03.

CONTRACT TIME. To commence work as specified in the "Notice to Proceed" and to prosecute the work to complete the contract within/or before

Total Contract Time:_____ (calendar date) – **To be completed by Proposer**

Any delay in awarding or the execution of this contract will not be considered as a basis for any monetary claim, however, an extension of time may be considered by the Administration, if warranted.

BONDING. When the Contractor's bid is $100,000 or more, the Contractor shall furnish a Payment Bond and a Performance Bond in the full amount of the Contract Award as security for the construction and completion of the contract in conformance with the Plans, Standard Specifications, revisions thereto, General Provisions and Special Provisions.

To guarantee all of the work performed under this contract to be done in conformance with the Standard Specifications, revisions thereto, General Provisions and Special Provisions in a good workmanlike manner and to renew or repair any work which may be rejected due to defective materials or workmanship, prior to final completion and acceptance of the work, also we have the equipment, labor, supervision and financial capacity to perform this contract either with our organization or with Subcontractors.

LIQUIDATED DAMAGES. The Contractor is hereby advised that liquidated damages in the amount of

N/A dollars (N/A) per working day

Four Thousdand Forty dollars ($4,040.00) per calendar day

will be assessed for unauthorized extensions beyond the contracted time of completion.

PROPOSAL GUARANTY. A bid security is not required on Contract Proposals under $100,000.

A bid security totaling at least five percent (5%) of the bid amount will be required on contracts of $100,000 or over.

Acceptable forms of security for bid guaranty shall be per GP-2.07.

Enclosed herewith, find bid security based on at least five percent (5%) of the aggregate amount of the bid submitted, and made payable to the "State of Maryland". This bid security is a Proposal Guaranty (which is understood will be forfeited in the event the contract is not executed, if awarded to the signer of this affidavit).

Commercial Nondiscrimination

A. As a condition of entering into this Agreement, Contractor represents and warrants that it will comply with the State's Commercial Nondiscrimination Policy, as described under Title 19 of the State Finance and Procurement Article of the Annotated Code of Maryland. As part of such compliance, Contractor may not discriminate on the basis of race, color, religion, ancestry, national origin, sex, age, marital status, sexual orientation, sexual identity, genetic information or an individual's refusal to submit to a genetic test or make available the results of a genetic test or on the basis of disability, or other unlawful forms of discrimination in the solicitation, selection, hiring, or commercial treatment of subcontractors, vendors, suppliers, or commercial customers, nor shall Contractor retaliate against any person for reporting instances of such discrimination. Contractor shall provide equal opportunity for subcontractors, vendors, and suppliers to participate in all of its public sector and private sector subcontracting and supply opportunities, provided that this clause does not prohibit or limit lawful efforts to remedy the effects of marketplace discrimination that have occurred or are occurring in the marketplace. Contractor understands that a material violation of this clause shall be considered a material breach of this Agreement and may result in termination of this Agreement, disqualification of Contractor from participating in State contracts, or other sanctions. This clause is not enforceable by or for the benefit of, and creates no obligation to, any third party.

B. The Contractor agrees to include the clause contained in subsection (A), above, in all subcontracts, regardless of the tier.

C As a condition of entering into this Agreement, upon the request of the Commission on Civil Rights, and only after the filing of a complaint against Contractor under Title 19 of the State Finance and Procurement Article of the Annotated Code of Maryland, as amended from time to time, Contractor agrees to provide within 60 days after the request a complete list of the names of all subcontractors, vendors, and suppliers that Contractor has used in the past 4 years on any of its contracts that were undertaken within the State of Maryland, including the total dollar amount paid by Contractor on each subcontract or supply contract. Contractor further agrees to cooperate in any investigation conducted by the State pursuant to the State's Commercial Nondiscrimination Policy as set forth under Title 19 of the State Finance and Procurement Article of the Annotated Code of Maryland, and to provide any documents relevant to any investigation that are requested by the State. Contractor understands that violation of this clause is a material breach of this Agreement and may result in contract termination, disqualification by the State from participating in State contracts, and other sanctions.