



Maryland Department of Transportation

*State Highway Administration
Baltimore, Maryland
Request for Proposals*

Contract No. PG7585184

MD 4 from Forestville Road to MD 458 (Silver Hill Road)

**Community Safety and Enhancement Project
Design-Build**

Prince George's County

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

The State Highway Administration will only be responsible for the completeness of documents obtained directly from the State Highway Administration Cashier's Office.

Failure to attach all addenda may cause the bid to be irregular.

VENDOR I.D. NUMBER

S.H.A. USE ONLY

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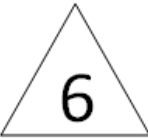


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NOTICE TO CONTRACTORS

Most SHA projects advertised for construction after July 1, 2012 were designed to follow the “2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control”. This project will be built using the 2011 version of these Standards and Specifications. These Standards and Specifications contain significant revisions to materials and methods compared to earlier versions. Perspective bidders are encouraged to consider the impacts of these changes when preparing their bids. These Standards and Specifications can be found on the internet at: <http://www.roads.maryland.gov/Index.aspx?PageId=689&d=6> .

NOTICE TO CONTRACTORS

Environmental Stewardship

The Maryland State Highway Administration is committed to the development and maintenance of the Administration's highway system in an environmentally responsible manner. Therefore, Contractors are encouraged to consider the use of Administration-approved recycled and reclaimed materials in construction projects where practicable, and in accordance with the Plans and Specifications.

The Contractor is also encouraged to reuse, salvage, or recycle all generated waste materials to the extent possible. Materials that are easily recognizable, maintain their physical properties, meet the required material properties for recycling, are easily separated and transported, and have value as commodities are candidates for recycling. These types of materials generally include metals (steel, iron, copper, aluminum, bronze, etc.), plastics (cones, barrels, barricades, crash cushion plastic barrels, conduit, containers, etc.), aluminum poles and signs, electronic and electrical components, signals and signal components, topsoil, formwork, temporary falsework, brick, masonry, stone, wood, paper, and timber and yard waste from clearing and grubbing operations.



NOTICE TO ALL HOLDERS OF THIS CONTRACT DOCUMENT

**NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM (NCHRP)
REPORT 350 AND THE MANUAL FOR ASSESSING SAFETY HARDWARE (MASH)
IMPLEMENTATION SCHEDULE FOR DEVICES USED IN THE MAINTENANCE OF
TRAFFIC**

Except as otherwise specified in this Section, all items for the maintenance of traffic, including those listed under the following categories, shall be crashworthy in conformance with Level 3 or other Level as specified by the Engineer in conformance with 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, the Contractor shall provide the Engineer with the manufacturers' certifications that the devices comply with the specified criteria.

Unless specifically waived by an attachment to these Contract Provisions, devices must be approved by the Office of Traffic and Safety.

Category 1 Devices

These devices are cones, tubular markers, flexible delineator posts, and drums, all without any accessories or attachments, which are used for channelization and delineation.

Category 2 Devices

These devices are Type I, II, and III barricades; portable sign supports with signs; intrusion alarms; and drums, vertical panels, and cones, all with 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 are area lighting supports, arrow panels, and portable variable message signs that are usually portable or trailer-mounted.

CONTRACT PROVISIONS
(NCHRP) REPORT 350 AND MASH IMPLEMENTATION SCHEDULE

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WORK ZONE DEVICES	IMPLEMENTATION SCHEDULE TO CONFORM TO NCHRP REPORT 350 OR MASH CRITERIA
CATEGORY 1 Cones, tubular markers, flexible delineator posts, and drums (all without any accessories or attachments)	All devices shall conform to NCHRP Report 350 or MASH criteria.
CATEGORY 2 Type I, II, and III barricades; portable signs supports with signs; intrusion alarms; and drums, vertical panels, and cones (all with accessories or attachments)	All devices shall conform to NCHRP Report 350 or MASH criteria.
CATEGORY 3 (a) Truck Mounted Attenuators (TMAs); Trailer Truck Mounted Attenuators (TTMAs) (b) Temporary Barriers (1) Concrete Barrier (2) Traffic Barrier W Beam and Water Filled Barrier (3) Steel/Aluminum Barrier (c) Temporary End Treatments	All devices shall conform to NCHRP Report 350 or MASH criteria.
CATEGORY 4 Portable trailer mounted devices including area lighting supports, arrow panels, and changeable message signs	The Contractor may use devices that do not conform to NCHRP Report 350 or MASH criteria, until compliance dates are established. Use of these devices shall comply with the provisions of Part 6 of the 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.

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 STABILIZATION OF 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.



**AFFIRMATIVE ACTION REQUIREMENTS
UTILIZATION OF MINORITY BUSINESS ENTERPRISES
FOR STRAIGHT STATE CONTRACTS
(Where the Contractor's bid exceeds \$50,000)**

A. General

For the purpose of these requirements, the following terms as defined below shall apply:

Administration Representative – A Minority Business Enterprise (MBE) Officer of an Administration who enforces the laws and regulations pertaining to 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 minority businesses fully in contracts and programs.

Business Enterprises – A 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/her designee, has been certified as a bona fide MBE.

Director, Office of Equal Opportunity – The individual designated for the Administration's overall MBE compliance.

Joint Venture – An association of a 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 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.

Minority Business Enterprise (MBE) – Any legal entity, other than a joint venture, organized to engage in commercial transactions which is at least 51 percent owned and controlled by one or more minority persons, or a nonprofit entity organized to promote interests of the physically or mentally disabled.

MBE Directory – A compilation of businesses certified by MDOT as 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.

MBE Program – A program developed by MDOT to implement the requirements of Title 14, Subtitle 3 of the State Finance Procurement Article, Annotated Code of Maryland and Title 10, Subtitle 3 of the State Finance Procurement Article of the Annotated Code of Maryland for Leases of State-Owned Property.



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MBE FOR STRAIGHT STATE DESIGN-BUILD CONTRACTS

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MBE Participation Packet – The documents submitted by the bidder or proposer pursuant to the appropriate special bid provisions. The MBE Participation Packet shall consist of the MBE Utilization Affidavit and the MBE Participation Schedule, both of which must be submitted with your bid or initial price proposal. The MBE Participation Packet also includes the following documents which are submitted after bids or proposals are opened: MDOT Outreach Efforts Compliance Statement (Form MDOT-OP-014-2), the MDOT MBE Subcontractor Project Participation Affidavit (Form MDOT-OP-015-2), the MDOT Joint Venture Disclosure Affidavit (Form D-EEO-006) and the Minority Contractor Unavailability Certificate (Form OOC46).

Minority or Minority Person for Straight State Contracts - Member of one of the following socially and economically disadvantaged groups:

1. African American – An individual having origins in any of the Black racial groups of Africa;
2. American Indian/Native American – An individual having origins in any of the original peoples of North America and who is a documented member of a North American tribe, band, or otherwise organized group of native people who are indigenous to the continental United States or who otherwise have a special relationship with the United States or a state through treaty, agreement, or some other form of recognition. This includes an individual who claims to be an American Indian/Native American and who is regarded as such by the American Indian/Native American community of which he/she claims to be a part, but does not include an individual of Eskimo or Aleutian origin;
3. Asian – An individual having origins in the far East, Southeast Asia, or the Indian Subcontinent and who is regarded as such by the community of which the person claims to be a part;
4. Hispanic – An individual of Mexican, Puerto Rican, Cuban, Central or South American, Portuguese or other Spanish culture or origin regardless of race, and who is regarded as such by the community of which the person claims to be a part;
5. Women – This category shall include all women, regardless of race or ethnicity, although a woman who is also a member of an ethnic or racial minority group may elect that category in lieu of the gender category; or
6. Physically or Mentally Disabled – An individual who has an impairment that substantially limits one or more major life activity, who is regarded generally by the community as having such a disability, and whose disability has substantially limited his or her ability to engage in competitive business.

B. MBE and Good Faith Effort Requirements

1. This contract includes an MBE participation goal for subcontracting, and/or procurement of materials, and/or services. Bidders/Offerors must make a good faith effort to meet the MBE participation goal **before bids or proposals are due**, including outreach efforts. A bid or initial proposal must include both a completed and executed Certified MBE Utilization and Fair Solicitation Affidavit and MBE Participation Schedule. The failure of a bidder to complete and submit the Certified MBE Utilization and Fair Solicitation



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MBE FOR STRAIGHT STATE DESIGN-BUILD CONTRACTS

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Affidavit and MBE Participation Schedule shall result in a determination that the bid is not responsive. The failure of an offeror to complete and submit the Certified MBE Utilization and Fair Solicitation Affidavit and MBE Participation Schedule 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 MBE goal, prior to completing the Certified MBE Utilization and Fair Solicitation Affidavit and MBE Participation Schedule and prior to submitting a bid or initial proposal bidders (or offerors) including those bidders or offerors that are certified MBEs 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 certified MBEs 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 certified MBEs solicited and to document these attempts;
 - d. Assist certified MBEs 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 certified MBEs.

3. The bidder shall seek commitments from minority business enterprises by subcontracting and/or procurement of materials and/or services, the combined value of which equals or exceeds the established Contract goal of 26 percent of the total value of the prime Contract. The Administration has further established that, within this Contract goal, there shall be a sub-goal of a minimum of 7 percent participation by firms classified as African American-owned firms, a sub-goal of 0 percent participation by firms classified as Woman-owned firms, a sub-goal of a minimum of 0 percent participation by firms classified as Hispanic American-owned firms, and a sub-goal of a minimum of 4 percent participation by firms classified as Asian American-owned firms. A bidder may count toward its MBE goals expenditures for materials and supplies obtained from MBE regular dealers and/or manufactures provided that the MBE assume the actual and contractual responsibility for the provision of the materials and supplies. The bidder may count its entire expenditure to a MBE 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 MBE regular dealer, that is not a manufacturer, provided that the MBE supplier performs a commercially useful function in the supply process. The apparent successful proposer shall submit to the Administration, within ten (10) business days after notification that it is the apparent successful proposer, an acceptable Affirmative Action Plan for the utilization of Minority Business Enterprises in this Contract. The Contract will not be awarded without the bidder's Affirmative Action Plan being approved by the Administration.



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



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MBE FOR STRAIGHT STATE DESIGN-BUILD CONTRACTS

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activities; utility coordination; permitting; and public information) for this contract of no less than 30 percent of the portion of the contract price allocable to professional services.

4. The Affirmative Action Plan shall include as a minimum:

a. The name of an employee designated as the bidder's Minority Business Liaison Officer.

b. A complete MBE Subcontractor Project Participation Affidavit (MDOT-OP 015-2), of minority business enterprises, from among those whose names appear in the MDOT MBE Directory or who are otherwise certified by MDOT as being minority business enterprises. Except as permitted by law and approved by the Administration, the MBE Subcontractor Project Participation Affidavit (MDOT-OP 015-2) submitted after the opening of bids or proposals shall include all MBE firms identified on the MBE participation schedule submitted with the bid or initial proposal with a percentage of participation that meets or exceeds the percentage of participation indicated in the bid or initial proposal. The MBE Subcontractor Project Participation Affidavit (MDOT-OP 015-2) shall be completed and signed by the Bidder and MBE for each business listed in the MBE Participation Schedule.

c. A completed Outreach Efforts Compliance Statement (MDOT-OP 014-2).

5. When a bidder intends to attain the appropriate goal for minority business enterprise participation by use of a joint venture, the bidder shall submit a Joint Venture Disclosure Affidavit (MDOT D-EEO-006-A) showing the extent of the MBE 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 signed by all parties.

6. When the proposed MBE participation does not meet the MBE Contract goals, information sufficient to demonstrate that the bidder has made good faith efforts to meet these goals shall be required.

7. Request for Exception to the MBE Goal

If the bidder is unable to secure from MBEs by subcontracting and/or by procurement of materials and/or services, commitments which at least equal the appropriate percent of the value of the prime Contract at time of bid, the bidder shall request, in writing, waiver of the unmet portion of the goal. This request must be initiated by checking the appropriate box on the Certified MBE 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:

a. A detailed statement of efforts made prior to bid to contact and negotiate with MBEs including the dates, names, addresses, and telephone numbers of MBEs who were



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- contacted; a description of the information provided to the MBEs regarding the work to be performed, anticipated schedule for portions of the work to be performed; and a detailed statement of the reasons why additional prospective agreements with MBEs were not reached;
- b. A detailed statement of the efforts made to select portions of the work proposed to be performed by MBEs in order to increase the likelihood of achieving the stated goals;
 - c. For each MBE 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 MBE contacted but unavailable, a Minority Contractor Unavailability Certificate, (OOC46), signed by the minority business enterprise, or a statement from the bidder stating that the MBE 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 MBE 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 MBEs who have the capability to perform the work of the contract. The bidder must solicit this interest within sufficient time to allow the MBEs to respond to the solicitation. The bidder must determine with certainty if the MBEs are interested by taking appropriate steps to follow up initial solicitations.
- (2) Selecting portions of the work to be performed by MBEs in order to increase the likelihood that the MBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate MBE participation, even when the bidder or offeror might otherwise prefer to perform these work items with its own forces.
- (3) Providing interested MBEs 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 MBEs. It is the bidder's or offeror's responsibility to make a portion of the work available to MBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available MBE subcontractors and suppliers, so as to facilitate MBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of MBEs that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for MBEs to perform the work.
- (b) A bidder using good business judgment would consider a number of factors in



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negotiating with subcontractors, including MBE 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 MBEs is not in itself sufficient reason for a bidder's failure to meet the contract MBE 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 MBEs if the price difference is excessive or unreasonable.

- (5) Not rejecting MBEs 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 MBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or contractor.
- (7) Making efforts to assist interested MBEs 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 MBEs.
- (9) In determining whether a bidder or offeror has made good faith efforts, the Administration 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 MBE 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 MBE 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. It



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is the policy of MDOT to encourage its Contractors to utilize, on a continuing basis, MBE banks.

10. Bidder Records

The bidder shall maintain records showing actions which have been taken to comply with procedures set forth herein.

11. Bidders Cooperation

The bidder shall cooperate with the Administration representative in any review of the Contractor's procedures and practices, with respect to the MBEs, which the Administration's representative may, from time to time, conduct.

12. Bidder MBE Modifications

During the life of the Contract, all plans to modify the approved MBE participation program will require the approval of the Administrator or his authorized representative. This will include any changes to items of work to be sublet or materials and services to be obtained which differs from those in the original MBE participation program. All requests for revisions shall be directed to the appropriate District Engineer for disposition.

The successful proposer's failure to participate in any of the above proceedings or failure to furnish information after written request may result in rejecting the bid and non-award of the Contract.

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 include:
 - a. The name of minority and non-minority subcontractors and suppliers, the type of work materials or services being performed on or incorporated in this project, the monetary value of such work materials or services, the terms of performance and/or delivery, copies of all cancelled checks paid to subcontractors and suppliers and a record of all payments made to subcontractors and suppliers.
 - b. Documentation of all correspondence, contacts, telephone calls, etc., to obtain the services of minority business enterprises on this project.
 - c. The progress and efforts made in seeking out minority contractor organizations and individual minority contractors for work on this project.
2. The Contractor shall submit reports, on a monthly basis, of those contracts and other business transactions executed with minority business enterprises, with respect to the records referred to in C. 1., 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, the Contractor shall notify



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the Administration's representative and request additional time to submit the report. Failure of the Contractor to report in a time manner may result in a finding of noncompliance. Additional report may be required by the Administration upon request.

3. To insure compliance with the certified MBE Contract participation goal, the Contractor shall:
 - a. Submit monthly reports listing all unpaid invoices over 30 days, from certified MBE subcontractors, and the reason payment has not been made.
 - b. Include in its agreement, with certified MBE subcontractors a, requirement that MBE subcontractors are to submit monthly, to the Administration, a report identifying the prime Contractor and listing the following:
 - (1) Payment received from the prime Contractor, in the proceeding 30 days;
 - (2) Invoices for which the subcontractor has not been paid.
4. All such records and reports shall be retained for a period of three years following acceptance of final payment and shall be available for inspection by the Maryland Department of Transportation and this 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's representative will conduct an investigation. If the Administration representative finds the prime Contractor or any subcontractor is not in compliance with these provisions, the representative will make a report of noncompliance and notify such Contractor in writing of the steps that will, in the judgement of the Administration, bring the Contractor into compliance. If the Contractor fails or refuses to comply fully with such steps, the Administration's representative will make a final report of the noncompliance to the Administrator, who may direct the imposition of one or more of the sanctions listed below:
 - a. Suspension of work on the project, pending correction;
 - b. Withholding payment or a percentage thereof, pending correction;
 - c. Referral of MBEs to the MDOT office of MBE, for review for decertification, for review/referral to the Attorney General's Office for review/initiation of debarment or for review for criminal prosecution through the MDOT Office of General Counsel;
 - d. Initiation of suspension in accordance with COMAR regulations;
 - e. Referral to the Attorney General's Office for review for debarment or for criminal prosecution through the MDOT Office of General Counsel;
 - f. Any other action as appropriate, within the discretion of the Administrator.



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2. If the documents used to determine the status of a MBE contains false, or misleading or misrepresenting information, the matter will be referred to the MDOT Office of the General Counsel for appropriate action. In addition, when directed by the Administrator, the Contractor shall terminate, without liability to the Administration, its contract with a firm, which for any reason, is either no longer certified or no longer eligible to do business in the State. The Contractor shall promptly submit plans for maintaining the required MBE participation on the project or appropriate request for waiver of all or part of the Contract goal with appropriate documentation to support Good Faith Efforts (as established by COMAR including the MDOT MBE/MBE Program Manual). The program and all revisions require the Administrator's approval.

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.



CONTRACT PROVISIONS
MBE DUAL CERTIFICATION

Effective on October 1, 2009, Minority Business Enterprise (MBE) firms may elect to be dually certified as woman-owned businesses and as members of an ethnic or racial category. For purposes of achieving any gender or ethnic/racial MBE participation subgoals in a particular contract, an MBE firm that has dual certification may participate in the contract either as a woman-owned business or as a business owned by a member of a racial or ethnic minority group, **but not both**.

- (a) A firm must be listed in the MDOT MBE/DBE Directory with the gender category in order to be used to meet the gender subgoal.
- (b) A firm must be listed in the MDOT MBE/DBE Directory with an ethnic/racial category in order to be used to meet the ethnic/racial subgoal.
- (c) A firm must be listed in the MDOT MBE/DBE Directory with both the gender and ethnic/racial categories in order for a contractor to have the option of selecting which of those categories it will use for the firm on a State contract.
- (d) Contractors should designate whether the MBE firm will be used as a woman-owned business or as a business owned by a member of a racial/ethnic group before calculating the percentage of MBE participation goals and subgoals they intend to meet.

Maryland's MBE/DBE Directory will reflect the dual certification status beginning October 1, 2009. You can access the MBE/DBE Directory at <http://mbe.mdot.state.md.us>.



CONTRACT PROVISIONS

APPRENTICESHIP TRAINING FUND

Effective July 1, 2013 State Law requires all contractors and subcontractors working on State prevailing wage projects with prevailing wage determinations to register (Apprenticeship Training Fund Site) with the Division of Labor and Industry Prevailing Wage Unit prior to the commencement of work and to make certain contributions toward improving and expanding apprenticeship programs in the State. In addition, registered apprenticeship programs and organizations that have registered apprenticeship programs that have been selected by contractors and subcontractors for contributions also are required to register with the Division of Labor and Industry Prevailing Wage Unit.

The State Apprenticeship Training Fund requires contractors and some subcontractors on public work contracts to make contributions to: (1) a registered apprenticeship program, (2) an organization that operates registered programs, or (3) the State Apprenticeship Training Fund.

The following information concerning the requirements of the apprenticeship training fund program are being provided for informational purposes only. It is the contractor's responsibility to contact the Maryland Department of Labor, Licensing and Regulation (DLLR), prior to commencement of any work, to determine how these provisions are being implemented and enforced by DLLR.

Definitions. The following terms have the meanings indicated.

(a) Terms Defined.

- (1) "Approved apprenticeship program" means an apprenticeship program or an organization with an apprenticeship program which has been registered with, and approved by, the Maryland Apprenticeship and Training Council or the United States Department of Labor.
- (2) "Commissioner" means the Commissioner of Labor and Industry.
- (3) "Covered craft" means a classification of workers listed in the prevailing wage determination applicable to a prevailing wage project.
- (4) "Fund" means the State Apprenticeship Training Fund.

Hourly Contribution Rate.

- (a) If a contractor participates in an apprenticeship training program for each covered craft, the contractor satisfies their obligation under State Finance and Procurement Article, §17-



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APPRENTICESHIP TRAINING FUND

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- 603(a)(1), Annotated Code of Maryland, by making contributions of at least 25 cents per person per hour.
- (b) If a subcontractor participates in an apprenticeship training program for each covered craft, the subcontractor satisfies their obligation under State Finance and Procurement Article, §17-604(a)(1), Annotated Code of Maryland, by making contributions of at least 25 cents per person per hour.
 - (c) Contractors and subcontractors that do not participate in an apprenticeship training program shall pay at least 25 cents per person per hour for each employee in each covered craft on the prevailing wage project to a registered apprenticeship program, an organization that has a registered apprenticeship program, or the Fund.
 - (d) Contractors and subcontractors who make contributions to the Fund shall do so on a monthly basis.
 - (e) Contractors and subcontractors who make contributions to a registered apprenticeship program or an organization that has a registered apprenticeship program shall make contributions on a monthly basis or consistent with a collective bargaining agreement or other contractual arrangement.
 - (f) If there is a prevailing wage determination that includes a fringe benefit contribution for apprenticeship that exceeds 25 cents per hour, a contractor or subcontractor that makes contributions to the Fund shall pay to the employee wages in the amount that the fringe benefit contribution for apprenticeship exceeds 25 cents per hour.

Contractor and Subcontractor Registration.

- (a) Contractors performing work on a prevailing wage project shall complete the registration process at the Division of Labor and Industry's website at <https://www.dllr.state.md.us/prevwage>.
- (b) Subcontractors who are performing work valued at \$100,000 or more on a prevailing wage project shall complete the registration process at the Division of Labor and Industry's website at <https://www.dllr.state.md.us/prevwage>.
- (c) Prior to the commencement of work, a registered contractor or registered subcontractor shall log onto the Division of Labor and Industry's website at <https://www.dllr.state.md.us/prevwage> and complete the required project log information including:
 - (1) The prevailing wage project number;
 - (2) Contract value;



- (3) Identification of subcontractors to perform work on the project and subcontract value amount;
- (4) Designation of the program or Fund where the contractor or subcontractor will make contributions; and
- (5) Any other information that the Commissioner requires.

Contractor and Subcontractor Notification to Subcontractors.

- (a) Contractors and subcontractors who hire subcontractors performing work valued at \$100,000 or more on a public work contract subject to the Maryland Prevailing Wage Law shall provide the subcontractors with written notice of the following requirements:
 - (1) Subcontractors shall complete the registration process at the Division of Labor and Industry's website at <https://www.dllr.state.md.us/prevwage>;
 - (2) Prior to the commencement of work, a subcontractor shall log onto the Division of Labor and Industry's website at <https://www.dllr.state.md.us/prevwage> and complete the required project log information including:
 - (a) The prevailing wage project number;
 - (b) Contract value;
 - (c) Identification of all subcontractors to perform work on the project and subcontract value amount;
 - (d) Designation of the program or Fund where the subcontractor will make contributions; and
 - (e) Any other information that the Commissioner requires; and
 - (f) Subcontractors performing work on a prevailing wage project valued at \$100,000 or more are required to make payments to approved apprenticeship programs or to the Fund for each employee employed in classifications listed on the prevailing wage determination.
- (b) Contractors and subcontractors shall retain a copy of the written notice required in §A of this regulation that was provided to covered subcontractors for inspection and review by the Commissioner for 3 years after the completion of their work on a public work project.



Contractor and Subcontractor Obligations Related to Contributions.

Contractors and subcontractors are required to:

- (a) Indicate on their prevailing wage payroll record their contributions under State Finance and Procurement Article, §17-603 or 17-604, Annotated Code of Maryland; and
- (b) Certify that the contributions were received by an approved apprenticeship program or the Fund.

Notification to Division of Labor and Industry of Changes to Designated Approved Apprenticeship Programs or Fund.

- (a) Contractors and subcontractors shall log onto the Division of Labor and Industry's website at <https://www.dllr.state.md.us/prevwage> and indicate each approved apprenticeship program or the Fund to which it will make contributions.
- (b) If a contractor or subcontractor intends to change a designation, it shall log onto the Division of Labor and Industry's website at <https://www.dllr.state.md.us/prevwage> to indicate the change in designation 30 days prior to that change.

Approved Apprenticeship Program Obligations.

- (a) Upon notice from the Division of Labor and Industry that the approved apprenticeship program has been designated for contributions by a contractor or subcontractor, an approved apprenticeship program shall register on the Division of Labor and Industry's website at <https://www.dllr.state.md.us/prevwage>.
- (b) An approved apprenticeship program shall complete the requested information on contributions received from contractors and subcontractors for each covered craft for each prevailing wage project at the Division of Labor and Industry's website at <http://www.dllr.state.md.us/prevwage> on or before the last day of the month immediately following each calendar quarter.
- (c) Certify that all funds received are used solely for the purpose of improving or expanding apprenticeship training in the State.

Audit of an Approved Apprenticeship Program. The Commissioner may require an independent audit by a certified public accountant of an approved apprenticeship program to verify that contributions received are used consistent with this subtitle.



Enforcement Procedures.

- (a) The Commissioner may investigate whether State Finance and Procurement Article, Title 17, Subtitle 6, Annotated Code of Maryland, has been violated:
 - (1) On the Commissioner's own initiative;
 - (2) On receipt of a written complaint; or
 - (3) On referral from another State agency.
- (b) The Commissioner may require a contractor, subcontractor, or an approved apprenticeship program to produce records as part of its investigation.
- (c) The Commissioner may enter a place of business to:
 - (1) Interview individuals; or
 - (2) Review and copy records.
- (d) If after an investigation, the Commissioner determines that there is a violation of State Finance and Procurement Article, Title 17, Subtitle 6, Annotated Code of Maryland, or a regulation adopted to carry out the title, the Commissioner shall issue an administrative charge that shall:
 - (1) Describe in detail the nature of the alleged violation;
 - (2) Cite the provision of law or regulation that is alleged to have been violated; and
 - (3) State the penalty, if any.
- (e) Within a reasonable amount of time after the issuance of the administrative charge, the Commissioner shall send a copy of the administrative charge to the alleged violator by certified mail with notice of the opportunity to request a hearing.
- (f) Within 15 days after the alleged violator receives the administrative charge, the employer may submit a written request for a hearing on the administrative charge and proposed penalty.
- (g) If a hearing is not requested within 15 days, the administrative charge, including any penalties, shall become a final order of the Commissioner.



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APPRENTICESHIP TRAINING FUND

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- (h) If there is a request for a hearing, the Commissioner may delegate the hearing to the Office of Administrative Hearings in accordance with State Government Article, Title 10, Subtitle 2, Annotated Code of Maryland.
- (i) A proposed decision of an administrative law judge shall become a final order of the Commissioner unless, within 15 days of the issuance of the proposed decision:
 - (1) The Commissioner orders review of the proposed decision; or
 - (2) The alleged violator submits to the Commissioner a written request for review of the proposed decision.
- (j) After review of the proposed decision under §I of this regulation, with or without a hearing on the record, the Commissioner shall issue an order that affirms, modifies, or vacates the proposed decision.



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.



CONTRACT PROVISIONS
TRAFFIC CONTROL PLAN CERTIFICATION

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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.



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PREVAILING WAGE INSTRUCTIONS

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- (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.



CONTRACT PROVISIONS
PREVAILING WAGE INSTRUCTIONS

CONTRACT NO. PG7585184
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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).



*Maryland Department of Transportation
State Highway Administration*

**CONTRACT PROVISIONS
PREVAILING WAGE INSTRUCTIONS**

CONTRACT NO. PG7585184
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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



STATE OF MARYLAND

DEPARTMENT OF LABOR, LICENSING AND REGULATION
DIVISION OF LABOR AND INDUSTRY
PREVAILING WAGE SECTION
1100 N. Eutaw Street, Room 607
Baltimore, MD 21201
(410) 767-2342

03/21/2014

REQUEST FOR ADVERTISEMENT AND NOTICE TO PROCEED

Gregory Cooke - Procurement Officer
SHA
7491 Connelley Drive
Hanover, MD 21076

Re: Community Safety and Enhancement Project
Project No: PG7585184

Enclosed please find the Prevailing Wage Determination and Instructions for Contractors for the project referenced above.

Upon advertisement for bid or proposal of this project, you are requested to submit to this office the date and name of publication in which such advertisement appeared.

Once awarded, you are further directed to submit to this office, the NOTICE TO PROCEED for the project, complete with the date of notice, the name of the general contractor, and the dollar amount of the project. In addition, we ask that a representative of the prevailing wage Unit be invited to attend the Pre-Construction Conference.

Any questions concerning this matter may be referred to PrevailingWage@dllr.state.md.us

Sincerely,

Enclosures
Wage Determination
Instruction for the Contractor

C. Edward Poarch, II
Supervisor
Prevailing Wage Unit

PREVAILING WAGE INSTRUCTIONS FOR THE CONTRACTOR & SUBCONTRACTOR

The contractor shall electronically submit completed copies of certified payroll records to the Commissioner of Labor & Industry, Prevailing Wage Unit by going on-line to <http://www.dllr.state.md.us/prevwage> and following the instructions for submitting payroll information (NOTE: A contractor must register prior to submitting on-line certified payroll information).

If you have technical questions regarding electronic submittal, contact the Department at prevailingwage@dllr.state.md.us.

All certified payroll records shall have an accurate week beginning and ending date. The contractor shall be responsible for certifying and submitting to the Commissioner of Labor and Industry, Prevailing Wage Unit all of their subcontractors' payroll records covering work performed directly at the work site. By certifying the payroll records, the contractor is attesting to the fact that the wage rates contained in the payroll records are not less than those established by the Commissioner as set forth in the contract, the classification set forth for each worker or apprentice conforms with the work performed, and the contractor or subcontractor has complied with the provisions of the law.

A contractor or subcontractor may make deductions that are (1) required by law; (2) required by a collective bargaining agreement between a bona fide labor organization and the contractor or subcontractor; or (3) contained in a written agreement between an employee and an employer undertaken at the beginning of employment, if the agreement is submitted by the employer to the public body awarding the public work and is approved by the public body as fair and reasonable.

A contractor or subcontractor is required to submit information on-line on their fringe benefit packages including a list of fringe benefits for each craft employed by the contractor or subcontractor, by benefit and hourly amount. Where fringe benefits are paid in cash to the employee or to an approved plan, fund, or program, the contribution is required to be indicated.

Payroll records must be electronically submitted and received within 14 calendar days after the end of each payroll period. If the contractor is delinquent in submitting payroll records, processing of partial payment estimates may be held in abeyance pending receipt of the records. In addition, if the contractor is delinquent in submitting the payroll records, the contractor shall be liable to the contracting public body for liquidated damages. The liquidated damages are \$10.00 for each calendar day the records are late.

Only apprentices registered with the Maryland Apprenticeship and Training Council shall be employed on prevailing wage projects. Apprentices shall be paid a percentage of the determined journey person's wage for the specific craft.

Overtime rates shall be paid by the contractor and any subcontractors under its contracts and agreements with their employees which in no event shall be less than time and one-half the prevailing hourly rate of wages for all hours worked in excess of ten (10) hours in any one calendar day; in excess of forty (40) hours per workweek; and work performed on Sundays and legal holidays.

Contractors and subcontractors employing a classification of worker for which a wage rate was not issued SHALL notify the Commissioner of Labor & Industry, Prevailing Wage Unit, for the purpose of obtaining the wage rate for said classification PRIOR TO BEING EMPLOYED on the project. To obtain a prevailing wage rate which was NOT listed on the Wage Determination, a contractor or subcontractor can look on the DLLR webpage under prevailing wage.

Contractors and subcontractors shall maintain a valid copy of proper State and county licenses that permit the contractor and a subcontractor to perform construction work in the State of Maryland. These licenses must be retained at the worksite and available for review upon request by the Commissioner of Labor and Industry's designee.

Under the Maryland Apprenticeship and Training Council requirements, consistent with proper supervision, training and continuity of employment and applicable provisions in collective bargaining agreements, a ratio of one journey person regularly employed to one apprentice shall be allowed. No deviation from this ratio shall be permitted without prior written approval from the Maryland Apprenticeship and Training Council.

Laborers may NOT assist mechanics in the performance of the mechanic's work, NOR USE TOOLS peculiar to established trades.

ALL contractors and subcontractors shall employ only competent workers and apprentices and may NOT employ any individual classified as a HELPER or TRAINEE on a prevailing wage project.

The State Apprenticeship and Training Fund (Fund) law provides that contractors and certain subcontractors performing work on certain public work contracts are required to make contributions toward apprenticeship. See §17-601 through 17-606, State Finance and Procurement, Annotated Code of Maryland. Contractors and subcontractors have three options where they can choose to make their contributions: (1) participate in a registered apprenticeship training program; (2) contribute to an organization that has a registered apprenticeship training program; or (3) contribute to the State Apprenticeship and Training Fund.

The Department of Labor, Licensing and Regulation (DLLR) is moving forward with final adoption of regulations. The regulations were published in the December 14, 2012 edition of the Maryland Register.

IMPORTANT: Please note that the obligations under this law will become effective on JULY 1, 2013. This law will require that contractors and certain subcontractors make contributions toward apprenticeship and report those contributions on their certified payroll records that they submit pursuant to the prevailing wage law.

The Department is offering outreach seminars to any interested parties including contractors, trade associations, and any other stakeholders. Please contact the Department at prevailingwage@dllr.state.md.us or (410) 767-2968 for seminar times and locations. In addition, information regarding this law will be provided at pre-construction meetings for projects covered by the Prevailing Wage law.

**For additional information, contact:
Division of Labor and Industry
Maryland Apprenticeship and Training
1100 North Eutaw Street, Room 606
Baltimore, Maryland 21201
(410) 767-2246
E-Mail Address: matp@dllr.state.md.us.**

STATE OF MARYLAND

DEPARTMENT OF LABOR, LICENSING AND REGULATION
DIVISION OF LABOR AND INDUSTRY
PREVAILING WAGE SECTION
1100 N. Eutaw Street, Room 607
Baltimore, MD 21201
(410) 767-2342

The wage rates to be paid laborers and mechanics for the locality described below is announced by order of Commissioner of Labor and Industry.

It is mandatory upon the successful bidder and any subcontractor under him, to pay not less than the specific rates to all workers employed by them in executing contracts in this locality. Reference: Annotated Code of Maryland State Finance and Procurement, Section 17-201 thru 17-226.

These wage rates were taken from the locality survey of 2013 for Prince Georges County, issued pursuant to the Commissioner's authority under State Finance and Procurement Article Section 17-209, Annotated Code of Maryland or subsequent modification.

**Note: If additional Prevailing Wage Rates are needed for this project beyond those listed below, contact the Prevailing Wage Unit. Phone: (410) 767-2342, email: prevailingwage@dllr.state.md.

Name and Title of Requesting Officer: Gregory Cooke - Procurement Officer
Department, Agency or Bureau: SHA
7491 Connelley Drive Hanover, MD 21076

Project Number PG7585184

Location and Description of work:

Prince Georges County: Community Safety and Enhancement Project,
MD 4 from Forestville Road to MD 458 (Silver Hill Road)

Determination Number 20320

Date of Issue: Mar 21, 2014

HIGHWAY CONSTRUCTION

CLASSIFICATION	MODIFICATION REASON	BASIC HOURLY RATE	BORROWED FROM	FRINGE BENEFIT PAYMENT
CARPENTER	AD	\$26.81	031	\$8.19
CARPENTER - SHORING SCAFFOLD BUILDER	AD	\$26.81	031	\$8.19
CEMENT MASON	AD	\$19.56		\$5.08
ELECTRICIAN	AD	\$35.10	021	\$16.53
FIRESTOPPER	AD	\$26.06	031	\$6.17
INSULATION WORKER	AD	\$33.13		\$13.72
LABORER - ASPHALT PAVER	AD	\$18.00		\$7.26
LABORER - ASPHALT RAKER	AD	\$11.00	013	\$3.16
LABORER - COMMON OR UNSKILLED	AD	\$18.00		\$7.26
LABORER - LANDSCAPING	AD	\$14.28	031	\$0.25
LABORER - LUTEMAN	AD	\$15.28		\$4.18
MILLWRIGHT	AD	\$29.26	031	\$12.30
PAINTER - BRIDGE	AD	\$32.66	027	\$8.97

PAINTER - BRIDGE SCAFFOLD & CONTAINMENT	AD	\$32.66	027	\$8.97
PILEDRIIVER	AD	\$26.62	031	\$8.18
POWER EQUIPMENT OPERATOR - ASPHALT DISTRIBUTOR	AD	\$18.00	021	\$0.00
POWER EQUIPMENT OPERATOR - BACKHOE	AD	\$16.00	021	\$3.31
POWER EQUIPMENT OPERATOR - BOBCAT	AD	\$15.28		\$4.18 a
POWER EQUIPMENT OPERATOR - BROOM / SWEEPER	AD	\$18.19	013	\$3.59
POWER EQUIPMENT OPERATOR - BULLDOZER	AD	\$26.25		\$0.00
POWER EQUIPMENT OPERATOR - CRANE	AD	\$30.30	021	\$15.30
POWER EQUIPMENT OPERATOR - EXCAVATOR	AD	\$22.56	031	\$0.00 a
POWER EQUIPMENT OPERATOR - GRADALL	AD	\$22.25	013	\$3.26
POWER EQUIPMENT OPERATOR - GRADER	AD	\$23.64	013	\$3.33
POWER EQUIPMENT OPERATOR - LOADER	AD	\$21.50	031	\$8.20
POWER EQUIPMENT OPERATOR - MASTER MECHANIC	AD	\$21.00	013	\$3.21
POWER EQUIPMENT OPERATOR - MILLING MACHINE	AD	\$24.00	021	\$3.31
POWER EQUIPMENT OPERATOR - PAVER	AD	\$14.00	021	\$0.00
POWER EQUIPMENT OPERATOR - ROLLER - ASPHALT	AD	\$14.00	021	\$0.00
POWER EQUIPMENT OPERATOR - ROLLER - EARTH	AD	\$11.00	013	\$3.16
POWER EQUIPMENT OPERATOR - SCREED	AD	\$20.20		\$6.29
STEAMFITTER/PIPEFITTER	AD	\$37.77		\$18.22
TRUCK DRIVER - DUMP	AD	\$18.00		\$0.00
TRUCK DRIVER - DUMP - ARTICULATING	AD	\$27.15		\$0.00
TRUCK DRIVER - LOWBOY	AD	\$20.00	013	\$3.16
TRUCK DRIVER - WATER	AD	\$19.50	031	\$0.70

FRINGE REFERENCES AS NOTED:

- a. PAID HOLIDAYS: New Year Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day & Christmas Day.
- b. PAID VACATIONS: Employees with 1 year service - 1 week paid vacation;
2 years service - 2 weeks paid vacation;
10 years service - 3 weeks paid vacation.

These **Informational Prevailing Wage Rates** may not be substituted for the requirements of pre-advertisement or onsite job posting for a public work contract that exceeds \$500,000 in value and either of the following criteria are met: (1) the contracting body is a unit of State government or an instrumentality of the State and there is any State funding for the project; or (2) the contracting body is a political subdivision, agency, person or entity (such as a county) and the State funds 50% or more of the project.

Modification Codes:

- (AD) 17-209 Annual Determination from Survey Wage Data Received
(CH) 17-211 Commissioners' Hearing
(CR) 17-208 Commissioners' Review
(SR) 17-208 Survey Review by Staff

Each "Borrowed From" county is identified with the FIPS 3-digit county code unique for the specific jurisdiction in Maryland.

For additional information on the FIPS (Federal Information Processing Standard) code, see <http://www.census.gov/datamap/fipslist/AllSt.txt>

The Prevailing Wage rates appearing on this form were originally derived from Maryland's annual Wage Survey. The Commissioner of Labor & Industry encourages all contractors and interested groups to participate in the voluntary Wage Survey, detailing wage rates paid to workers on various types of construction throughout Maryland.

A mail list of both street and email addresses is maintained by the Prevailing Wage Unit to enable up-to-date prevailing wage information, including Wage Survey notices to be sent to contractors and other interested parties. If you would like to be included in the mailing list, please forward (1) your Name, (2) the name of your company (if applicable), (3) your complete postal mailing address, (4) your email address and (5) your telephone number to PWMAILINGLIST@dllr.state.md.us. Requests for inclusion can also be mailed to: Prevailing Wage, 1100 N. Eutaw Street - Room 607, Baltimore MD 21201-2201.



CONTRACTOR AFFIRMATIVE ACTION PROGRAM

1. GENERAL

- a.** The Contractor shall cooperate with the Maryland Department of Transportation in carrying out its equal opportunity obligations and in the Department's review of the Contractor's activities performed under this contractual agreement.
- b.** All contractors shall comply with the Governor's Code of Fair Practices, Promulgated July, 1976. The Contractor shall include these requirements in every subcontract with such modifications of language as is necessary to make these provisions binding on the subcontractor.
- c.** All contractors shall comply with Maryland Department of Transportation Minority Business Enterprise Program requirements.

2. APPLICABILITY

- a.** The Maryland Department of Transportation Contractor Affirmative Action/Equal Employment Opportunity Program requirements are applicable to all contractors doing business with the Maryland Department of Transportation.
- b.** The Maryland Department of Transportation Minority Business Enterprise Program requirements are applicable to construction contracts in excess of \$100,000.

3. DEFINITIONS

- a.** Affirmative Actions - The efforts exerted toward achieving equal employment opportunity through positive, aggressive and continuous results-oriented measures to correct past and present discriminating practices and their effects on the conditions and privileges of employment.
- b.** Contractor/Subcontractor - The individual, partnerships, firm or corporation undertaking the execution of work under the terms of a contract and acting directly or through his agents or employees.
- c.** Corrective Action - A contractor's written and signed commitment outlining specific actions to be taken with time limits, goals, etc., to correct a violation of applicable EEO regulations.
- d.** Discrimination - A distinction in treatment, whether intentional or unintentional, based on political or religious opinion or affiliation, race, color, creed or national origin or sex, physical or mental handicap or age, except where sex, handicap or age involves a bona fide job requirement.
- e.** Equal Employment Opportunity Officer - A designated employee of the Contractor whose responsibility it shall be to implement and maintain the Affirmative Action Plan.



CONTRACT PROVISIONS
CONTRACTOR AFFIRMATIVE ACTION PROGRAM

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- f. "Good Faith Effort" - A results-oriented positive action designed to achieve Affirmative Action objectives or goals.
- g. Personnel Actions - All decisions respecting employment including, but not limited to hiring, upgrading, demotion, transfer, recruitment or advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training to include apprenticeship, pre-apprenticeship or on-the-job training.

4. LEGAL MANDATES

- a. Title VI, Civil Rights Act of 1964 prohibits discrimination based on race, color, or national origin in all programs and activities which receive Federal Financial Aid. Employment discrimination is prohibited if a primary purpose of Federal assistance is a provision of employment, e.g., apprenticeship, training, work study, or similar programs. Revised guidelines in 1973 prohibit discriminatory employment practices in all programs if such practices cause discrimination in services provided to beneficiaries of the program.
- b. Title VII, Civil Rights Act of 1964 (as amended by the Equal Employment Opportunity Act of 1972). Title VII prohibits discrimination because of race, color, religion, sex or national origin, in any term, condition, or privilege of employment.
- c. Executive Order 11246 (as amended). This order, issued by the President in 1965, requires Equal Employment Opportunity/Affirmative Action Programs by all Federal contractors and subcontractors. It also requires that firms with contracts over \$50,000.00 and 50 or more employees develop and implement written programs, which are to be monitored by the Federal Office of Contract Compliance. Specific requirements for such result oriented programs are identified in the Revised Order # 4 issued by the Federal Office of Contract Compliance, U.S. Department of Labor. These requirements include identifying areas of minority and female under-utilization, numerical promotional and hiring goals, and other actions to increase minority employment in classifications where they are currently under-utilized.
- d. The Age Discrimination Act of 1967 prohibits employers of 25 or more persons from discriminating against persons 40-65 years of age in any area of employment due to their age.
- e. National Labor Relations Act of 1935. Discrimination on the basis of race, religion, sex, or national origin constitutes an unfair labor practice. It shall be unlawful under this Act for employers to participate with unions in the commission of any discriminatory practices or to practice discrimination in a manner which gives rise to racial, or other division, amongst employees to the detriment of organized union activity. It shall be unlawful for unions to exclude individuals discriminatorily from union memberships, thereby causing them to lose job opportunities, to discriminate in the representation of union members or non-members in collective bargaining, in the processing of grievance, or in any other respect which may cause or attempt to cause employers to enter into discriminatory agreements, or otherwise discriminate against members and non-members.



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- f. Governor's Code of Fair Practices for the State of Maryland (Amended). The Governor of Maryland issued a revised Code of Fair Practices which was promulgated March 3, 1988, in recognition of the State's responsibility to root out the evils of discrimination on the basis of race, color, creed, national origin, sex and age. This Code was amended so as to be in compliance with Federal mandates regulating laws pertinent to Equal Employment Opportunity/Affirmative Action.
- g. Rehabilitation Act of 1973 (Public Law 93-112). This law provides a statutory basis for the Rehabilitation Services Administration and to authorize programs to promote and expand employment opportunities in the public and private sectors for handicapped individuals.
- h. Article 78A, Section 7A, Annotated Code of Maryland provides for nondiscrimination in State construction contracts and subcontracts. This provision obligates the Contractor not to discriminate in any manner against any employee or applicant for employment because of race, creed, color, or national origin and obligates subcontractors to the same.
- i. Other Laws. Employment discrimination has also been ruled by courts to be prohibited by the Civil Rights Acts of 1866 and 1870, the equal protection clause of the Fourteenth Amendment of the Constitution of the United States, and the Equal Pay Act of 1963. Action under these laws on behalf of individuals or groups may be taken by individuals, private organizations, trade unions, or other groups.

5. ASSIGNMENT OF RESPONSIBILITIES

- a. The Contractor will designate an Equal Employment Opportunity Officer. He/she will have the responsibility of implementing our Affirmative Action Plan. He/she will coordinate, advise and assist management and other key officials. He/she will render periodic reports to the responsible executives relative to the state of progress and make appropriate recommendations along these lines to the executives relative to the state of progress and make appropriate recommendations along these lines to the executives of this project.
- b. The name of the EEO Officer, telephone number and address where he/she can be reached concerning any acts or alleged acts of discrimination, will be posted on the bulletin board at the home office as well as on the bulletin boards on all job sites.

6. DISSEMINATION OF POLICY

- a. The Contractor will take appropriate steps to insure that all employees are advised of its policy of nondiscrimination of its interest in actively and affirmatively providing equal employment opportunity for all citizens. The steps include:
 - (1) Periodic meetings of supervisory and personnel office employees to be conducted at least every six months so that our EEO policy and plan may be revised and explained.
 - (2) All new supervisory and personnel office employees to be made aware of our EEO policy and plan as soon as practicable, but certainly within thirty (30) days following the date the first reporting for duty.



CONTRACT PROVISIONS
CONTRACTOR AFFIRMATIVE ACTION PROGRAM

- (3) Making our EEO policy known to all employees, prospective employees, and potential sources of employees, through schools, employment agencies, labor unions, college placement officers, etc., by taking the following actions:
 - (a) Notices and posters setting forth our EEO policy will be placed in areas readily accessible to employees and applicants for employment.
 - (b) Our EEO policy and the procedure for implementing the EEO policy will be brought to the attention of employees through meetings, employee handbooks, or other appropriate means.

7. RECRUITMENT

- a. The Contractor will include in all advertising the following notation: "An Equal Opportunity Employer." We will insert all such advertisements in newspapers or other publications having large circulation among minorities and females in the area from which the project work is derived.
- b. We will, unless precluded by a valid collective bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minority and female applicants, including, but not limited to, State employment agencies, school, college, and minority/female organizations, i.e., the Urban League, NAACP, etc. To meet this requirement, we shall identify sources of potential minority/female employees and establish with such sources procedures whereby minority/female applicants may be referred to us for employment consideration.
- c. We will develop procedures for promoting the employment of minority/female youth on an after-school, summer and vacation basis.
- d. We will encourage our employees to refer minority/female applicants for employment by posting appropriate notices or bulletins in areas accessible to all such employees. In addition, information and procedures with regard to referring minority/female applicants will be discussed with employees.

8. PERSONNEL ACTIONS

- a. To avoid discrimination in any of our personnel actions, the following procedures will be followed:
 - (1) We will conduct periodic inspections of projects sites to insure that working conditions and employee facilities do not indicate discriminatory practices.
 - (2) We will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.
 - (3) We will periodically review personnel actions in depth to determine whether there is any evidence of discrimination. Where evidence is found, we will promptly take corrective action.



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CONTRACTOR AFFIRMATIVE ACTION PROGRAM

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- (4) We will investigate all complaints of alleged discrimination and shall attempt to resolve such complaints. Additionally, if the investigation indicates that the discrimination may affect persons other than the complainant, appropriate corrective actions will include other persons. Upon completion of each investigation, we will inform every complainant of all avenues of appeal.

9. TRAINING AND PROMOTION

- a. To eliminate any discrimination in training and promotion, the following actions will be taken:
 - (1) We will assist in locating, qualifying, and increasing the skills of minority/female employees and applicants for employment.
 - (2) Consistent with our employment requirements and as permissible under State regulations, we will make full use of training programs, i.e., preapprenticeship, apprenticeship, and on-the-job training programs for the geographical area of contract performance.
 - (3) We will advise employees and applicants for employment of available training programs and entrance requirements for the programs.
 - (4) We will periodically review the training and promotional potential of minority/female employees and shall encourage eligible employees to apply for such training and promotions.

10. UTILIZATION OF UNIONS

- a. In carrying out our Affirmative Action Plan, we will use good faith efforts to obtain the cooperation from unions we rely on, in whole or part, as a source of employees to increase opportunities for minority/female groups. We, either directly or through a contractor's association acting as our agent, will include the procedures set forth below:
 - (1) Use good faith efforts to develop, in cooperation with the unions, joint training programs aimed at qualifying more minorities/females for membership in the unions and increasing their skills so they may qualify for higher paying employment.
 - (2) Incorporate an Equal Employment Opportunity clause into all union agreements so that they shall be contractually obligated not to discriminate in the referral of job applicants.

11. UTILIZATION OF SUBCONTRACTORS

- a. We will use good faith efforts to employ subcontractors whose employees reflect minority/female groups approximately equal to the number available in the current labor pool population, or owned by minority/female.
- b. We will use good faith efforts to assure that all subcontractors comply with equal employment obligations as defined in the amended Code of Fair Practices.



CONTRACT PROVISIONS
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12. RECORDS AND REPORTS

- a. In accordance with the Governor's Code, Article III, Section A and C (2), we will keep such records as are necessary to determine compliance with our equal opportunity obligations. The records kept shall be designed to indicate:
 - (1) The number of minority/female and other persons employed in each work classification of the project.
 - (2) The progress and efforts being made in cooperation with unions, if any, to increase minority/female employment opportunities.
 - (3) The progress and efforts being made in locating, hiring, training, qualifying and upgrading minority/female employees.
 - (4) The progress and efforts being made in securing the services of minority/female subcontractors.
- b. All such records will be retained for a period of three years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the Department of Transportation.
- c. We will submit to the Administration a monthly report for the first three months after construction begins and, thereafter, upon request for the duration of the project. This report shall indicate the number of minority/female employees currently engaged in each work classification.

3. MONITORING

- a. We will periodically evaluate our Affirmative Action Plan and the results achieved to insure that the plan is in compliance with our commitments.



**SUGGESTED GOALS FOR TIMETABLES
FOR
MINORITY WORKHOUR UTILIZATION**

For all trades, the following goals and timetables, as appropriate, for minority-workhour utilization shall be applicable:

- (1) Baltimore Metropolitan SMSA - this area (Region 1) includes Anne Arundel, Baltimore, Carroll, Harford, Howard Counties and Baltimore City. The total distribution of work hours (actual work hours performed on the job) for minorities and females shall be consistent with the following utilization goals for minorities and females, respectively, and shall apply to all trades.

UTILIZATION:

MINORITIES

From January 1, 1980 to October 3, 1980 23.5% - 27.5%
After October 3, 1980 23.0%

FEMALES

From August 16, 1979 to August 15, 1980 6.9%
After August 16, 1980 6.9%

- (2) Eastern Shore Maryland NON-SMSA - this area (Region II) includes Caroline, Dorchester, Kent, Queen Annes, Somerset, Talbot, Wicomico, and Worcester Counties. The total distribution of work hours (actual work hours performed on the job) for minorities and females, respectively, and shall apply to all trades.

UTILIZATION:

MINORITIES

From January 1, 1980 to October 3, 1980 21% - 24%
After October 3, 1980 23.8%

FEMALES

From August 16, 1979 to August 15, 1980 6.9%
From August 16, 1980 6.9% (3)



CONTRACT PROVISIONS
CONTRACTOR AFFIRMATIVE ACTION PROGRAM

- (3) Southern Maryland NON-SMSA - this area (Region III) includes Calvert, Frederick, Washington and St. Marys Counties. The total distribution of work hours (actual work hours performed on the job) for minorities and females shall be consistent with the following utilization goals for minorities and females, respectively, and shall apply to all trades.

UTILIZATION:

MINORITIES

From January 1, 1980 to October 3, 1980	25%
After October 3, 1980	25.2%

FEMALES

From August 16, 1979 to August 15, 1980	6.9%
After August 16, 1980	6.9%

- (4) Washington, D.C. Metropolitan SMSA - this area (Region IV) includes Charles, Montgomery and Prince Georges Counties. The total distribution of work hours (actual work hours performed on the job) for minorities and females shall be consistent with the following utilization goals for minorities and females, respectively, and shall apply to all trades.

UTILIZATION:

MINORITIES

After October 3, 1980	28.0%
-----------------------	-------

FEMALES

From August 16, 1979 to August 15, 1980	6.9%
After August 16, 1980	6.9%

- (5) Western Maryland NON-SMSA - this area (Region V) includes Allegany and Garrett Counties. The total distribution of work hours (actual work hours performed on the job) for minorities and females shall be consistent with the following utilization goals for minorities and females, respectively, and shall apply to all trades.



CONTRACT PROVISIONS
CONTRACTOR AFFIRMATIVE ACTION PROGRAM

CONTRACT NO. PG7585184
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UTILIZATION:

MINORITIES

From January 1, 1980 to October 3, 1980	3.0%
After October 3, 1980	4.8%

FEMALES

From August 16, 1979 to August 15, 1980	6.9%
After August 16, 1980	6.9%

- (6) Wilmington Delaware SMSA - this area (Region VI) includes Cecil County only. The total distribution of work hours (actual work hours performed on the job) for minorities and females shall be consistent with the following utilization goals for minorities and females, respectively, and shall apply to all trades.

UTILIZATION:

MINORITIES

From January 1, 1978 thru October 3, 1980	15% - 18.5%
After October 3, 1980	12.3%

FEMALES

From August 16, 1979 to August 15, 1980	6.9%
After August 16, 1980	6.9%



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.



CONTRACT PROVISIONS
HIGH VISIBILITY SAFETY APPAREL POLICY

CONTRACT NO. PG7585184
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REFERENCES.

- (a) ANSI/ISEA 107/2004 standard – American National Safety Institute/International Safety Equipment Association
- (b) MUTCD 2003 – 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, "Standard Specifications for Construction and Materials" dated July 2008 revisions thereof, or additions thereto, and the Special Provisions included in this Request for Proposals.

In the following sections of the "Standard Specifications for Construction and Materials." Dated July 2008, the word "Engineer" shall be taken to mean "Design-Build Engineer."

Category 100 Preliminary

Section 101.03.02 ¶ 1, Line 1

Category 200 Grading

Section 201.03.04 ¶ 6, Line 2

Section 201.03.10 ¶ 1, Line 4

Section 204.02.03 ¶ 1, Line 1

Section 206.04.02 ¶ 5, Line 2

Category 300 Drainage

Section 306.04.03 ¶ 1, Line 1

Section 310.03.02 ¶ 1, Line 5,

Section 314.02.03 ¶ 1, Line 5

Category 400 Structures

Section 402.03.04 ¶ 2, Line 2

Section 410.03.09 ¶ 1, Line 4

Section 411.03 ¶ 2, Line 1,6

Section 430.03.14 ¶ 1, Line 5

Category 500 Paving

Section 522.03 ¶ 1, Line 1

Category 600 Shoulders

Section 606.03.01 ¶ 5, Line 3

Section 607.03.01 ¶ 3, Line 2

Category 800 – Traffic

Section 804.03.03 ¶ 1, Line 6

Section 804.03.03 ¶ 2, Line 2

**CONTRACT PROVISIONS
SPECIFICATIONS**

CONTRACT NO. PG7585184

2 of 2

Section 810.03.04 ¶ 1, Line 3

Category 900 – Materials

Section 910.02.03 ¶ 1, Line 3

Section 915.01.06 ¶ 1, Line 4, 7

Section 921.10 ¶ 1, Line 3

PROJECT DESCRIPTION

Refer to TC Section 2.07.02, Project Description

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 July 2008 revisions thereof, or additions thereto, and the Special Provisions included in this Request for Proposals.

EMPLOYMENT AGENCY

The Maryland Department of Human Resources is located at:

PRINCE GEORGE'S COUNTY

Prince George's One-Stop Career Center
1100 Mercantile Lane, Suite 120, Largo, Maryland 20774
Telephone: (301) 618-8400
Fax: (301) 386-5533

Laurel Regional Career Center
312 Marshall Avenue, Suite 604, Laurel, Maryland 20707-4824
Telephone: (301) 362-9708
Fax: (301) 362-9719

NOTICE TO CONTRACTOR

PROJECT SCHEDULE. Section 109 shall only apply when a CPM Project Schedule item is included in the Schedule of Prices. Otherwise, all Project Schedules shall conform to Section 110.

NOTICE TO PROPOSERS. The Proposal Form Packet in this Request for Proposals requires the following information be submitted for the Proposer 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 the bidder is required to complete the AAP information on pages 19, 20, 24–27, and 37-41 of 45 of the Contract Provisions, Proposal Form Packet —Federal, or complete the AAP information on pages 14, 15, 19-22, and 32-36 of 41 of the Contract Provisions, Proposal Form Packet—State, or complete the AAP information on pages 15, 16, 20-23 and 33-37 of 42 of the Contract Provisions, Proposal Form Packet—State Small Business Reserve Procurement. 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 now available only on the Administration’s Internet Site at www.roads.maryland.gov. The Book of Standards can be located by clicking on Business with SHA; Business Standards and Specifications; and Book of Standards for Highway and Incidental Structures. Hard copies of the Book of Standards will no longer be sold in the Cashiers Office and hard copy distributions of the Standard updates will no longer be made.

PAYMENT OF STATE OBLIGATIONS. Electronic funds transfer will be used by the State to pay the Contractor for any Contract expected to exceed \$200,000 and any other State payments unless the State Comptroller’s Office grants the Contractor an exemption.

Therefore, by submitting a response to this solicitation, the Proposer/Offeror agrees to accept payment by electronic funds transfer unless the State Comptroller’s Office grants an exemption.

Prior to the Award of the Contract the selected Proposer/Offeror shall register using the X-10 Vendor Electronic Funds (EFT) Registration Request Form. The instructions and the form are located on the internet at compnet.comp.state.md.us/gad.

Any request for exemption shall be submitted to the State Comptroller's Office at the address specified on the X-10 form and shall include the business identification information as stated on the form and include the reason for the exemption.

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 TC Section 2.08.02.

RIGHT-OF-WAY STATUS

For right-of-way status information, please refer to TC Section 2.07.02.05.6 Right of Way.

In accordance with the requirements of Title 23, Code of Federal Regulations, Part 635, this is to certify that of the twenty-four (24) parcels needed for construction on the above-captioned contract, none (0) are in the possession of the State Highway Administration (SHA) at this time.

The status of the twenty-four (24) parcels not in our possession is as follows:

- 107420 - Pennsylvania Crossing Homeowners Assn., Inc.; awaiting appraisal
- 107421 - Pennsylvania Crossing Homeowners Assn., Inc.; awaiting appraisal
- 107422 - Leach, Nathan & Juliette; awaiting appraisal
- 107423 - Unknown Owners; awaiting appraisal
- 107425 - Currie, Ulysses & Shirley A. G.; awaiting appraisal
- 107426 - Center at Forestville LLC; awaiting appraisal
- 107427 - Harris, Angela L.; awaiting appraisal
- 107428 - McConell, Frances J. & Leo J. Jr.; awaiting appraisal
- 107429 - Joyce C. & Raymond N. Simons; awaiting appraisal
- 107430 - Forest Run HOA SWM Easement; awaiting appraisal
- 107431 - Pace, Francesco G & Rosa D.; awaiting appraisal
- 107432 - Horne, Lydia R. & Jerome I. ; awaiting appraisal
- 107433 - Bice, Earl R. Jr. and Mildred J.; awaiting appraisal
- 107435 - Barnhart, Jr., Spencer G.; awaiting appraisal
- 107436 - Maryland National Capital Park & Planning Commission; awaiting appraisal
- 107437 - Forest Run HOA SWM Easement; awaiting appraisal
- 107440 - Reed, Martin; awaiting appraisal
- 107441 - Penn Mar Apartments LTD Partnership; awaiting appraisal
- 107442 - Forest Mill Townhouse Association, Inc.; awaiting appraisal
- 107443 - New Hope Baptist Church of Forestville; awaiting appraisal
- 107444 - J.C. Penney Properties, Inc.; awaiting appraisal
- 107445 - Donnell Funding, LLC; awaiting appraisal



SPECIAL PROVISIONS
NOTICE TO CONTRACTOR

CONTRACT NO. PG7585184
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107446 - New Hope Baptist Church of Forestville; awaiting appraisal

All necessary rights-of-way have not been fully acquired. The right to occupy and to use all rights-of-way required for the proper execution of the project have not been acquired. The State Highway Administration does not have physical possession and does not have the right to remove, salvage, or demolish these improvements.

It is anticipated that the total right-of-way clearing date for the above captioned contract will be April 1, 2015.

There are no relocation assistance services necessary for the above-captioned contract.

Right-of-way is being acquired in accordance with the FHWA directives.

Notice is hereby given in the contract proposal, in accordance with Title 23, Code of Federal Regulations, Part 635, that the lack of possession of any of these properties on this project may interfere with construction operation.

The SHA will not honor any claim for inconvenience or delay caused by the lack of clear right-of-way. Notice will be given that an extension of time will be granted, if necessary, for delays caused by the interference beyond the time of notice to proceed.

REQUIRED PERMITS

For permit information, please refer to TC Section 2.07.02.7 Permits. All permits obtained by SHA will be inserted here upon approval.



Maryland DNR Forest Service

8023 Long Hill Road

Pasadena, MD 21122

REFORESTATION LAW PROJECT REVIEW

Contract Number: PG7585184

County: Prince George's

PDMS#:

Reviewed by: Horace Henry

To: Liling Tien, RLA, ASLA
President
P.E.L.A. Design, INC.
7402 York Road, Suite 201
Towson, MD 21204

Date: 04/28/14

Project: MD 4 from Forestville Rd. to MD 458
(Silver Hill Rd.) Improvement Project
Prince George's County, MD

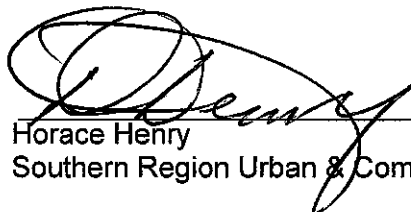
I refer to the above referenced project (MD 4 from Forestville Rd. to MD 458 improvement). Based on the submitted Reforestation Site Review Form and a site visit conducted on April 28, 2014, the following conditions pertain:

- 1. The estimated acreage to be cleared amounts to 5.97 acres.
- 2. Reforestation of approximately 1.09 acres is to be established on-site within one year of the project's official construction completion date.
- 3. Reforestation of approximately 4.88 acres is to be conducted off-site as set forth in Natural Resources Article § 5-103. This reforestation must be completed within one year of the project's official construction completion date.
- 3. Other conditions:

It is understood that the Contractor will be responsible for all on-site mitigation (1.09 acres). All reforestation that is carried out by the Contractor must conform to the planting specifications of the Maryland State Highway Administration (SHA), and a copy of the planting plans/schedule should be sent to the following address: **'Maryland DNR Forest Service, 8023 Long Hill Road, Pasadena, MD 21122'**.

Similarly, it is the understanding that SHA will be responsible for all off-site mitigation (4.88 acres). State agencies that 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 Law Fund.

Attached is a copy of the 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: Horace Henry— phone #: 410-360-9774 or hhenry@dnr.state.md.us



Horace Henry
Southern Region Urban & Community Forestry Coordinator

Maryland Department of Natural Resources
Forest Service

REFORESTATION SITE REVIEW

Request for Site Review: to be completed by Constructing Agency. Please complete the top portion of this form only, and return it, along with site plans showing site's location, forest area(s) to be removed (highlighted on plan), and removal amount (noted on dwg.) to the appropriate DNR Regional Forest Service office while project is still in initial design stages and prior to construction start (before any removal occurs).

Contract Number : PG7585184 PDMS #:
County: Prince Georges Constructing Agency:
Project Description: MD 4 from Forestville Rd & MD 458 Improvement Project
Contact Person & Title: Liling Tien, RLA, ASLA, President
Contact Address: P.E.L.A. Design, Inc., 7402 York Road, Baltimore, MD 21204 Room #: Suite #201
Contact Telephone # : (410) 296-3990 Contact Fax #: (410) 296-3898

Estimated Target Dates: Construction Bidding: 03/31/15
Construction: Fall 2015
Completion: Spring 2018

Estimated Tree Clearing and Reforestation Summary: - - - - -

Estimated acreage to be cleared: 5.97 acres
(See Sheet F02-11 Forest Impact Index Plan)
Acres available for on-site replacement: 1.09 acres

Note: if on-site replacement is impossible, the constructing agency is expected to locate alternate reforestation sites on public lands.*
Acres available at the off-site location(s): 4.88 acres
Proposed location for off-site planting (attach location map): to be determined by SHA

Date form was completed by constructing agent: _____

* If you are requesting to transfer funds to DNR in lieu of mitigation planting, you must provide a detailed explanation of why you can not accomplish the planting obligations on-site and must receive Forest Service's approval before any payments will be accepted.

Construction Site Review: to be completed by DNR Forestry Personnel, within 20 working days of request receipt

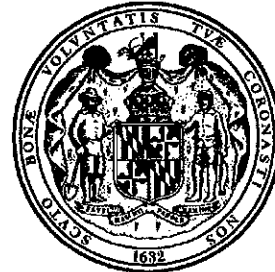
Date Received: 03/26/14 Field Review Date: 04/28/14 Forestry Reviewer: HORACE HENRY Estimated Acres to be cleared: 5.97
Telephone #: () 410-360-9774
Dominant Tree Species Found: Willow oak, other Oak, Bradford pear Red maple, Boxelder, Locust, Eastern white pine, Holly
Areas of Special Concern: "WASHINGTON METRO"
Watershed in which this project is located: UPPER Tidal Potomac River Designation # (per map/key) 02140201
Has site been previously reviewed: Yes/No If yes, date:
Verified acres to be planted on site (amount): 1.09 acres

For any necessary notes regarding appropriate replacement planting species, spacing, need for shelters, etc., see back of this document.
SHA61.1-F830.10 Rev. 04/24/96 DNR/RCS 399 (June 19, 1995)

RECEIVED
MAR 26 2014

STATE OF MARYLAND
DEPARTMENT OF THE ENVIRONMENT
WATER MANAGEMENT ADMINISTRATION
LETTER OF AUTHORIZATION

AUTHORIZATION NUMBER: 14-NT-0007/201460031
EFFECTIVE DATE: July 22, 2014
EXPIRATION DATE: July 22, 2017
AUTHORIZED PERSON: Maryland Department of Transportation
State Highway Administration
707 N. Calvert Street
Baltimore, MD 21202



Attn: Mr. Todd Nichols

IN ACCORDANCE WITH ENVIRONMENT ARTICLE §5-503(a) AND §5-906(b), ANNOTATED CODE OF MARYLAND (2007 REPLACEMENT VOLUME), COMAR 26.17.04 AND 26.23.01, AND 26.08.02 AND THE ATTACHED CONDITIONS OF AUTHORIZATION, MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION ("AUTHORIZED PERSON"), IS HEREBY AUTHORIZED BY THE WATER MANAGEMENT ADMINISTRATION ("ADMINISTRATION") TO CONDUCT A REGULATED ACTIVITY IN A NONTIDAL WETLAND, BUFFER, OR EXPANDED BUFFER, AND/OR TO CHANGE THE COURSE, CURRENT OR CROSS-SECTION OF WATERS OF THE STATE, IN ACCORDANCE WITH THE ATTACHED PLANS APPROVED BY THE ADMINISTRATION ON July 22, 2014, ("APPROVED PLAN") AND PREPARED BY MARYLAND STATE HIGHWAY ADMINISTRATION AND INCORPORATED HEREIN, AS DESCRIBED BELOW:

This approval authorizes 2,489 square feet (1,901 square feet of permanent impacts and 588 square feet of temporary impacts) to the nontidal wetland 25-foot buffer; 686 linear feet of stream impacts (642 linear feet of permanent and 44 linear feet of temporary) to unnamed tributaries to Henson Creek; and, temporary disturbance of 5,971 square feet in the 100-year floodplain for roadway improvements along MD 4, from Forestville Road to MD 458 in Prince George's County. The work includes narrowing the existing roadway, constructing a 5-foot-wide sidewalk and a 10-foot-wide shared-use path, installing new stormwater management facilities and drainage facilities, installing traffic barriers, relocating utilities, and plantings. No wetlands will be affected by the work.

MD Grid Coordinates: N 130973± E 409079±

SHA Contract No. PG7585184

Amanda Sigillito, Chief
Nontidal Wetlands Division

Attachments: Conditions of Authorization
Best Management Practices
Impact Plates
Mitigation Approval Letter

cc: WMA, Compliance Program w/ file
U.S. Army Corps of Engineers

GENERAL CONDITIONS

1. **Validity:** Authorization is valid only for use by Authorized Person. Authorization may be transferred only with prior written approval of the Administration. In the event of transfer, transferee agrees to comply with all terms and conditions of Authorization.
2. **Initiation of Work, Modifications and Extension of Term:** Authorized Person shall initiate authorized activities within two (2) years of the Effective Date of this Authorization or the Authorization shall expire. Authorized Person may submit written requests to the Administration for (a) extension of the period for initiation of work, (b) modification of Authorization, including the Approved Plan, or, (c) not later than 45 days prior to Expiration Date, an extension of the term. Requests for modification shall be in accordance with applicable regulations and shall state reasons for changes, and shall indicate the impacts on nontidal wetlands, streams, and the floodplain, as applicable. The Administration may grant a request at its sole discretion.
3. **Responsibility and Compliance:** Authorized Person is fully responsible for all work performed and activities authorized by this Authorization shall be performed in compliance with this Authorization and Approved Plan. Authorized Person agrees that a copy of the Authorization and Approved Plan shall be kept at the construction site and provided to its employees, agents and contractors. A person (including Authorized Person, its employees, agents or contractors) who violates or fails to comply with the terms and conditions of this Authorization, Approved Plan or an administrative order may be subject to penalties in accordance with §5-514 and §5-911, Department of the Environment Article, Annotated Code of Maryland (2007 Replacement Volume).
4. **Failure to Comply:** If Authorized Person, its employees, agents or contractors fail to comply with this Authorization or Approved Plan, the Administration may, in its discretion, issue an administrative order requiring Authorized Person, its employees, agents and contractors to cease and desist any activities which violate this Authorization, or the Administration may take any other enforcement action available to it by law, including filing civil or criminal charges.
5. **Suspension or Revocation:** Authorization may be suspended or revoked by the Administration, after notice of opportunity for a hearing, if Authorized Person: (a) submits false or inaccurate information in Permit application or subsequently required submittals; (b) deviates from the Approved Plan, specifications, terms and conditions; (c) violates, or is about to violate terms and conditions of this Authorization; (d) violates, or is about to violate, any regulation promulgated pursuant to Title 5, Department of the Environment Article, Annotated Code of Maryland as amended; (e) fails to allow authorized representatives of the Administration to enter the site of authorized activities at any reasonable time to conduct inspections and evaluations; (f) fails to comply with the requirements of an administrative action or order issued by the Administration; or (g) does not have vested rights under this Authorization and new information, changes in site conditions, or amended regulatory requirements necessitate revocation or suspension.
6. **Other Approvals:** Authorization does not authorize any injury to private property, any invasion of rights, or any infringement of federal, State or local laws or regulations, nor does it obviate the need to obtain required authorizations or approvals from other State, federal or local agencies as required by law.
7. **Site Access:** Authorized Person shall allow authorized representatives of the Administration access to the site of authorized activities during normal business hours to conduct inspections and evaluations necessary to assure compliance with this Authorization. Authorized Person shall provide necessary assistance to effectively and safely conduct such inspections and evaluations.
8. **Inspection Notification:** Authorized Person shall notify the Administration's Compliance Program at least five (5) days before starting authorized activities and five (5) days after completion. For Allegany, Garrett, and Washington counties, Authorized Person shall call 301-689-1480. For Carroll, Frederick, Howard, Montgomery and Prince George's counties, Authorized Person shall call 301-665-2850. For Baltimore City, Anne Arundel, Baltimore, Calvert, Charles and St. Mary's counties, Authorized Person shall call 410-537-3510. For Caroline, Cecil, Dorchester, Harford, Kent, Queen Anne's, Somerset, Talbot, Wicomico and Worcester, Authorized Person shall call 410-901-4020. If Authorization is for a project that is part of a mining site, please contact the Land Management Administration's Mining Program at 410-537-3557 at least five (5) days before starting authorized activities and five (5) days after completion.
9. **Sediment Control:** Authorized Person shall obtain approval from Maryland Department of the Environment for a grading and sediment control plan specifying soil erosion control measures. The approved grading and sediment control plan shall be included in the Approved Plan, and shall be available at the construction site.
10. **Federally Mandated State Authorizations:**
 - X Water Quality Certification:** Water Quality Certification is granted for this project provided that all work is performed in accordance with the authorized project description and associated conditions.
 - X Coastal Zone Consistency:** This Authorization constitutes official notification that authorized activities are consistent with the Maryland Coastal Zone Management Program, as required by Section 307 of the Federal Coastal Zone Management Act of 1972, as amended. Activities within the following counties are not subject to this requirement: Allegany, Carroll, Frederick, Garrett, Howard, Montgomery, and Washington.

11. **Best Management Practices During Construction:** Authorized Person, its employees, agents and contractors shall conduct authorized activities in a manner consistent with the Best Management Practices specified by the Administration.
12. **Disposal of Excess:** Unless otherwise shown on the Approved Plan, all excess fill, spoil material, debris, and construction material shall be disposed of outside of nontidal wetlands, nontidal wetlands buffers, and the 100-year floodplain, and in a location and manner which does not adversely impact surface or subsurface water flow into or out of nontidal wetlands.
13. **Temporary Staging Areas:** Temporary construction trailers or structures, staging areas and stockpiles shall not be located within nontidal wetlands, nontidal wetlands buffers, or the 100-year floodplain unless specifically included on the Approved Plan.
14. **Temporary Stream Access Crossings:** Temporary stream access crossings shall not be constructed or utilized unless shown on the Approved Plan. If temporary stream access crossings are determined necessary prior to initiation of work or at any time during construction, Authorized Person, its employees, agents or contractors shall submit a written request to the Administration and secure the necessary permits or approvals for such crossings before installation of the crossings. Temporary stream access crossings shall be removed and the disturbance stabilized prior to completion of authorized activity or within one (1) year of installation.
15. **Discharge:** Runoff or accumulated water containing sediment or other suspended materials shall not be discharged into waters of the State unless treated by an approved sediment control device or structure.
16. **Instream Construction Prohibition:**
 No instream construction is to occur under this Authorization.
 X To protect important aquatic species, motor driven construction equipment shall not be allowed within stream channels unless on authorized ford crossings. Activities within stream channels are prohibited as determined by the classification of the stream (COMAR 26.08.02.08): **Henson Creek and its tributaries are Use I** waterways; in-stream work may not be conducted from **March 1** through **June 15**, inclusive, of any year.
17. **Disturbance of Stream Channels:** Motor driven construction equipment shall not be allowed within the stream channel unless shown on Approved Plan or specifically authorized in writing by the Administration.
18. **Instream Blasting:** Authorized Person shall obtain prior written approval from the Administration before blasting or using explosives in the stream channel.
19. **Minimum Disturbance:** Any disturbance of stream banks, channel bottom, wetlands, and wetlands buffer authorized by this Authorization or Approved Plan shall be the minimum necessary to conduct permitted activities. All disturbed areas shall be stabilized vegetatively no later than seven (7) days after construction is completed or in accordance with the approved grading or sediment and erosion control plan.
20. **Restoration of Construction Site:** Authorized Person shall restore the construction site upon completion of authorized activities. Undercutting, meandering or degradation of the stream banks or channel bottom, any deposition of sediment or other materials, and any alteration of wetland vegetation, soils, or hydrology, resulting directly or indirectly from construction or authorized activities, shall be corrected by Authorized Person as directed by the Administration.

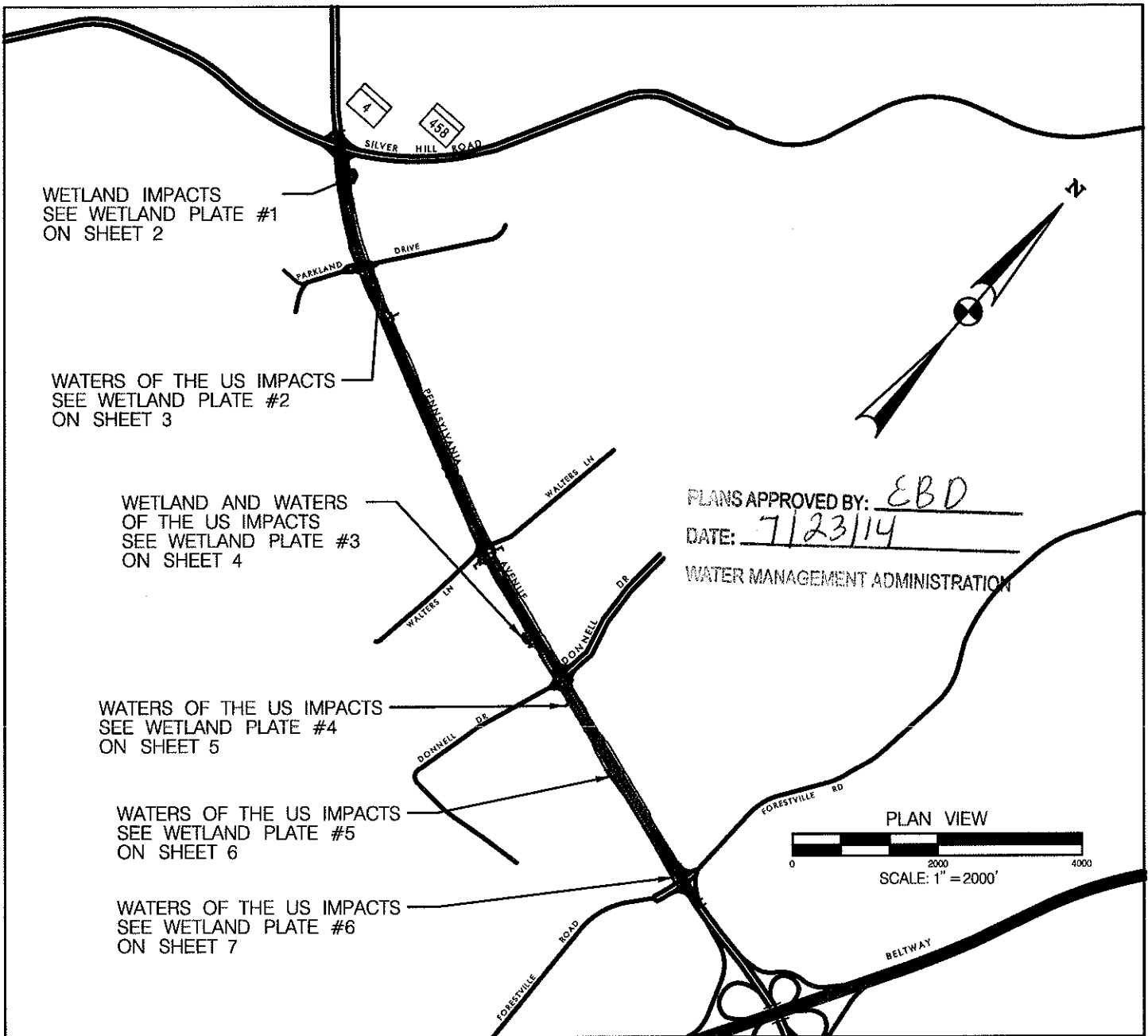
U.S. ARMY CORPS OF ENGINEERS AUTHORIZATION


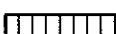
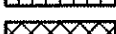
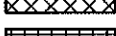
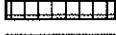
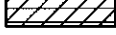

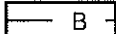


The U.S. Army Corps of Engineers has determined that the project qualifies for authorization under the Maryland State Programmatic General Permit (MDSPGP-4). Information regarding the terms and conditions of the MDSPGP-4 authorization will be sent directly to the applicant by the Corps.

**BEST MANAGEMENT PRACTICES FOR WORKING IN
NONTIDAL WETLANDS, WETLAND BUFFERS,
WATERWAYS, AND 100-YEAR FLOODPLAINS**

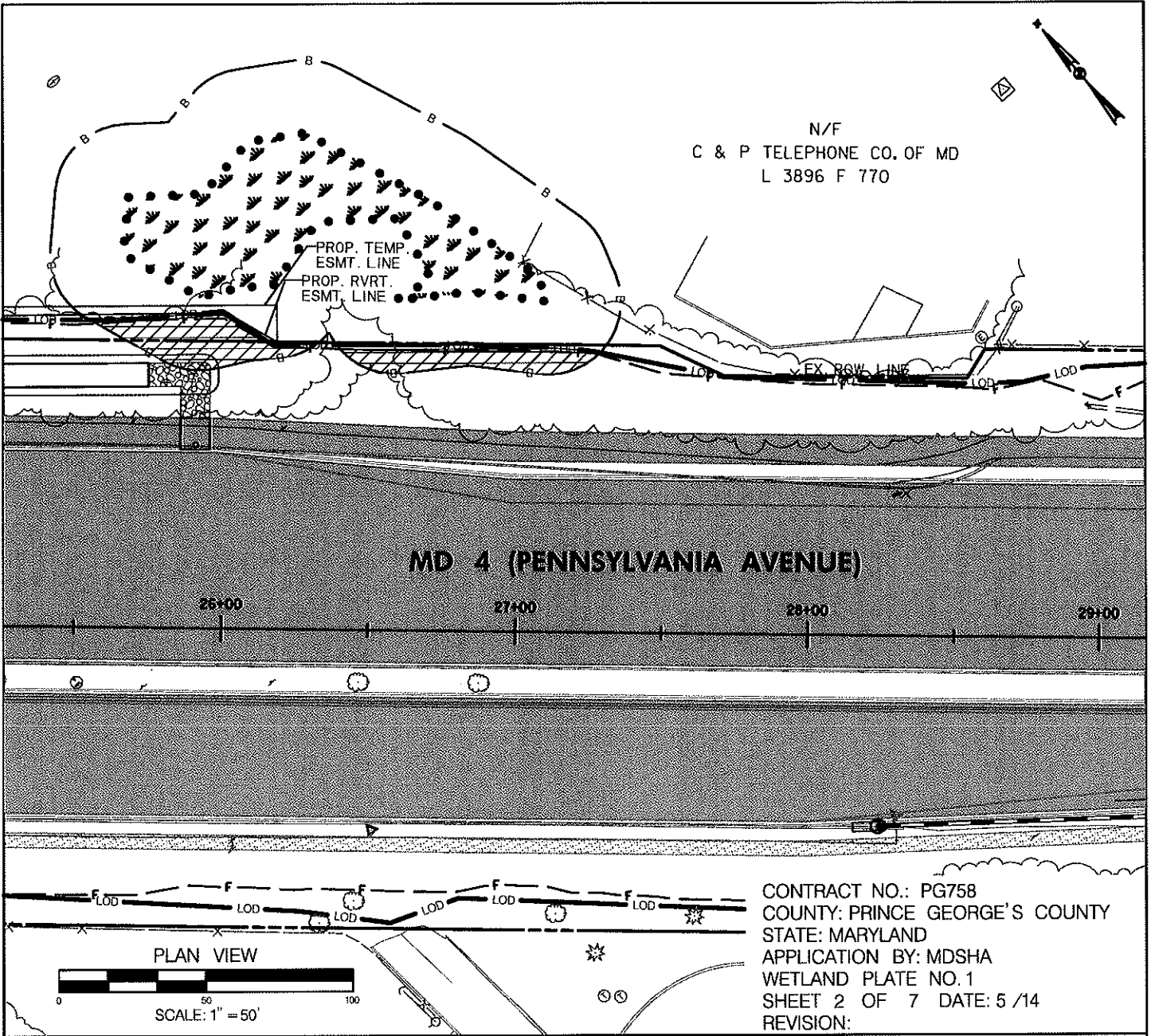
- 1) No excess fill, construction material, or debris shall be stockpiled or stored in nontidal wetlands, nontidal wetland buffers, waterways, or the 100-year floodplain.
- 2) Place materials in a location and manner that does not adversely impact surface or subsurface water flow into or out of nontidal 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 material 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 stabilization of 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:

Use I waters: In-stream work shall not be conducted during the period March 1 through June 15, 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.



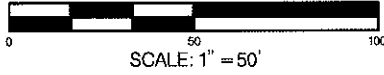
LEGEND	IMPACT DATA
 PERMANENT WATERS OF THE US IMPACT	PERMANENT WATERS OF THE US IMPACT - 2264 SF (642 LF) TEMPORARY WATERS OF THE US IMPACT - 361 SF (44 LF)
 TEMPORARY WATERS OF THE US IMPACT	PERMANENT WETLAND IMPACT - 0 SF TEMPORARY WETLAND IMPACT - 0 SF
 PERMANENT WETLAND IMPACT	PERMANENT WETLAND BUFFER IMPACT - 1901 SF TEMPORARY WETLAND BUFFER IMPACT - 588 SF
 TEMPORARY WETLAND IMPACT	
 PERMANENT WETLAND BUFFER IMPACT	
 TEMPORARY WETLAND BUFFER IMPACT	
 WETLAND BUFFER	<div> <p>SHA MARYLAND STATE HIGHWAY ADMINISTRATION 707 NORTH CALVERT ST. BALTIMORE, MARYLAND 21202 MD 4 (PENNSYLVANIA AVENUE) FROM FORESTVILLE ROAD TO MD 458 (SILVER HILL ROAD) PG758B21</p> </div>
 LIMITS OF DISTURBANCE	
 LIMITS OF WATERS OF THE US	
 WETLAND AREA	
	DATE: MAY 2014 SCALE: 1" = 2000' SHEET: 1 OF 7

N/F
 C & P TELEPHONE CO. OF MD
 L 3896 F 770







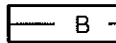





CONTRACT NO.: PG758
 COUNTY: PRINCE GEORGE'S COUNTY
 STATE: MARYLAND
 APPLICATION BY: MDSA
 WETLAND PLATE NO. 1
 SHEET 2 OF 7 DATE: 5 /14
 REVISION:

PLAN VIEW



LEGEND

-  PERMANENT WATERS OF THE US IMPACT
-  TEMPORARY WATERS OF THE US IMPACT
-  PERMANENT WETLAND IMPACT
-  TEMPORARY WETLAND IMPACT
-  PERMANENT WETLAND BUFFER IMPACT
-  TEMPORARY WETLAND BUFFER IMPACT
-  WETLAND BUFFER
-  LIMITS OF DISTURBANCE
-  LIMITS OF WATERS OF THE US
-  WETLAND AREA

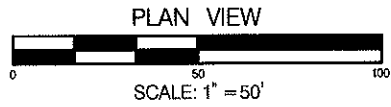
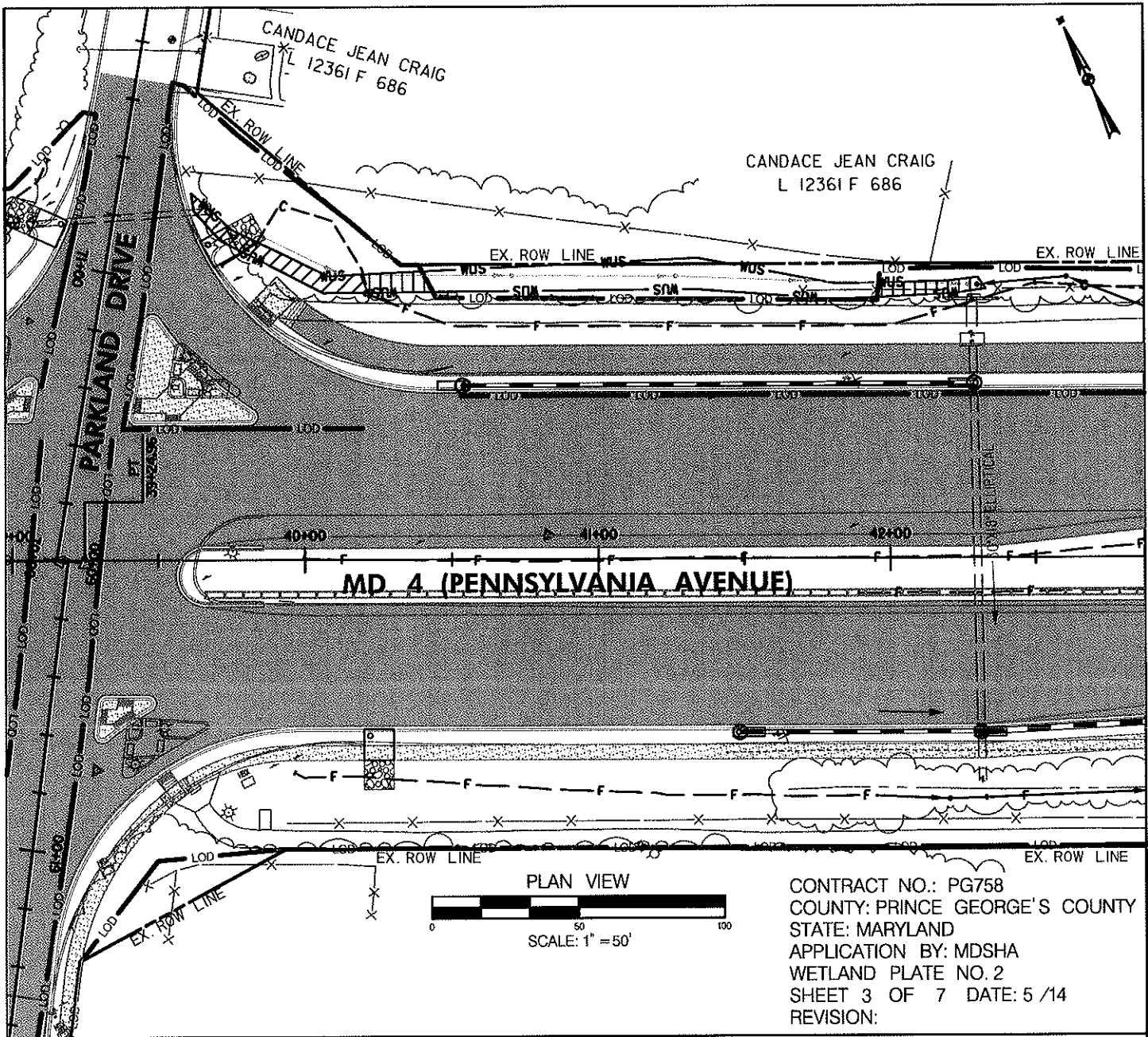
IMPACT DATA

PERMANENT WATERS OF THE US IMPACT - 0 SF (0 LF)
 TEMPORARY WATERS OF THE US IMPACT - 0 SF
 PERMANENT WETLAND IMPACT - 0 SF
 TEMPORARY WETLAND IMPACT - 0 SF
 PERMANENT WETLAND BUFFER IMPACT - 1264 SF
 TEMPORARY WETLAND BUFFER IMPACT - 215 SF



MARYLAND STATE HIGHWAY ADMINISTRATION
 707 NORTH CALVERT ST.
 BALTIMORE, MARYLAND 21202
 MD 4 (PENNSYLVANIA AVENUE) FROM
 FORESTVILLE ROAD TO
 MD 458 (SILVER HILL ROAD)
 PG758B21

DATE: MAY 2014 SCALE: 1" = 50' SHEET: 2 OF 7



CONTRACT NO.: PG758
 COUNTY: PRINCE GEORGE'S COUNTY
 STATE: MARYLAND
 APPLICATION BY: MDSHA
 WETLAND PLATE NO. 2
 SHEET 3 OF 7 DATE: 5 /14
 REVISION:

LEGEND

- PERMANENT WATERS OF THE US IMPACT
- TEMPORARY WATERS OF THE US IMPACT
- PERMANENT WETLAND IMPACT
- TEMPORARY WETLAND IMPACT
- PERMANENT WETLAND BUFFER IMPACT
- TEMPORARY WETLAND BUFFER IMPACT
- WETLAND BUFFER
- LIMITS OF DISTURBANCE
- LIMITS OF WATERS OF THE US
- WETLAND AREA

IMPACT DATA

PERMANENT WATERS OF THE US IMPACT - 357 SF (100 LF)
 TEMPORARY WATERS OF THE US IMPACT - 307 SF (22 LF)

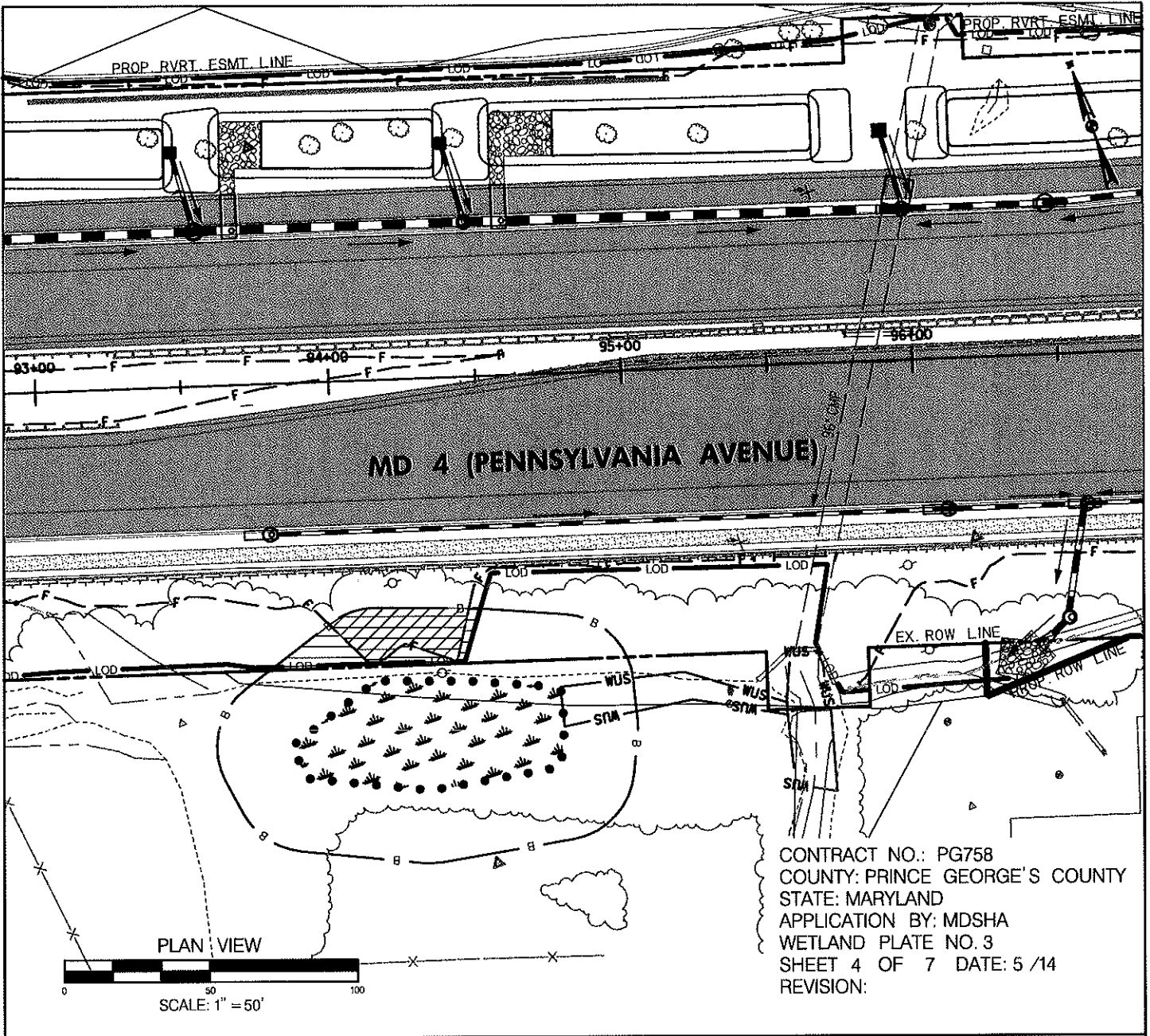
PERMANENT WETLAND IMPACT - 0 SF
 TEMPORARY WETLAND IMPACT - 0 SF





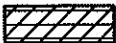
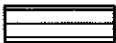
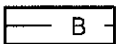
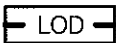


PERMANENT WETLAND BUFFER IMPACT - 0 SF
 TEMPORARY WETLAND BUFFER IMPACT - 0 SF

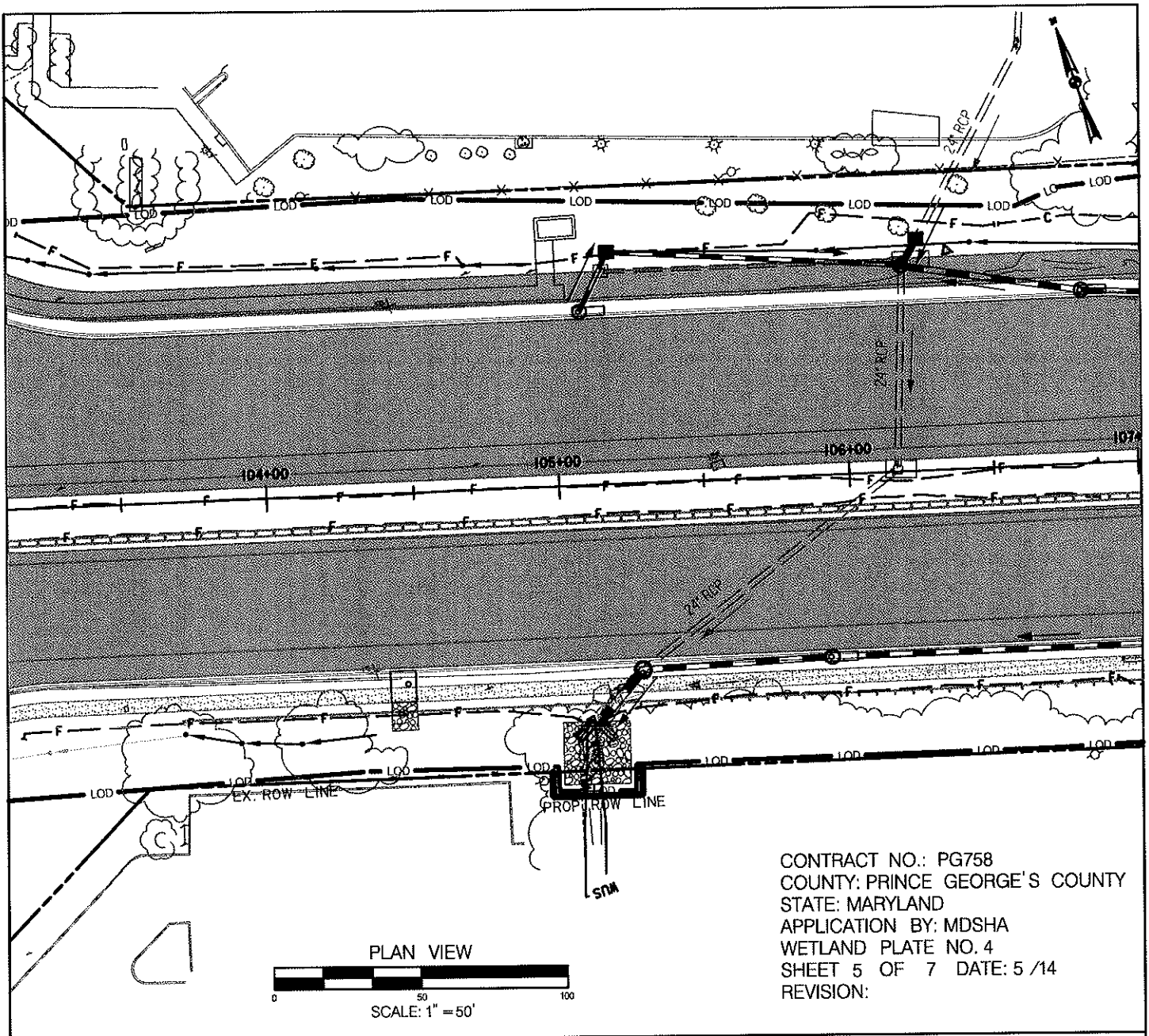
SHA MARYLAND STATE HIGHWAY ADMINISTRATION
 707 NORTH CALVERT ST.
 BALTIMORE, MARYLAND 21202

MD 4 (PENNSYLVANIA AVENUE) FROM
 FORESTVILLE ROAD TO
 MD 458 (SILVER HILL ROAD)
 PG758B21

DATE: MAY 2014 SCALE: 1" = 50' SHEET: 3 OF 7





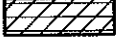
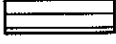
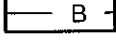





LEGEND	IMPACT DATA
<ul style="list-style-type: none">  PERMANENT WATERS OF THE US IMPACT  TEMPORARY WATERS OF THE US IMPACT  PERMANENT WETLAND IMPACT  TEMPORARY WETLAND IMPACT  PERMANENT WETLAND BUFFER IMPACT  TEMPORARY WETLAND BUFFER IMPACT  WETLAND BUFFER  LIMITS OF DISTURBANCE  LIMITS OF WATERS OF THE US  WETLAND AREA 	<p>PERMANENT WATERS OF THE US IMPACT - 0 SF (0 LF) TEMPORARY WATERS OF THE US IMPACT - 0 SF</p> <p>PERMANENT WETLAND IMPACT - 0 SF TEMPORARY WETLAND IMPACT - 0 SF</p> <p>PERMANENT WETLAND BUFFER IMPACT - 637 SF TEMPORARY WETLAND BUFFER IMPACT - 373 SF</p> <p>SHA MARYLAND STATE HIGHWAY ADMINISTRATION 707 NORTH CALVERT ST. BALTIMORE, MARYLAND 21202</p> <p>MD 4 (PENNSYLVANIA AVENUE) FROM FORESTVILLE ROAD TO MD 458 (SILVER HILL ROAD) PG758B21</p> <p>DATE: MAY 2014 SCALE: 1" = 50' SHEET: 4 OF 7</p>



CONTRACT NO.: PG758
 COUNTY: PRINCE GEORGE'S COUNTY
 STATE: MARYLAND
 APPLICATION BY: MDSA
 WETLAND PLATE NO. 4
 SHEET 5 OF 7 DATE: 5 /14
 REVISION:

LEGEND

-  PERMANENT WATERS OF THE US IMPACT
-  TEMPORARY WATERS OF THE US IMPACT
-  PERMANENT WETLAND IMPACT
-  TEMPORARY WETLAND IMPACT
-  PERMANENT WETLAND BUFFER IMPACT
-  TEMPORARY WETLAND BUFFER IMPACT
-  WETLAND BUFFER
-  LIMITS OF DISTURBANCE
-  LIMITS OF WATERS OF THE US
-  WETLAND AREA

IMPACT DATA

PERMANENT WATERS OF THE US IMPACT - 86 SF (24 LF)
 TEMPORARY WATERS OF THE US IMPACT - 13 SF (3 LF)

PERMANENT WETLAND IMPACT - 0 SF
 TEMPORARY WETLAND IMPACT - 0 SF

PERMANENT WETLAND BUFFER IMPACT - 0 SF
 TEMPORARY WETLAND BUFFER IMPACT - 0 SF

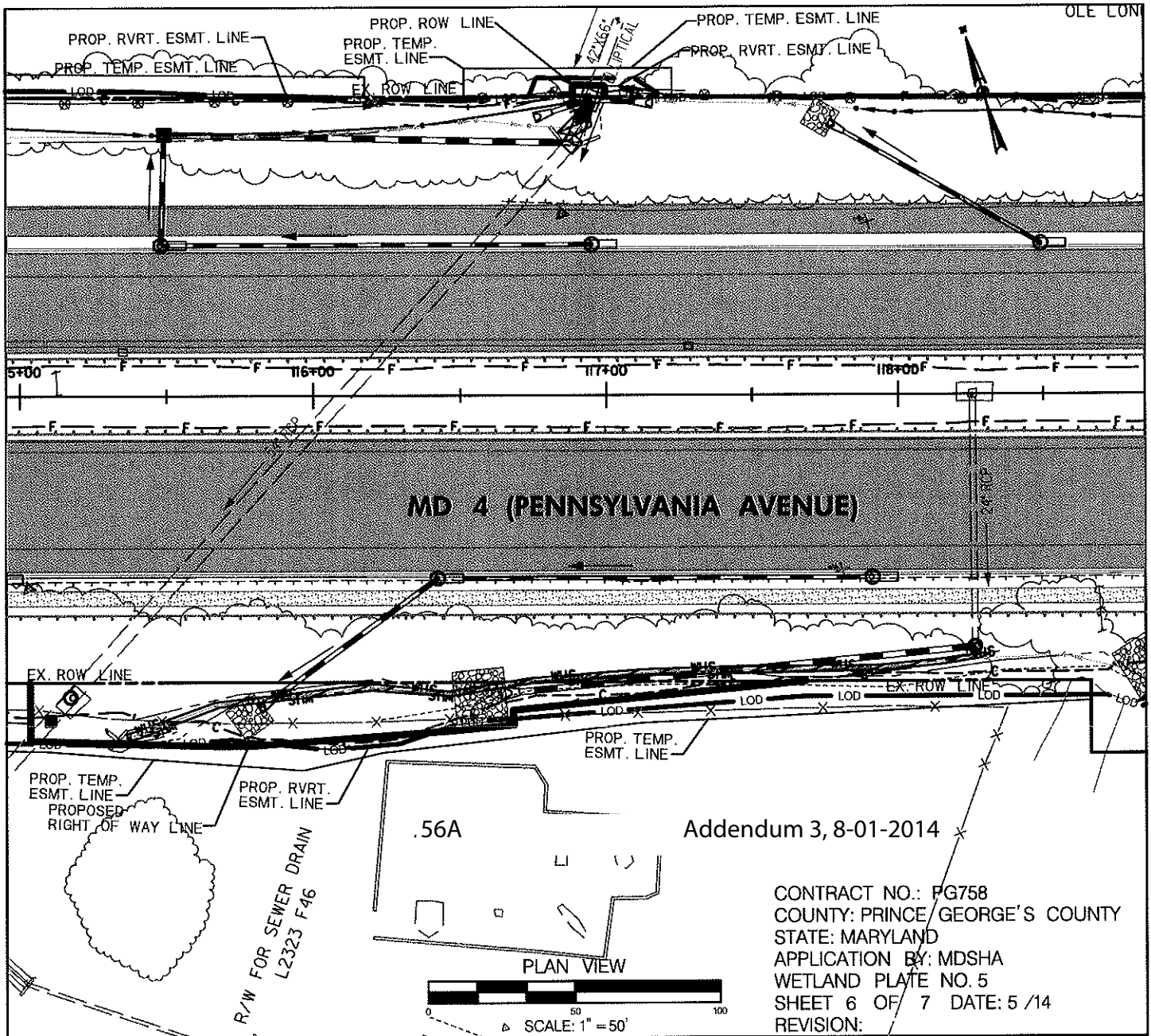


MARYLAND STATE HIGHWAY ADMINISTRATION
 707 NORTH CALVERT ST.
 BALTIMORE, MARYLAND 21202
 MD 4 (PENNSYLVANIA AVENUE) FROM
 FORESVILLE ROAD TO
 MD 458 (SILVER HILL ROAD)
 PG758B21

DATE: MAY 2014

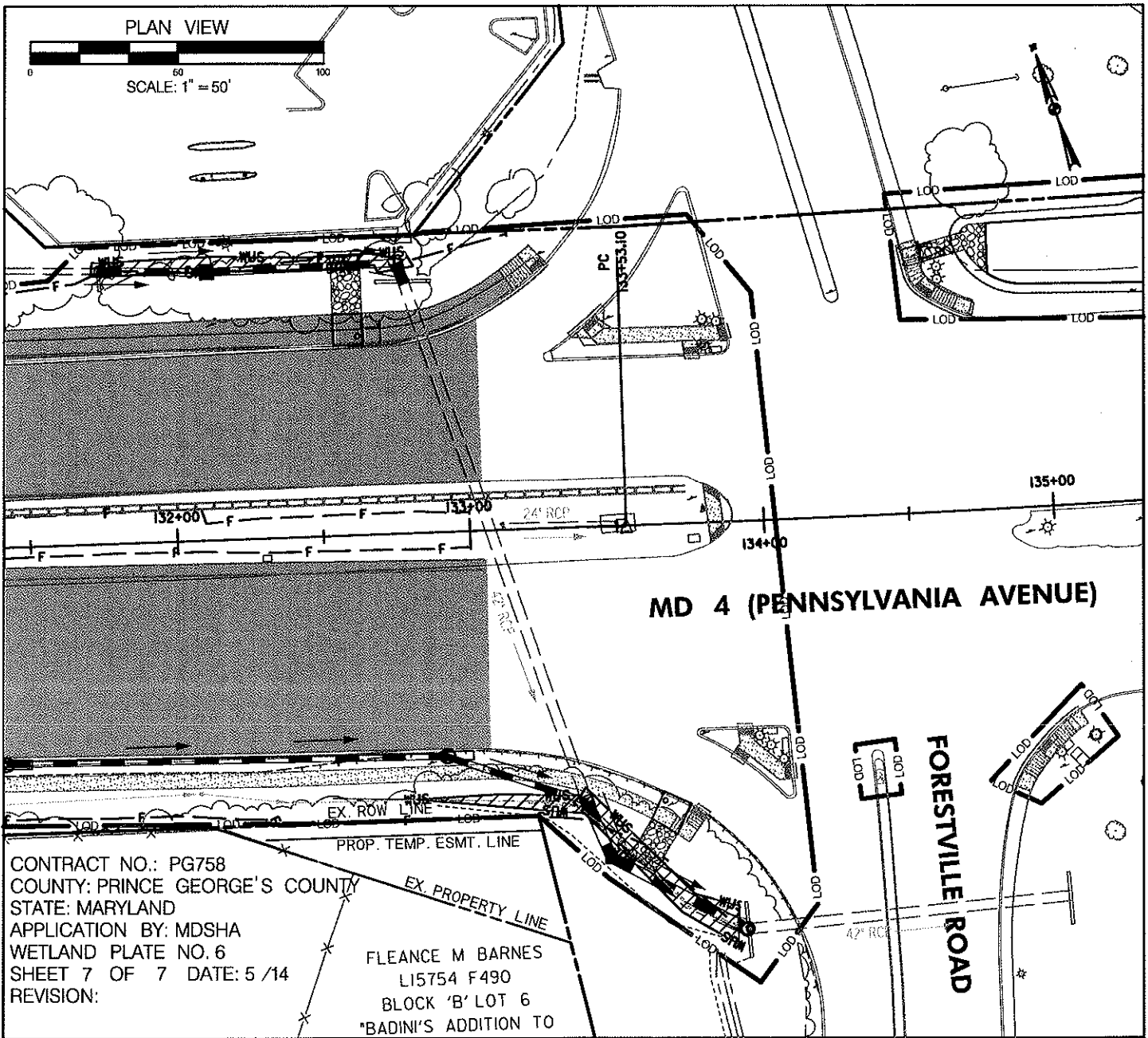
SCALE: 1" = 50'

SHEET: 5 OF 7




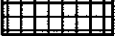
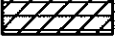
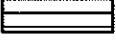
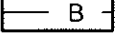
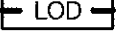




CONTRACT NO.: PG758
 COUNTY: PRINCE GEORGE'S COUNTY
 STATE: MARYLAND
 APPLICATION BY: MDSA
 WETLAND PLATE NO. 5
 SHEET 6 OF 7 DATE: 5 /14
 REVISION:

LEGEND	IMPACT DATA			
PERMANENT WATERS OF THE US IMPACT	PERMANENT WATERS OF THE US IMPACT - 561 SF (285 LF) TEMPORARY WATERS OF THE US IMPACT - 41 SF (19 LF)			
TEMPORARY WATERS OF THE US IMPACT	PERMANENT WETLAND IMPACT - 0 SF TEMPORARY WETLAND IMPACT - 0 SF			
PERMANENT WETLAND IMPACT	PERMANENT WETLAND BUFFER IMPACT - 0 SF TEMPORARY WETLAND BUFFER IMPACT - 0 SF			
TEMPORARY WETLAND IMPACT				
PERMANENT WETLAND BUFFER IMPACT				
TEMPORARY WETLAND BUFFER IMPACT				
WETLAND BUFFER				
LIMITS OF DISTURBANCE				
LIMITS OF WATERS OF THE US				
WETLAND AREA				
	<p> MARYLAND STATE HIGHWAY ADMINISTRATION 707 NORTH CALVERT ST. BALTIMORE, MARYLAND 21202 MD 4 (PENNSYLVANIA AVENUE) FROM FORESTVILLE ROAD TO MD 458 (SILVER HILL ROAD) PG758B21 </p>			
	<table border="1"> <tr> <td>DATE: MAY 2014</td> <td>SCALE: 1" = 50'</td> <td>SHEET: 6 OF 7</td> </tr> </table>	DATE: MAY 2014	SCALE: 1" = 50'	SHEET: 6 OF 7
DATE: MAY 2014	SCALE: 1" = 50'	SHEET: 6 OF 7		



LEGEND

-  PERMANENT WATERS OF THE US IMPACT
-  TEMPORARY WATERS OF THE US IMPACT
-  PERMANENT WETLAND IMPACT
-  TEMPORARY WETLAND IMPACT
-  PERMANENT WETLAND BUFFER IMPACT
-  TEMPORARY WETLAND BUFFER IMPACT
-  WETLAND BUFFER
-  LIMITS OF DISTURBANCE
-  LIMITS OF WATERS OF THE US
-  WETLAND AREA

IMPACT DATA

PERMANENT WATERS OF THE US IMPACT - 1260 SF (233 LF)
 TEMPORARY WATERS OF THE US IMPACT - 0 SF

PERMANENT WETLAND IMPACT - 0 SF
 TEMPORARY WETLAND IMPACT - 0 SF

PERMANENT WETLAND BUFFER IMPACT - 0 SF
 TEMPORARY WETLAND BUFFER IMPACT - 0 SF

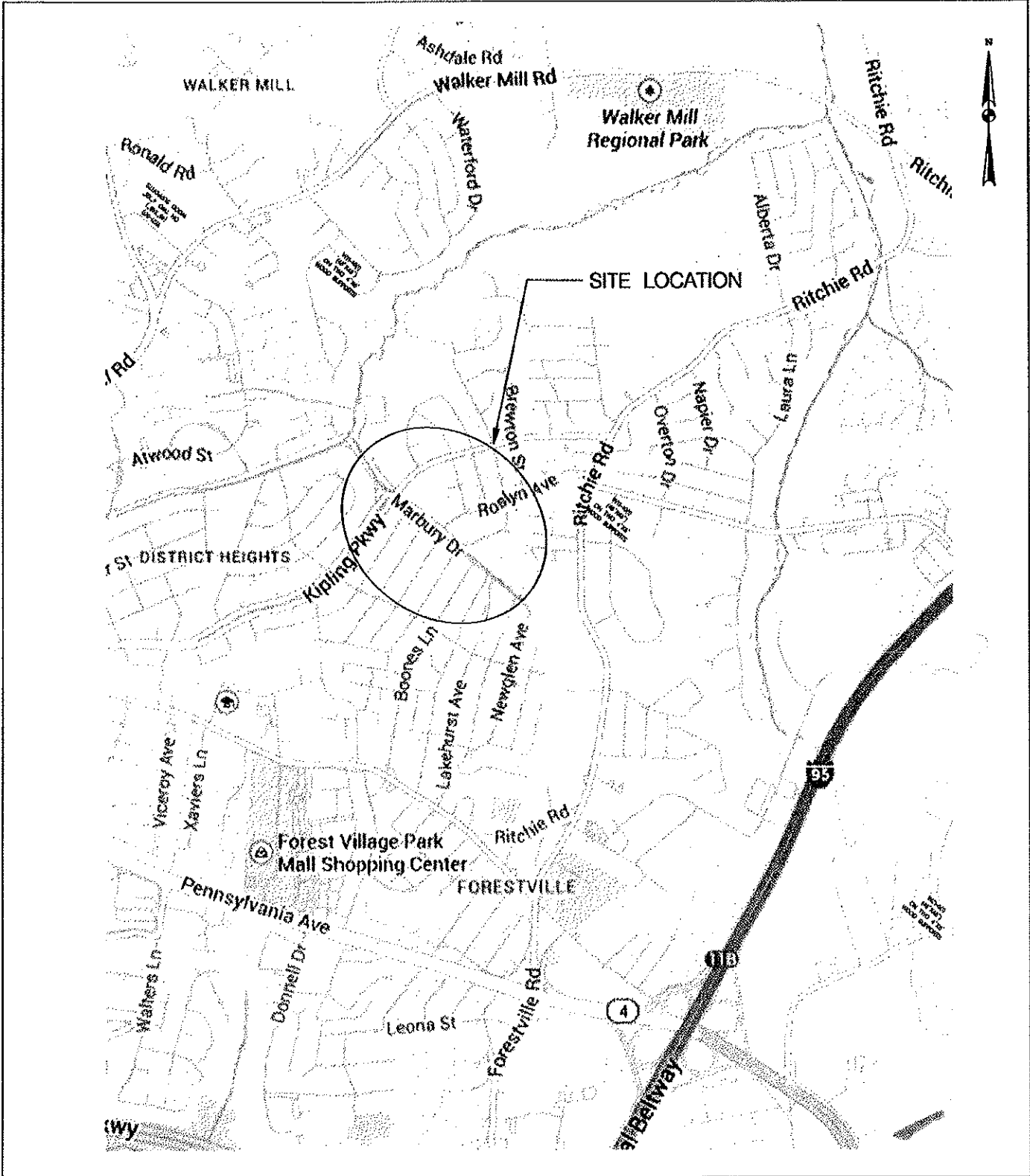


MARYLAND STATE HIGHWAY ADMINISTRATION
 707 NORTH CALVERT ST.
 BALTIMORE, MARYLAND 21202
 MD 4 (PENNSYLVANIA AVENUE) FROM
 FORESTVILLE ROAD TO
 MD 458 (SILVER HILL ROAD)
 PG758B21

DATE: MAY 2014

SCALE: 1" = 50'

SHEET: 7 OF 7



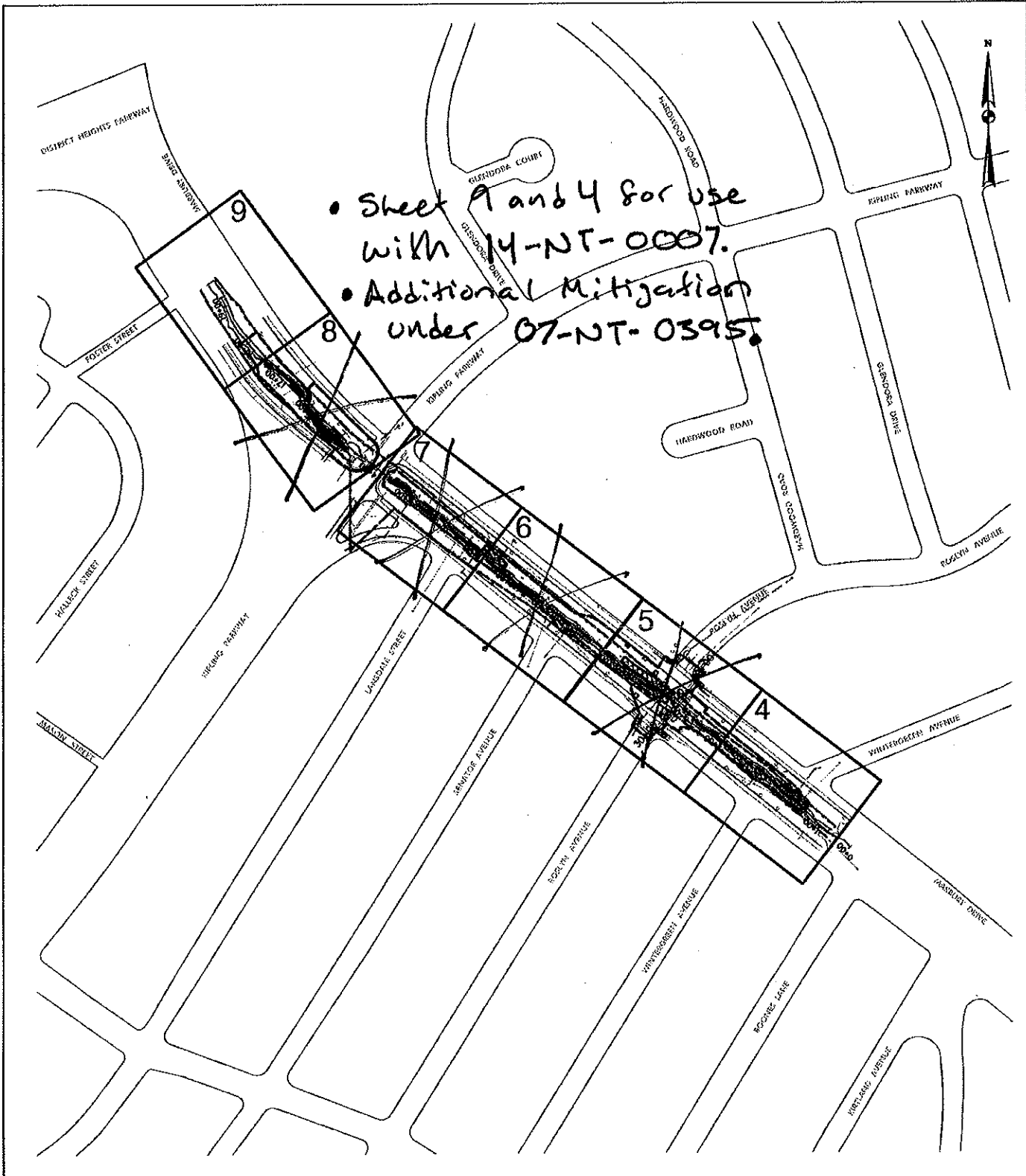
PURPOSE: MARBURY DRIVE
STREAM MITIGATION

NOT TO SCALE

SNA

MARYLAND STATE HIGHWAY ADMINISTRATION
707 NORTH CALVERT ST.
BALTIMORE, MARYLAND 21202

CONTRACT NO.: PG618C21
COUNTY: PRINCE GEORGE'S
STATE: MARYLAND
APPLICATION BY: MDSA
WETLAND PLATE NO.
SHEET 1 OF 9 DATE: 5/2/14
REVISION:

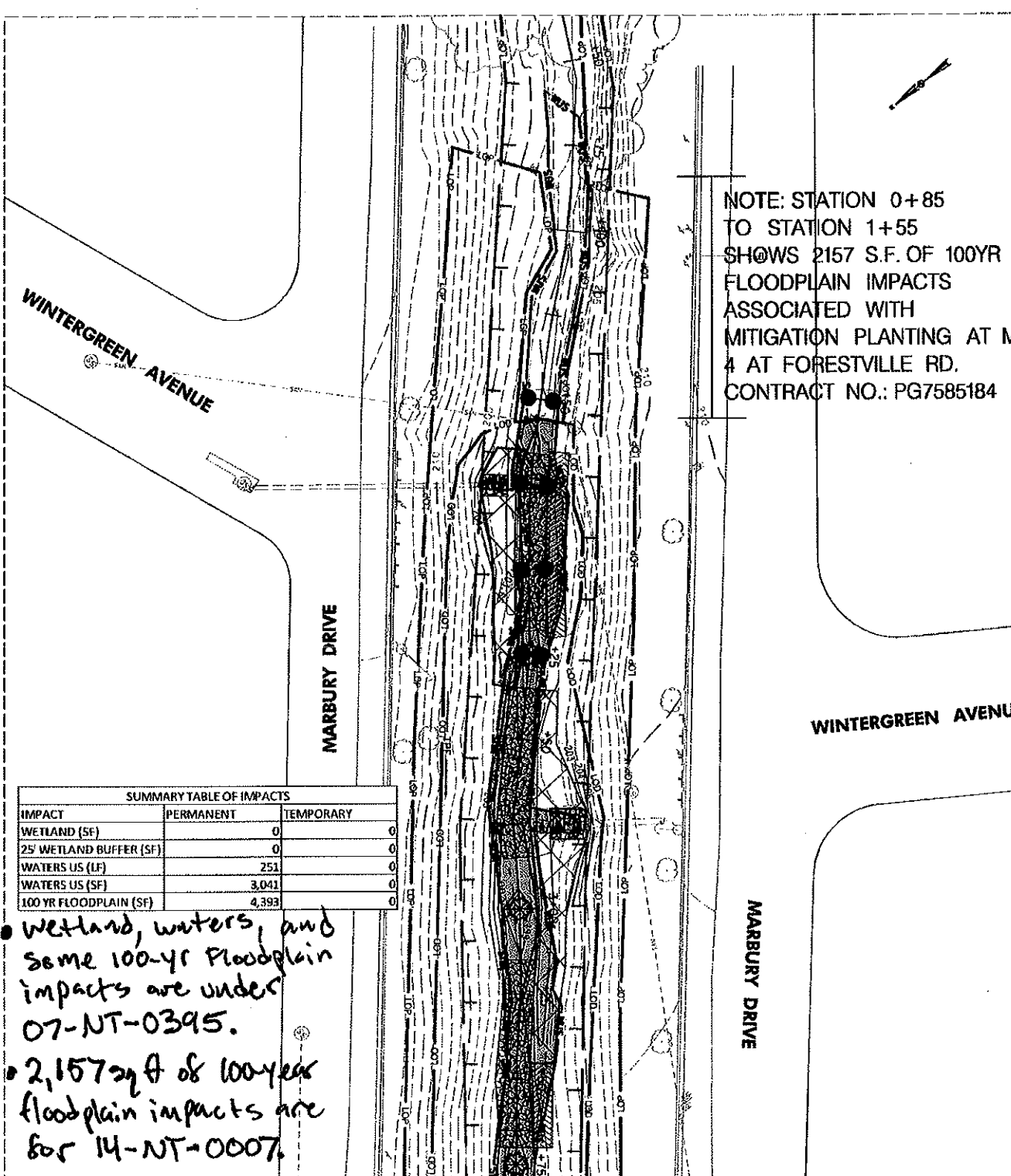


PURPOSE: MARBURY DRIVE
 STREAM MITIGATION

VICINITY MAP

SCALE: 1" = 300'
SKA
 MARYLAND STATE HIGHWAY ADMINISTRATION
 707 NORTH CALVERT ST.
 BALTIMORE, MARYLAND 21202

CONTRACT NO.: PG618C21
 COUNTY: PRINCE GEORGE'S
 STATE: MARYLAND
 APPLICATION BY: MDSHA
 WETLAND PLATE NO.
 SHEET 2 OF 9 DATE: 5/2/14
 REVISION:



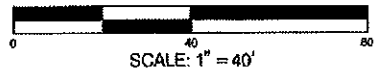
NOTE: STATION 0+85 TO STATION 1+55 SHOWS 2157 S.F. OF 100YR FLOODPLAIN IMPACTS ASSOCIATED WITH MITIGATION PLANTING AT MD 4 AT FORESTVILLE RD. CONTRACT NO.: PG7585184

SUMMARY TABLE OF IMPACTS		
IMPACT	PERMANENT	TEMPORARY
WETLAND (SF)	0	0
25' WETLAND BUFFER (SF)	0	0
WATERS US (LF)	251	0
WATERS US (SF)	3,041	0
100 YR FLOODPLAIN (SF)	4,393	0

- Wetland, waters, and some 100-yr floodplain impacts are under 07-NT-0395.
- 2,157sq ft of 100-year floodplain impacts are for 14-NT-0007.

MATCH SHEET 5 OF 9

PLAN VIEW



SCALE: 1" = 40'



MARYLAND STATE HIGHWAY ADMINISTRATION
707 NORTH CALVERT ST.
BALTIMORE, MARYLAND 21202

CONTRACT NO.: PG618C21
COUNTY: PRINCE GEORGE'S
STATE: MARYLAND
APPLICATION BY: MDSA
WETLAND PLATE NO. 1
SHEET 4 OF 9 DATE: 5/2/14
REVISION:

MARBURY DRIVE
PURPOSE: STREAM MITIGATION

MARBURY DRIVE

NO STREAM IMPACTS WILL OCCUR WITHIN THE LOP BOUNDARY BECAUSE NO EQUIPMENT WILL BE ALLOWED IN THE STREAM

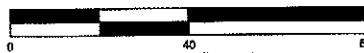
NOTE: STATION 18+09 TO STATION 19+22 SHOWS 3814 S.F. OF 100YR FLOODPLAIN IMPACTS ASSOCIATED WITH MITIGATION PLANTING AT MD 4 AT FORESTVILLE RD. CONTRACT NO.: PG7585184

SUMMARY TABLE OF IMPACTS		
IMPACT	PERMANENT	TEMPORARY
WETLAND (SF)	0	0
25' WETLAND BUFFER (SF)	112	0
WATERS US (LF)	55	0
WATERS US (SF)	843	0
100 YR FLOODPLAIN (SF)	3,047	0

- Wetland, waters, and some 100-year floodplain impacts are under 07-NT-0395.
- 3,814 sq ft of 100-year floodplain impacts are under 14-NT-0007

FOSTER STREET

PLAN VIEW



SCALE: 1" = 40'

SHA

MARYLAND STATE HIGHWAY ADMINISTRATION
707 NORTH CALVERT ST.
BALTIMORE, MARYLAND 21202

CONTRACT NO.: PG618C21
COUNTY: PRINCE GEORGE'S
STATE: MARYLAND
APPLICATION BY: MDSHA
WETLAND PLATE NO. 6
SHEET 9 OF 9 DATE: 5/2/14
REVISION:

PURPOSE: MARBURY DRIVE
STREAM MITIGATION



DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 1715
BALTIMORE, MD 21203-1715

OCT 07 2014

Operations Division

Subject: CENAB-OP-RMN (MD SHA/MD 4 from Forestville Rd to MD 458/Roadway Improvements) 2014-60031-M15

Mr. Todd Nichols
Maryland State Highway Administration
707 North Calvert Street, Mailstop C-306
Baltimore, Maryland 21202

Dear Mr. Nichols:

This is in reference to your application dated February 26, 2014, wherein you requested Department of the Army (DA) authorization to implement improvements in the MD 4 corridor to construct 5-foot-wide sidewalks, a 10-foot-wide shared-use path, install new stormwater management facilities and drainage features, install traffic barriers, relocate utilities, and provide vegetative plantings along MD 4 from MD 458 to Forestville Road in Prince George's County, Maryland. The proposed project would permanently impact approximately 642 linear feet (2,264 square feet) of stream channel and temporarily impact 44 linear feet (361 square feet) of stream channel. Compensatory mitigation would be provided by the creation of 200 linear feet of riparian buffer at the Marbury Drive stream restoration site in District Heights, Prince George's County, Maryland. The Corps received the application on August 26, 2014.

The U.S. Army Corps of Engineers, Baltimore District, has determined that the proposed work, if accomplished in accordance with the enclosed plan(s), is authorized as a Category A activity for 1.e(7)-Temporary Construction Access, Stream Diversion, & Dewatering Activities and as a Category B activity for 1.d-Linear Transportation Activities under the DA Maryland State Programmatic General Permit-4 (MDSPGP-4). This general permit was published in the Corps' Special Public Notice #11-77 issued on September 28, 2011. This MDSPGP-4 verification is provided pursuant to Section 404 of the Clean Water Act. If any of the information contained in your application and/or plans is later found to be in error, the MDSPGP-4 authorization for your project may be modified, suspended, or revoked.

The enclosed list of activity-specific impact limits and requirements and general conditions must be followed for purposes of the MDSPGP-4 in performing the work. In addition to the enclosed list of conditions, you must also comply with the following special conditions:

1. All fill used as backfill material within regulated waters of the U.S. must be clean and free of debris and/or toxins and must be from an upland source.
2. All stream bank, stream channel, and stormwater outfall stabilization must be constructed using clean stone and/or rock. The use of broken concrete, asphalt, debris, or other similar types of material for revetment construction are prohibited.
3. The permittee must immediately remove any and all debris introduced into waters of the U.S. as a result of any construction and/or demolition activities and must ensure that all debris is disposed of properly at an authorized upland disposal site.

4. Compensatory mitigation at the Marbury Drive stream mitigation site must adhere to the approved June 6, 2014 Phase II Mitigation Plan: MD 4 from Forestville to MD 458, District Heights, Prince George's County. Planting must occur by the end of 2015.
5. Aerial Cover Vegetative Standards for planting viability at the Marbury Drive stream mitigation site:
 - a. By the end of monitoring year one, a minimum of 50% of the mitigation site shall be vegetated (either by planted or volunteer plants) by native species.
 - b. By the end of monitoring year three, a minimum of 70% of the mitigation site shall be vegetated (either by planted or volunteer plants) by native species.
 - c. By the end of monitoring year five, a minimum of 85% of the mitigation site shall be vegetated (either by planted or volunteer plants) by native species.
 - d. Volunteer species should support functions consistent with design goals.
 - e. If 85% aerial coverage is not attained by end of monitoring year five, the reasons for failure must be determined, corrective measures must be taken and the area replanted.

As a condition of the MDSPGP-4 authorization, you are required to complete and sign the **enclosed** Compliance Self-Certification Form regarding the completed work and any required mitigation. The signed form should be returned to the Regulatory Branch at the above address **within 60 days** following completion of the authorized work and any required mitigation. Your signature on the self-certification form verifies your understanding that the work was completed in accordance with the terms and conditions associated with your DA permit.

This permit verification, including the computation of impacts and any required compensatory mitigation requirements, is based on a preliminary jurisdictional determination (JD). This preliminary JD finds that there "may be" waters of the United States within the review area shown on project plans and mitigation plans and identify all potential jurisdictional waters and wetlands within the review area that could be affected by the proposed activity. The project plans and mitigation plans, copies of which are enclosed, each consist of 7 sheets and are dated May 2014 and 5/2/14, respectively. This preliminary JD is not appealable.

If you do not agree with the extent of waters or wetlands and this preliminary JD upon which this permit verification was based, you are hereby advised of your option to request and obtain an approved JD from this office before accepting the terms and conditions of this permit verification. An approved JD is an official, written Corps determination stating the presence or absence of jurisdictional waters of the United States and identifies the limits of waters of the United States on a project site. An approved JD can be relied upon for a period of five years and can be appealed through the Corps' administrative appeal process (33 CFR Part 331).

Undertaking any activity in reliance on a Corps permit authorization based on a preliminary JD means that you accept the permit in entirety, and waive all rights to appeal the permit, including its terms and conditions and the preliminary JD associated with this permit.

Please be aware that the terms and conditions of this permit will continue to be binding on the new property owner(s) if structures or work authorized by this permit exist at the time of ownership transfer of the associated property. Although the construction period for work authorized by this MDSPGP-4 is finite, the permit itself, with its limitations, does not expire. To validate the transfer of this permit and the legal responsibility to comply with its terms and

conditions, the transferee (new owner) must provide a mailing address and telephone number along with their signature and date in the space provided below and mail a copy to the above address.

Your MDSPGP-4 authorization is valid until September 30, 2016 unless the permit is modified, reissued, or revoked. You must remain informed of the changes to the MDSPGP-4. When changes to the MDSPGP-4 occur, a public notice announcing the changes will be issued.

Be advised that you have 12 months from the effective date of the MDSPGP-4's expiration, modification or revocation to complete the work under the present terms and conditions provided you have commenced construction or are under contract to commence construction of the authorized work.

In order for this authorization to be valid, you must obtain all required Federal, State, and local permits.

If you have any questions concerning this matter, please call Mr. Jack Dinne, of this office, at (410) 962-6005 or by email at john.j.dinne@usace.army.mil.

Sincerely,



Joseph P. DaVia
Chief, Maryland Section Northern

Enclosures

Cc:
Mr. Ed Tinney, MDE-Nontidal

_____	_____	_____
TRANSFEEE SIGNATURE	DATE	AREA CODE / TELEPHONE NO.
_____	_____	
PRINTED NAME	ADDRESS	

To identify how we can better serve you, we need your help. Please take the time to fill out our new customer service survey at: <http://www.nab.usace.army.mil/Missions/Regulatory.aspx>



DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, U.S. ARMY CORPS OF ENGINEERS
P.O. BOX 1715
BALTIMORE, MD 21203-1715

2014-60031-M15

REPLY TO
ATTENTION OF

Effective October 1, 2011

Corps Permit Number

CENAB-OP-R-MDSPGP-4 (MARYLAND STATE PROGRAMMATIC GENERAL PERMIT-4)

TO WHOM IT MAY CONCERN:

Upon the recommendation of the Chief of Engineers, and under the provisions of Section 404 of the Clean Water Act, as amended, and Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403), the Secretary of the Army hereby authorizes the discharge of dredged or fill material or the placement of structures into Waters of the United States, including wetlands and navigable waters. These discharges and structures must comply with all the terms and conditions identified in this MDSPGP-4. It has been determined that the project qualifies for the MDSPGP-4. Accordingly, you are authorized to undertake the activity pursuant to:

1. Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403); and/or
2. Section 404 of the Clean Water Act (33 U.S.C. 1344).

You are authorized to perform work in accordance with the terms and conditions specified in Section VII of the MDSPGP-4 effective on October 1, 2011.

VII. General Conditions: To qualify for MDSPGP-4 authorization, the prospective permittee must comply with the following general conditions, as appropriate, in addition to any activity-specific conditions in the MDSPGP-4 category list and any case-specific special conditions imposed by the Corps.

A. General Requirements:

1. **Other Permits:** Authorization under the MDSPGP-4 does not obviate the need to obtain other Federal, State, or local authorizations required by law.

2. **Geographic Jurisdiction:** This MDSPGP-4 will authorize work undertaken within the geographic limits of the State of Maryland under the regulatory jurisdiction of the Baltimore District.

3. **Applicability:** Applicability of the MDSPGP-4 shall be reviewed with reference to the Corps definition of waters of the United States, including wetlands, and navigable waters of the United States. Applicants are responsible for delineating boundaries of all waters of the United States, including wetland boundaries. The delineation of wetland boundaries shall be accomplished in accordance with the current Federal manual for identifying jurisdictional wetlands and appropriate guidance issued by the Corps of Engineers.

4. **Minimal Effects:** Projects authorized by the MDSPGP-4 shall have no more than minimal individual and cumulative adverse environmental effects.

5. **Discretionary Authority:** Notwithstanding compliance with the terms and conditions of the MDSPGP-4, the Corps retains discretionary authority to require an alternate Corps permit review for any project under all categories of the MDSPGP-4 based on concerns for the aquatic environment or for any other factor of the public interest. This authority may be invoked on a case-by-case basis during the review process for Category B activities whenever the Corps determines that, based on the concerns stated above, the potential consequences of the proposed project warrant individual review. In some rare instances, the Corps may have concerns for the aquatic environment or for any other public interest factor pertaining to a specific proposed project, which has already received a case-specific verification as a Category A activity. In order to evaluate this project under an alternate Corps permit review, the verification must be suspended in accordance with Section VIII.E of the MDSPGP-4.

Whenever the Corps notifies an applicant that an alternate Corps permit may be required, authorization under the MDSPGP-4 is voided. No work may be conducted until the individual Corps permit is obtained, or until the Corps notifies the applicant that further review has demonstrated that the work may proceed under the MDSPGP-4.

6. Single and Complete Projects: The MDSPGP-4 shall not be used for piecemeal work and shall be applied to single and complete projects, including maintenance activities. For purposes of this MDSPGP-4, a single and complete project means the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers and which has independent utility. All components of a project, including all attendant features both temporary and permanent, shall be reviewed together as constituting one single and complete project. All planned phases of multi-phased projects (e.g., subdivisions should include all work such as roads, utilities, and lot development) shall be applied for and reviewed together as constituting one single and complete project. The MDSPGP-4 shall not be used for any activity or portion of a project (e.g., a pier or boat ramp), that is part of, or dependent on, an overall project (e.g., the dredging of a main navigation channel or a spur channel), for which an individual permit or some other alternate Corps permit is required.

7. Use of Multiple MDSPGP-4 Activities: More than one MDSPGP-4 activity may be used to authorize a single and complete project. However, the specific requirements, including all activity-specific requirements and impact thresholds, must be met for each MDSPGP-4 activity and the total extent of project impacts must not exceed the acreage and/or linear foot limit of the MDSPGP-4 activity with the highest specified acreage and/or linear foot limit. For example, if a road crossing is authorized under Category A of Section IV.B.1.(d)(1) with an associated nontidal bank stabilization authorized under Section IV.B.1.f.(4)(a), the maximum total impact limits to nontidal waters of the United States for the single and complete project may not exceed 10,000 square feet in total area and/or 500 linear feet in total length. The road crossing and nontidal bank stabilization activities must still meet all Category A activity-specific requirements and impact thresholds.

A single and complete project with multiple impacts, that may be eligible for authorization under a Category A and a Category B activity, requires an application submittal to the Corps and review under the MDSPGP-4 Category B verification procedures. All specific requirements, including the activity-specific requirements and impact thresholds of the Category A activity and the Category B activity must be met and the total extent of project impacts must not exceed to total acreage and/or linear foot limit of the MDSPGP-4 activity with the highest specified acreage and/or linear foot limit. For example, if a road crossing is authorized under Category A of Section IV.B.1.(d)(1) with an associated nontidal bank stabilization authorized under Section IV.B.f.(4)(b), the maximum total impact limits to waters of the United States for the single and complete project may not exceed 1/2 acre (21,780 square feet) in total area and/or 2,000 linear feet in total length. The road crossing activity must meet the Category A activity-specific requirements and impact thresholds, and the nontidal bank stabilization activity must meet the Category B activity-specific requirements and impact thresholds.

8. Permit On-Site: The permittee shall ensure that a copy of the MDSPGP-4 and the accompanying authorization letter are at the work site at all times. These copies must be made available to any regulatory representative upon request. Although the permittee may assign various aspects of the work to different contractors or sub-contractors, all contractors and sub-contractors shall be expected to comply with all conditions of any general permit authorization.

9. Authorized Activities in Navigable Waters Subject to Section 10 of the Rivers and Harbors Act of 1899:

a. If future operations by the United States require removal, relocation, or other alteration of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable water, the permittee will be required, upon due notice from the Corps, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

b. The permittee acknowledges the possibility that the structure permitted herein may be subject to damage by wave wash from passing vessels and/or ice flows within the waterway. The issuance of this permit does not relieve the permittee from taking all proper steps to ensure the integrity of the structure permitted herein and the safety of vessels moored thereto from damage by wave wash and/or ice flows, and the permittee shall not hold the United States liable for such damage.

c. The permittee must install and maintain, at his/her expense any safety lights, markers, and/or signals prescribed by the USCG, through regulations or otherwise, on the authorized facilities and/or structures. The permittee must contact the Commander (AOWW), Fifth Coast Guard District, Federal Building, 431 Crawford

Street, Portsmouth, Virginia, 23704, to ascertain the need for obstruction lights. Prior to commencing the construction or installation of an authorized structure in navigable waters of the United States, the permittee must submit a "Private Aids to Navigation Application" to the Commander of the USCG.

d. The permittee must provide location coordinates of the authorized structures, including minimum depth and other pertinent information to the USCG and request that a Local Notice to Mariners is issued regarding the authorized work.

10. For Aerial Transmission Lines Across Navigable Waters: The following minimum clearances are required for aerial electric power transmission lines crossing navigable waters of the United States. These clearances are related to the clearances over the navigable channel provided by existing fixed bridges, or the clearances which would be required by the USCG for new fixed bridges, in the vicinity of the proposed aerial transmission line. These clearances are based on the low point of the line under conditions producing the greatest sag, taking into consideration temperature, load, wind, length of span, and type of supports as outlined in the National Electrical Safety Code:

NOMINAL SYSTEM VOLTAGE (kV)	Minimum additional clearance (ft.) above clearance required for bridges.
115 and below	20
138	22
161	24
230	26
350	30
500	35
700	42
750-765	45

a. Clearances for communication lines, stream gauging cables, ferry cables, and other aerial crossings must be a minimum of ten feet above clearances required for bridges, unless specifically authorized otherwise by the District Engineer.

b. Corps Regulation ER 1110-2-4401 prescribes minimum vertical clearances for power communication lines over Corps lake projects. In instances where both the National Electrical Safety Code requirements and ER 1110-2-4401 apply, the greater minimum clearance is required.

A. National Concern:

1. **Historic Properties:** Any activity authorized by the MDSPGP-4 shall comply with Section 106 of the National Historic Preservation Act. Maryland Department of the Environment, in cooperation with the Maryland Historic Preservation Office, shall conduct an initial review and notify the Corps if any archaeological or other cultural resources are in the vicinity of the project. The Corps may require applicants to perform a survey of archaeological and historical resources in the project area. The Corps shall determine whether National Historic Preservation Act Section 106 consultation is required. The applicant must notify the Corps if they have knowledge that the activity may affect any historic properties listed or eligible for listing, or that the applicant has reason to believe may be eligible for listing on the National Register of Historic Places. If the permittee discovers any previously unknown archaeological or other cultural resource while accomplishing the work authorized by the MDSPGP-4, the permittee shall immediately notify the Corps of what has been found and stop work in the permit area until the required coordination has been completed. The permittee shall not begin or continue work until notified by the District Engineer that the requirements of the National Historic Preservation Act have been satisfied

and that the activity may proceed. Information on the location and existence of historical resources can be obtained from the MHT, Office of Preservation Services, and the National Register of Historic Places.

2. **Tribal Rights:** No activity or its operation may impair reserved tribal rights, including but not limited to, reserved water rights and treaty fishing and hunting rights.

3. **National Lands:** Activities authorized by the MDSPGP-4 shall not impinge upon the value of any Federal land, including but not limited to, National Wildlife Refuges, National Forests, National Parks, National Marine Sanctuaries, or any area administered by the FWS, U.S. Forest Service, or National Park Service (e.g., Assateague Island National Seashore).

4. **Endangered Species:** The MDSPGP-4 does not authorize any activity that may directly or indirectly affect a threatened or endangered species or a species proposed for such designation, as identified under the Federal ESA; or which may directly or indirectly destroy or adversely modify the critical habitat of such species unless and until appropriate coordination with the applicable resource agency(s) is complete and all such issues are resolved in accordance with the applicable regulations and procedures. MDE, in cooperation with MD DNR, shall conduct an initial review and notify the Corps and FWS or NMFS if any Federally listed species or critical habitat is likely to be in the vicinity of the project. The Corps shall determine if consultation with FWS or NMFS is required under Section 7 of the ESA. If consultation is required, the applicant, after notification, shall not begin or continue work until notified by the Corps that the requirements of the ESA have been satisfied and that the activity is eligible for authorization. Information on the location of threatened and endangered species and their critical habitat can be obtained from FWS and NMFS. The Corps will be initiating consultation under the Endangered Species Act on this MDSPGP-4 and any conditions from that consultation will be inserted into the MDSPGP-4.

National Marine Fisheries Service – Endangered Species Act Requirements:

a. **Interactions with National Marine Fisheries Service Federally Threatened or Endangered Species:** Any interaction between a sea turtle or any species listed now or in the future under Federal law as a threatened or endangered species (“listed species”) (e.g., North Atlantic right whale, humpback whale, shortnose sturgeon) and the vessels associated with the project must be reported to the NMFS as follows: If the animal appears alive and uninjured (i.e., breathing normally, no visible wounds, movement uninhibited), the permittee or its representative must report the incident to the NMFS Northeast Region Marine Mammal and Sea Turtle Stranding and Entanglement Hotline at (866) 755-6622 within 24 hours of returning from the trip on which they made the discovery. If the animal requires assistance, the call to the hotline must be made immediately. If the animal appears to be injured (i.e. bleeding, gasping for air, etc.) or dead, the permittee or its representative must also immediately call the hotline so the appropriate rehabilitation or stranding network representative can be contacted. The applicant shall also notify the Corps of all correspondence and interaction with the NMFS within two calendar days. Additional information about any Federally threatened or endangered species may be obtained from the attached fact sheet or online at: http://www.nero.noaa.gov/prot_res/stranding/SpeciesOverview.html and at: http://www.nero.noaa.gov/prot_res/esp/. An interaction is defined as an entanglement or capture of a listed species or a strike/direct contact between vessels or equipment used for the project and a listed species.

b. **Vessel Buffer:** When listed species are sighted, vessels must attempt to maintain a distance of 50 yards (150 feet) or greater between the animal and the vessel whenever possible. State and Federal regulations prohibit approaching a right whale within a 500 yard (1,500 foot) buffer zone. Any vessel finding itself within the 500 yard (1,500 foot) buffer zone created by a surfacing right whale must depart immediately at a safe, slow speed. If other listed species are detected, vessels will reduce their speeds to 10 knots or to the maximum extent practicable to ensure human safety. If listed species are sighted off of a moving dredge, intentional approaches within 100 yards (300 feet) of the animal must be avoided. Vessels must reduce speeds to 4 knots or the lowest speed practicable to ensure human safety. Any interactions must be reported to the NMFS.

c. Best Management Practices Applicable to Category A Activities Within Tidal Waters Having Salinity Levels Less Than 6 Parts Per Thousand (ppt) (See Appendix B):

(i) **Pile Driving:** For the protection of listed species within all tidal waters of the Chesapeake Bay in Maryland and its tidal tributaries with salinity levels <6 ppt, pile driving methods must maintain noise level thresholds not to exceed 187dB SEL re 1µPa or 206dB peak re 1µPa at a distance of >10m from the pile being installed; and for levels >155dB peak re 1µPa must not exceed 12 consecutive hours on any given day and a 12 hour

recovery period (i.e., in-water noise levels below 155dB peak re 1µPa) must be provided between work days. Pile driving construction must adhere to one of the following methods: (a) piles must be installed in-the-dry during low water; or (b) piles must be drilled and pinned to ledge; or (c) vibratory hammers must be used to install any size and quantity of wood, concrete, or steel pilings; or (d) impact hammers must be limited to one hammer and <50 piles installed per day with the following: wood piles of any size; concrete piles <18-inches diameter; steel piles <12-inch diameter if the hammer is <3,000 pounds and a wood cushion is used between the hammer and steel pile; or (e) approved pile driving methods that will allow noise level thresholds to be met.

(ii) Sediment Disturbing Activities Time-of-Year Restriction: Sediment disturbing activities, which includes pile driving activities, are prohibited during the period April 1 through June 30 within all tidal waters of the Chesapeake Bay in Maryland and its tidal tributaries with salinity levels <6 ppt for the protection of shortnose sturgeon and early life stages in these waters.

5. Essential Fish Habitat (EFH) and Fish and Wildlife Coordination Act: Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act requires an EFH consultation with the NMFS for any action or proposed action authorized, funded, or undertaken by a Federal agency that may adversely affect EFH. Essential Fish Habitat has been defined by Congress as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” The designation and conservation of EFH seeks to minimize adverse effects on habitat caused by fishing and non-fishing activities. NMFS has determined that many of the MDSPGP-4 Category A activities are eligible for EFH general or programmatic concurrence and require no further EFH consultation. National Marine Fisheries Service, in consultation with the District, has determined that individual EFH consultation is needed for some projects potentially eligible for authorization under Category A of the MDSPGP-4 that may adversely affect EFH. The Corps will coordinate with NMFS as part of the Category B review procedures. EFH conservation recommendations made by NMFS will normally be included as a permit requirement by the Corps. If the EFH coordination and consultation requirements cannot be resolved under the MDSPGP-4 process, an alternate Corps permit review process is required for the project. The Corps will be initiating consultation under these authorities on this MDSPGP-4, and any conditions from that consultation to protect NOAA trust resources will be inserted into this MDSPGP-4.

6. Wild and Scenic Rivers: No activity is authorized under the MDSPGP-4 that occurs in a component of the National Wild and Scenic River System, including rivers officially designated by Congress as study rivers for possible inclusion in the system, while such rivers are in an official study status, unless the appropriate Federal agency, with direct management responsibility for the river, has determined in writing that the proposed activity will not adversely affect any National Wild and Scenic River, including study rivers. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service, U. S. Forest Service, Bureau of Land Management, or FWS).

7. Federally Authorized Civil Works Projects:

a. Federal Navigation Projects: The MDSPGP-4 does not authorize interference with any existing or proposed Federal navigation projects. The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration. (See VII.A.9.a.)

b. Federal Navigation Channel Setbacks: All activities must comply with the Baltimore District Minimum Setback Guidance for Structures Along Federally Authorized Channels. Please see the Baltimore District’s Regulatory webpage to view this guidance:

<http://www.nab.usace.army.mil/Wetlands%20Permits/publications.htm>

c. Other Federally Authorized Civil Work Projects (e.g., flood control, dams, and reservoirs): The MDSPGP-4 does not authorize interference with any proposed or existing Federally authorized civil works project.

8. **Federal Liability:** In issuing this permit, the Federal Government does not assume any liability for the following:

- a. Damages to the permitted project, or uses thereof, as a result of other permitted or unpermitted activities or from natural causes;
- b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest;
- c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit;
- d. Design or construction deficiencies associated with the permitted work; and
- e. Damage claims associated with any future modification, suspension or revocation of the MDSPGP-4 or any specific MDSPGP-4 verification.

9. **Navigation:** Projects authorized under the MDSPGP-4 shall not cause interference with navigation, and no attempt shall be made by the permittee to prevent the full and free use by the public of all navigable waters at or adjacent to projects authorized under the MDSPGP-4. Nothing in the MDSPGP-4 shall in any way restrict the District Engineer, U.S. Army Engineer District, Baltimore, from exercising his legal authority to protect the public interest in navigation or from exercising his authority under the Navigation Servitude of the United States. (See VII.B.8.)

10. **Fills Within 100-Year Floodplain:** The activity must comply with applicable Federal Emergency Management Agency approved State or local floodplain management requirements.

11. **Safety of Impoundment Structures:** To ensure that all impoundment structures are safely designed, the Corps may require non-Federal applicants to demonstrate that the structures comply with established State dam safety criteria or have been designed by qualified persons. The Corps may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

B. **Minimization of Environmental Impacts:**

1. **Avoidance and Minimization:** Discharges of dredged or fill material into waters of the United States and adverse impacts of such discharges on the aquatic ecosystem shall be avoided and minimized to the maximum extent practicable at the project site (i.e., on-site).

2. **Mitigation Standards:** A proposed compensatory mitigation proposal may be submitted with the application to expedite the process. The Corps will determine if the project is eligible for authorization under the MDSPGP-4 subject to the applicant's submittal of a compensatory mitigation proposal for stream and wetland impacts. Compensatory mitigation plans will generally include a requirement for the establishment, performance, maintenance, legal protection (e.g., conservation easements), and long-term management of the mitigation area. Applicants may propose the use of mitigation banks, in-lieu-fee programs, or separate permittee-responsible mitigation. In general, maintenance of previously authorized activities typically does not require mitigation. All mitigation must be in compliance with the 2008 Mitigation Rule (73 FR 70).

a. Wetland mitigation will generally be required for all permanent tidal or nontidal wetland losses either through the use of the State's tidal or nontidal programmatic wetland compensation, mitigation banks, in-lieu-fee programs, and/or by the permittee as required by special condition of the MDSPGP-4 or the State authorization. Generally, the minimum required wetland mitigation ratios will be as follows: 2:1 for forested and scrub-shrub wetlands; 1:1 for herbaceous emergent wetlands, and 1:1 for permanent conversion of forested wetlands to herbaceous emergent wetlands. Wetland mitigation can include wetland restoration, establishment, enhancement (including restoration or enhancement of upland forested buffers), and/or wetland preservation, unless the Corps determines in writing that some other form of mitigation would be more appropriate and provides a project-specific waiver of this requirement. Since the likelihood of success is greater and the impacts are reduced, wetland restoration should be the first compensatory mitigation option considered.

b. Stream mitigation, focusing on functional replacement, will generally be required for any project that involves losses of more than 200 linear feet to stream channels and rivers through the use of mitigation banks, in-lieu-fee programs, or by the permittee as required by special condition of the MDSPGP-4 and/or the State authorization. Stream mitigation can include stream restoration, establishment, enhancement (including enhancement of riparian buffers), and stream preservation. Riparian buffer areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat impact concerns. The need to require mitigation for impacts to open waters will be determined on a case-by-case basis.

c. For activities resulting in the loss of marine or estuarine resources, permittee-responsible compensatory mitigation may be environmentally preferable if there are no mitigation banks or in-lieu-fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee.

d. For permittee-responsible mitigation, the special conditions of the MDSPGP-4 verification must clearly indicate the party or parties responsible for the implementation, performance, and long-term management of the compensatory mitigation project.

3. **Work in Wetlands:** Heavy equipment working in wetlands shall be avoided if possible and, if required, soil and vegetation disturbance shall be minimized by using techniques such as timber mats, geotextile fabric, and vehicles with low-pressure tires. Disturbed areas in wetlands shall be restored to preconstruction contours and elevations upon completion of the work.

4. **Temporary Fill and Mats:** Temporary fill and the use of mats are both considered a discharge of fill material and must be included in the quantification of impact area authorized by the MDSPGP-4. Temporary fill (e.g., access roads, cofferdams) in waters and wetlands authorized by the MDSPGP-4 shall be properly stabilized during use to prevent erosion. Temporary fill in wetlands shall be placed on geotextile fabric laid on the existing wetland grade. Upon completion of the work, all temporary fills shall be disposed of at an upland site, suitably contained to prevent erosion and transport to a waterway or wetland. Temporary fill areas shall be restored to their original, pre-construction contours and revegetated with native wetland species.

5. **Erosion and Sediment Control:** Adequate erosion and sediment control measures, practices, and devices, such as turbidity curtains in tidal waters, vegetated filter strips, geotextile silt fences, phased construction, or other devices or methods, shall be used to reduce erosion and retain sediment on-site during and after construction. These devices and methods shall be capable of (a) preventing erosion, (b) collecting sediment and suspended and floating materials, and (c) filtering fine sediment. Erosion and sediment control devices shall be removed when the work is complete and the site has been successfully stabilized. The sediment collected by these devices shall be removed and placed at an upland location, in a manner that will prevent its later erosion into a waterway or wetland. All exposed soil and other fills shall be permanently stabilized at the earliest practicable date. In-stream work shall be conducted "in the dry" whenever practicable. This should be accomplished using stream diversion devices, other than earthen or stone cofferdams. In addition, work in waters of the United States should be performed during periods of low-flow or no-flow, whenever practicable.

6. **Aquatic Life Movements:** No activity may substantially disrupt the necessary life-cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through, or spawn/nursery within the area (e.g., anadromous/catadromous fish); unless the activity's primary purpose is to impound water. Culverts placed in streams must be installed to maintain low flow conditions. A low flow channel must be maintained through any discharges placed for armoring across the channel so as to not impede flow in the waterway and/or not to block or impede the movements of anadromous, estuarine, and resident fish. Permanent culvert or pipes placed in streams must be depressed in accordance with the State of Maryland regulations. If depression of the culvert is not practicable, the applicant must submit a narrative, along with their application, documenting measures evaluated to minimize disruption of the movement of aquatic life, as well as specific documentation concerning site conditions and limitations on depressing the culvert, cost, and engineering factors that prohibit depressing the pipe/culvert. Options that need to be considered include the use of a bridge, bottomless pipe, partial depression, or other measures to provide for the movement of aquatic organisms. The documentation must also include photographs documenting site conditions. The applicant may find it helpful to contact their regional fishery agency for recommendations about the measures to be taken to allow for fish passage

7. Water Crossings:

a. All temporary and permanent crossings of waterbodies shall be suitably bridged, culverted, or otherwise constructed to withstand and to prevent the restriction of high flows and tidal flows; to maintain existing low flows; and to prevent the obstruction of movement by aquatic life indigenous to the water body, including anadromous, estuarine, and resident fish species.

b. All water crossings (e.g., utility lines and road crossings) must be constructed roughly perpendicular to waters of the United States, including streams and wetlands. Where a utility line or access road is constructed parallel to a stream corridor, an undisturbed buffer shall be maintained between the utility line/access road and the waterway to avoid or minimize potential future impacts to waters of the United States. These potential impacts would include such issues as sewer line leaks or failures, future stream channel meandering, stream bank instability and failure, and right-of-way maintenance.

c. Water crossings must be constructed "in the dry" whenever practicable. This should be accomplished by using stream diversion devices other than earthen or stone cofferdams.

d. Equipment shall cross streams only at suitably constructed permanent or temporary crossings.

e. Temporary structures and fills shall be removed and the area restored to its original contours and elevations, or to the conditions specified in the approved plans. The temporary structures and the areas of fill associated with these structures must be included in the total waterway/wetlands impacts.

8. Discharge of Pollutants: All activities that are authorized under the MDSPGP-4 and that involve any discharge or relocation of pollutants into waters of the United States shall be consistent with applicable water quality standards, effluent limitations, standards of performance, prohibitions, and pretreatment standards and management practices established pursuant to the CWA (33 U.S.C. 1251 et. Seq.), and applicable State and local laws and regulations. No discharge of dredged or fill material in association with this authorization may consist of unsuitable material such as trash, debris, car bodies, asphalt, etc.

9. Spawning Areas: Activities, including structures and work in navigable waters of the United States or discharges of dredged or fill materials in fish and shellfish spawning or nursery areas during spawning seasons, shall be avoided. Impacts to these areas shall be avoided or minimized to the maximum extent practicable during all other times of year. Activities that result in the physical destruction (e.g., through excavation, dredging, mining, fill, or significant downstream sedimentation by substantial turbidity) of an important spawning/nursery area are not authorized by this MDSPGP-4.

10. Waterfowl Breeding and Wintering Areas: Discharges into breeding and wintering areas for migratory waterfowl shall be avoided to the maximum extent practicable.

11. Environmental Values: The permittee shall make every reasonable effort to construct or operate the work authorized under the MDSPGP-4 in a manner that maintains as many environmental values as practicable, and that avoids or minimizes any adverse impacts on existing fish, wildlife, and natural environmental values.

12. Management of Water Flows: To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

13. Water Supply Intakes: No discharge of dredged or fill material may occur in the proximity of a public water supply intake.

D. Procedural Conditions:

1. **Inspections:** The permittee shall permit the District Engineer or his authorized representative(s) to make periodic inspections at any time deemed necessary to ensure that the work is being performed in accordance with the terms and conditions of the MDSPGP-4. The District Engineer may also require post-construction engineering drawings (as-built plans) for completed work, and post-dredging survey drawings for any dredging work.

2. **Compliance Certification:** Every permittee who receives a written MDSPGP-4 verification shall submit a signed Compliance Certification Form within 60 days following completion of the authorized work and any required mitigation (but not mitigation monitoring, which requires separate submittals). Failure to submit the Compliance Certification Form by the permittee could result in the Corps taking appropriate non-compliance enforcement action against the permit holder. The Corps will provide a blank copy of the Compliance Certification Form to the permittee with the MDSPGP-4 verification. The completed form will include the following:

a. A statement that the authorized work either was or was not done in accordance with the MDSPGP-4 verification, including any general and/or specific conditions. If the activity was not done in accordance with the MDSPGP-4 verification, including any general and/or specific conditions and requirements, the permittee shall describe the specifics of the deviation from the authorized activity.

b. A statement that any required mitigation was or was not completed in accordance with the permit conditions. If the mitigation was not completed in accordance with the permit conditions, the permittee shall describe the specifics of the deviation from the permit conditions.

c. The signature of the permittee, certifying the completion of the work and compensatory mitigation.

After the project is completed, the certification shall be sent to the Baltimore District at the following address:

**U. S. Army Corps of Engineers
Baltimore District
Attn: CENAB-OP-R
P. O. Box 1715
Baltimore, Maryland 21203-1715**

3. **Transfer of MDSPGP-4 Verifications:** If the permittee sells the property associated with a MDSPGP-4 verification, the permittee may transfer the MDSPGP-4 verification to the new owner by submitting a letter to the Baltimore District Corps of Engineers office to validate the transfer. A copy of the MDSPGP-4 verification must be attached to the letter, and the letter must contain the following statement and signature:

“When the structures or work authorized by this MDSPGP-4 are still in existence at the time the property is transferred, the terms and conditions of this MDSPGP-4, including special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this MDSPGP-4 permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.”

(Transferee)

(Date)

4. **Maintenance:** The permittee shall properly maintain the work or structure authorized by the MDSPGP-4 in good condition and in compliance with the terms and conditions of the MDSPGP-4, including maintenance to ensure public safety.

5. **Property Rights:** The MDSPGP-4 does not convey any property rights, either in real estate or material, or any exclusive privileges, nor does it authorize any injury to property or invasion of rights or any infringement of Federal, State, or local laws or regulations.

6. **Modification, Suspension and Revocation:** The MDSPGP-4, or any verification under it, may be either modified, suspended, or revoked, in whole or in part, pursuant to DA policies and procedures and any such action shall not be the basis for any claim for damages against the United States.

7. **Restoration:** The permittee, upon receipt of a notice of revocation of authorization under the MDSPGP-4, shall restore the wetland or waterway to its former condition, without expense to the United States and as directed by the Secretary of the Army or his authorized representative. If the permittee fails to comply with such a directive, the Secretary or his designee may restore the wetland or waterway to its former condition, by contract or otherwise, and recover the cost from the permittee.

8. **Special Conditions:** The Corps may impose special conditions on any project authorized under the MDSPGP-4, in cases where the Corps determines that special conditions are necessary to avoid or minimize adverse effects on the environment or on any other factor of the public interest. Failure to comply with all conditions of the authorization/ verification, including special conditions, will constitute a permit violation/unauthorized work and may subject the permittee to criminal, civil, or administrative penalties, and/or restoration.

9. **False or Incomplete Information:** In granting authorization pursuant to this permit, the Baltimore District will rely upon information and data provided by the permittee. If the project is verified by the Corps or MDE under the MDSPGP-4 and subsequently discovers that it has relied on false, incomplete, or inaccurate information provided by the permittee, the MDSPGP-4 verification may be revoked, in whole or in part, and/or the United States may institute appropriate legal proceedings.

10. **Compliance:** Any activity performed in waters of the United States, including wetlands and navigable waters, that is not in compliance with all the terms and conditions of the MDSPGP-4, which includes the MDSPGP-4 authorized activity activity-specific requirements, constitutes unauthorized work and is subject to an enforcement action by the Corps or the EPA. Furthermore, the MDSPGP-4 does not delegate any Section 404 enforcement or regulatory authority. Unauthorized work in waters of the United States, including wetlands and navigable waters, is subject to one or more of the following responses by EPA and/or the Corps:

- a. A Cease and Desist order and/or an administrative compliance order requiring remedial action.
- b. Initiation and assessment of a Class I administrative penalty order pursuant to Section 309(g) of the CWA.
- c. Initiation and assessment of a Class II administrative penalty for continuing violation pursuant to Section 309(g) of the CWA.
- d. Referral of the case to the U. S. Attorney with a recommendation for a civil or criminal action.
- e. If the Corps determines that an after-the-fact application is appropriate, it will be reviewed following the appropriate procedures.
- f. Any other appropriate response.



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, U.S. ARMY CORPS OF ENGINEERS
P.O. BOX 1715
BALTIMORE, MD 21203-1715

2014-60031-M15

Corps Permit Tracking Number

MDSPGP-4
ACTIVITY (d)
Linear Transportation Activities

The authorized Linear Transportation Activities work must comply with the following applicable activity-specific conditions indicated by an “X” in the boxes below, all general conditions of this general permit, and any project-specific special conditions.

All work authorized by this activity, including discharges, must comply with all activity-specific impact limits and requirements, in addition to the general conditions of this permit. This activity authorizes discharges of dredged or fill material associated with new construction, expansion, modification, or improvement of temporary and permanent linear transportation projects (e.g., roads, highways, railways, trails, airport runways, and taxiways), which cross waters of the United States, including streams and wetlands. This activity cannot be used to authorize non-linear features commonly associated with transportation projects, such as vehicle maintenance or storage buildings, parking lots, train stations, or aircraft hangers (Sections 10 and 404; all waters of the United States).

New crossings of all waters of the United States will be reviewed based on the following order of preference: (a) bridge, (b) bottomless arch culvert, and (c) pipe or box culvert. Written documentation may be required to support the preferred crossing method.

Category A Impact Limits and Requirements:

- i. The total temporary and permanent impacts to nontidal waters of the United States, which includes nontidal wetlands, streams, rivers, and other open waters, are not to exceed 5,000 square feet and/or 200 linear feet of streams, rivers, and other nontidal open waters.
- ii. This activity can authorize multiple road crossings provided that the total temporary and permanent impact of all of the crossings meets the 5,000 square feet and 200 linear feet impact limit.
- iii. All linear transportation activities with discharges in tidal waters and wetlands or in nontidal wetlands adjacent to tidal waters are not authorized under Category A and require review under Category B or alternate Corps permit review procedures, as appropriate.
- iv. Category B or alternate Corps permit review procedures are required for stream relocation projects that do not propose natural stream design to relocate impacted streams.
- v. Any temporary crossing that must remain in place for over one year after the installation date requires review under Category B or alternate Corps permit review procedures, as appropriate.
- vi. The following conditions are applicable to Coastal Plain streams, and Harford and Cecil County Piedmont streams:

(1) Permanent culvert pipes that are greater than 24 inches in diameter and bridge/arch footers must be countersunk a minimum of 12 inches below the natural stream invert.

(2) Permanent culvert pipes and bridge/arch footers placed in streams on bedrock or over buried utility lines are exempt from these countersinking (i.e., depressing) requirements and must be constructed in accordance with the State of Maryland regulations. Permanent culvert pipes and bridge/arch footers placed in streams on bedrock or over buried utility lines are eligible for Category A review with specific

**MDSPGP-4
ACTIVITY (d)**

-2-

documentation concerning site conditions and limitations on depressing the culvert, cost, and engineering factors that prohibit depressing the pipes/culvert.

(3) All permanent culvert pipes greater than 24 inches in diameter and bridge/arch footers (except those placed in streams on bedrock or over buried utility lines) that cannot be countersunk in accordance with condition (i) above are not eligible for Category A and must be reviewed under Category B or alternate Corps permit review procedures, as appropriate.

Category B Impact Limits and Requirements:

- i. Total temporary and permanent impacts to tidal and nontidal waters of the United States are not to exceed 1/2 acre (21,780 square feet) and/or 2,000 linear feet of streams, rivers, and other open waters.
- ii. Category B or alternate Corps permit review procedures are required for any impacts to tidal waters and wetlands, and nontidal wetlands adjacent to tidal waters of the United States.
- iii. The following conditions are applicable to Coastal Plain streams, and Harford and Cecil County Piedmont streams:

(1) Permanent culvert pipes that are greater than 24 inches in diameter and bridge/arch footers must be countersunk a minimum of 12 inches below the natural stream invert.

(2) Permanent culvert pipes and bridge/arch footers placed in streams on bedrock or over buried utility lines are exempt from these countersinking (i.e., depressing) requirements and must be constructed in accordance with the State of Maryland regulations.

(3) All permanent culvert pipes greater than 24 inches in diameter and bridge/arch footers placed in streams must be countersunk in accordance with condition (i) above (except those placed in streams on bedrock or over buried utility lines), unless the Corps and MDE waives the countersinking (i.e., depressing) requirement by making a written determination concluding that countersinking is not practicable and will result in minimal adverse effects.

(4) If countersinking of the culvert or footer is not practicable in accordance with requirement (i) above (except those placed in streams on bedrock or over buried utility lines), the applicant must submit a narrative, along with their application, documenting measures evaluated to minimize disruption of the movement of aquatic life, as well as specific documentation concerning site conditions and limitations on depressing the culvert/footer, cost, and engineering factors that prohibit depressing the culvert/footer. Preferred alternative options that must be considered include the use of a bridge or bottomless pipe. Other alternative options may include partial depression or other measures to provide for the movement of aquatic organisms. This documentation must also include photographs documenting site conditions. The applicant may find it helpful to contact their regional fishery agency for recommendations about the measures to be taken to allow for migratory fish passage.

Requirements Applicable to Both Category A and Category B Activities:

- i. Application must be submitted to MDE for Corps authorization.
- ii. The width of the fill must be limited to the minimum necessary for the crossing.
- iii. The crossing must not be used as a berm for a permanent impoundment.



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BALTIMORE DISTRICT, U.S. ARMY CORPS OF ENGINEERS
P.O. BOX 1715
BALTIMORE, MD 21203-1715

2014-60031-M15

Corps Permit Tracking Number

MDSPGP-4
ACTIVITY (e-(7))
Temporary Construction Access, Stream Diversions, and Dewatering

The authorized Temporary Construction Access, Stream Diversions, and Dewatering work must comply with the following applicable activity-specific conditions indicated by an "X" in the boxes below, all general conditions of this general permit, and any project-specific special conditions.

This activity authorizes temporary structures, work, and discharges of dredged or fill material, including stream diversion devices necessary for construction activities or repair, or access fills or dewatering of construction sites, provided that the associated primary activity is authorized by the Corps or the USCG, or for other construction activities not subject to the Corps or USCG regulations (Sections 10 and 404; all waters of the United States)

Category A Impact Limits and Requirements:

- i. The total temporary impacts to waters of the United States, which includes tidal and nontidal wetlands, streams, rivers, navigable waters, and other open waters, are not to exceed 10,000 square feet of waters of the United States and/or 200 linear feet of streams, rivers, and other open waters. The entire length of diverted stream is considered impacted.
- ii. Discharges into tidal wetlands and waters associated with causeways, approach fills (except for construction mats), and cofferdams are not eligible for Category A and must be reviewed under Category B or alternate Corps permit review procedures, as appropriate.
- iii. Any temporary crossing that must remain in place for over one year after the installation date requires review under Category B or alternate Corps permit review procedures, as appropriate.

Category B Impact Limits and Requirements: The total temporary impacts to waters of the United States, which includes tidal and nontidal wetlands, streams, rivers, navigable waters, and other open waters, are not to exceed 1.0 acre (43,560 square feet) and/or 2,000 linear feet of streams, rivers, and other open waters. The entire length of diverted stream is considered impacted.

Requirements Applicable to Both Category A and Category B Activities:

- i. Application must be submitted to MDE for Corps authorization.
- ii. Appropriate measures must be taken to maintain near normal downstream flows and to minimize flooding.
- iii. Fill must be of materials and placed in a manner that will not be eroded by expected high flows.
- iv. Work should be accomplished by using stream diversion devices, other than earthen or stone cofferdams or causeways.
- v. Upon completion of the project, all temporary construction materials must be removed and stabilized with straw bales, silt fence, or other erosion and sediment control devices to prevent its reentry into waters of the United States, including wetlands, and the site returned to preconstruction conditions.
- vi. A restoration plan of reasonable measures to avoid and minimize adverse effects to aquatic resources must be included with the application.
- vii. The width of the fill must be limited to the minimum necessary for the temporary road crossing.

**MDSPGP-4
ACTIVITY (e-(7))**

-2-

- viii. The temporary road crossing must be removed within 14 calendar days after the structure is no longer needed, subject to any time of year restrictions.
- ix. Any streams or wetlands impacted for the temporary road crossing must be returned to pre-construction conditions which include contours, elevations, stream substrate, and revegetation with native species.

Project-Specific Special Conditions apply (See Corps verification letter for these conditions)



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BALTIMORE DISTRICT, U.S. ARMY CORPS OF ENGINEERS
P.O. BOX 1715
BALTIMORE, MD 21203-1715

Operations Division

MDSPGP-4 PERMIT COMPLIANCE CERTIFICATION FORM (10/1/11)

Corps Permit Tracking No. 2014-60031-M15 Category & Activity Number CAT B, Activity d, CAT A, Activity e(7)

Project Name MD SHA/Project PG758B21/MD 4 from Forestville Rd to MD 458 Applicant Name Todd Nichols

Waterway Henson Creek County Prince George's

Dear Permittee:

In accordance with the compliance certification condition of your MDSPGP-4 authorization, you are required upon completion of all permitted work, or if mitigation/compensation is required, within 60 days following completion of the authorized work and any required mitigation (but not the mitigation monitoring, which requires separate submittals), to complete and sign this certification form and return it to the Corps of Engineers, Baltimore District, ATTN: CENAB-OP-R, P.O. Box 1715, Baltimore, Maryland 21203-1715.

Please note that the permitted activity is subject to compliance inspections by U.S. Army Corps of Engineers representatives. As a condition of this permit, failure to return this notification form, provide the required information below, or to perform the authorized work in compliance with the permit, can result in suspension, modification or revocation of your authorization in accordance with 33 CFR Part 325.7 and/or administrative, civil, and/or criminal penalties, in accordance with 33 CFR part 326.

Please provide the following information:

1. Date authorized work commenced: _____ 2. Date authorized work completed: _____

3. Was all work and any required mitigation, completed in accordance with your MDSPGP-4 authorization, including all general and/or specific conditions? YES ___ NO ___

4. For Category A projects involving pile driving activities that are within all tidal waters of the Chesapeake Bay in Maryland and its tidal tributaries with salinity levels less than 6 parts per thousand (See Appendix B of the MDSPGP-4), please indicate the pile driving method that was used for the authorized work:

- _____ (a) Piles must be installed in-the-dry during low water;
- _____ (b) Piles must be drilled and pinned to ledge;
- _____ (c) Vibratory hammers must be used to install any size and quantity of wood, concrete, or steel pilings;
- _____ (d) Impact hammers must be limited to one hammer and <50 piles installed per day with the following: wood piles of any size; concrete piles <18-inches diameter; steel piles <12-inch diameter if the hammer is <3,000 pounds and a wood cushion is used between the hammer and steel pile;
- _____ (e) Approved pile driving methods that will allow noise level thresholds to be met.
Describe: _____

5. Explain in detail any deviations to the authorized work and/or mitigation (use additional sheets if necessary)

6. Was mitigation accomplished through a contribution to the Maryland Nontidal Wetlands Compensation Fund? YES _____ NO _____ (if NO, please complete Nos. 7 and 8 below).

7. Wetland Mitigation: Required? YES _____ NO _____ Required Completion Date _____
Wetland Mitigation Completed? YES _____ NO _____ Mitigation Monitoring Reports Required? YES _____ NO _____

8. Please attach labeled photographs showing completed work including mitigation area(s).

I hereby certify that, except as noted above, that all work, including mitigation, has been completed in accordance with the terms and conditions, including special conditions of the above referenced permit.

Signature of Permittee Date

Address: _____

Telephone: _____

Signature of Contractor/Agent Date

Address: _____

Telephone: _____



MARYLAND DEPARTMENT OF THE ENVIRONMENT

1800 Washington Boulevard • Baltimore MD 21230
410-537-3000 • 1-800-633-6101 • www.mde.maryland.gov

Martin O'Malley
Governor

Robert M. Summers, Ph.D.
Secretary

Anthony G. Brown
Lieutenant Governor

October 6, 2014

Ms. Karuna Pujara, Chief
Highway Hydraulics Division
State Highway Administration
707 North Calvert Street
Baltimore, MD 21202

Re: MDE No. 13-SF-0307
No. PG7585184
MD 4 Pedestrian Safety Enhancement Project
Letter of Intent

Dear Ms. Pujara:

The Water Management Administration (WMA) has reviewed the submittal received September 12, 2014 for the above referenced project in Prince George's County. The review was in accordance with Sections 4-106 and 4-205 of the Department of the Environment Article, Annotated Code of Maryland with regard to Sediment Control and Stormwater Management. The report summarizes the hydrologic analyses and required stormwater management using environmental sensitive design (ESD) practices for developing the proposed improvements.

The Administration has determined that the Preliminary Erosion and Sediment Control Plans and the hydrologic analysis for the existing and proposed conditions presented in the Stormwater Management Concept Report (dated September 12, 2014) are acceptable for evaluating the SWM requirements for the project's points of investigation (POIs) as specified. Please note that if the hydrologic parameters for the proposed conditions are revised in the final design of the project, the status of the items noted below shall be re-evaluated and modifications may be required. Additionally, as indicated in the SWM report additional revisions may be required to address remaining comments previously issued. This requires additional detailed design to complete.

- 1. Stormwater Management is to be provided for the points of investigation as summarized below:

Table with 2 columns: Point of Investigation, Proposed SWM Measure. Rows include 1-A, 1-B, 1-C, and 2-A with descriptions of ESD practices and Q10 management.

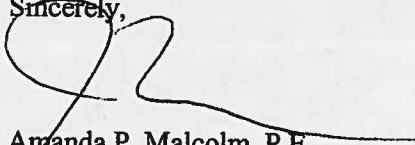
Point of Investigation	Proposed SWM Measure
	practice. Q10 not required due to decrease in peak discharge.
2-B	ESDv/WQv, CPv not provided by ESD or structural practices. Q10 management will be provided through an underground detention facility at Sta 44+25 LT to 45+75LT.
2-D	ESDv/WQv, CPv provided by eight microbioretention ESD practices. As shown, Q10 not required due to decrease in peak discharge.
2-E	ESDv/WQv, CPv not provided by ESD or structural practices. As shown, Q10 not required due to decrease in peak discharge.
2-F	ESDv/WQv, CPv and Q10 provided by thirteen microbioretention ESD practices. Q10 management provided through curve number reduction within the microbioretention.
2-G	ESDv/WQv, CPv not provided by ESD or structural practices. As shown, Q10 not required due to decrease in peak discharge.
2-H	ESDv/WQv, CPv not provided by ESD or structural practices. As shown, Q10 not required due to decrease in peak discharge.
3-A	ESDv/WQv, CPv not provided by ESD or structural practices. As shown, Q10 not required due to decrease in peak discharge.
3-C	ESDv/WQv, CPv provided by thirteen microbioretention ESD practices. Q10 management will be provided through an underground detention facility at Sta 93+00 LT to 95+50LT.
3-D	ESDv/WQv, CPv not provided by ESD practices or structural BMP. As shown, Q10 not required due to decrease in peak discharge.
3-E	ESDv/WQv, CPv provided by two microbioretention ESD practices. Q10 management will be provided through an underground detention facility at Sta 117+50 LT to 120+50LT.
3-F	ESDv/WQv, CPv provided by one microbioretention ESD practices. Q10 management will be provided through an underground detention facility at Sta 127+50 LT to 129+00 LT.
3-G	ESDv/WQv, CPv not provided by ESD practices or structural BMP. Q10 management will be provided through an underground detention facility at Sta 104+00 LT to 105+00 LT.
3-H	ESDv/WQv, CPv not provided by ESD practices or structural BMP. Q10 management will be provided through an underground detention facility at Sta 103+50 LT to 104+50 LT.
4-A	ESDv/WQv, CPv provided by four microbioretention ESD practices. As shown, Q10 not required due to decrease in peak discharge.

2. Drainage areas for micro-bioretenion facilities shall not exceed 28,000 sqft as discussed with MDE.
3. Loss of existing dry swale water quality treatment within POI 2 shall be included in the POI 2 ESD requirements all remaining existing swales do not meet ESD water quality requirements.
4. SHA shall confirm and receive approval for Q10 management from Prince George's County for all POIs where there is an increase in the 10 year discharge.

5. The submitted Stormwater Management Concept Summary Sheets for the Washington Metropolitan Watershed (02-14-02) (dated 9/12/14) will be used as the basis for evaluating the final design for water quality and channel protection volume.
6. Water Quality Banking Summary Sheets for the Metropolitan Watershed (02-14-02) must be submitted with the final design.
7. Attenuation of the 10-year peak discharge shall be provided, for the 10 year 24 hour storm at all POIs where there is an increase in discharge, meaning the post development peak discharge rate shall be less than or equal to the existing peak discharge rate.
8. Approval from MDE's Wetlands and Waterways Program will be required for all work impacting wetlands or waterways.
9. An NPDES Application for an Individual or a General Permit to Discharge Stormwater Associated with Construction Activities must be submitted to and approved by MDE prior to any earth disturbance.
10. Stormwater Management and Erosion/Sediment Control Plans shall be submitted for final review and approval.
11. Final design of all stormwater management practices shall be in accordance with the requirements of the 2010 Maryland Stormwater Design Manual. In addition, significant changes to this approved concept design will necessitate a new concept approval.

Review of this project will continue upon satisfactory response to the above comments. Please fully address each comment and make the necessary revisions. Then return one set of revised prints and a point-by-point response letter addressing each comment. Please call me at (410) 537-3563 with any questions or comments.

Sincerely,



Amanda P. Malcolm, P.E.
Sediment and Stormwater Plan Review Division
Water Management Administration

APM/JMH

Cc:

Maryland State Highway Administration
Attn: Mr. Ryan Doran
Hydraulic Division Room C201
707 North Calvert Street
Baltimore, Maryland 21202

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 successful proposer, 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 successful proposer 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 successful proposer and the date of notice that the apparent successful proposer will not be awarded this Contract.

Should this Contract not be awarded to the apparent successful proposer 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 –
COMPETITIVE 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 TC 2 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:

Price Proposals shall be evaluated as outlined in TC 2 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 TC 2 of the Request for Proposals.

TERMS AND CONDITIONS

TC SECTION 2
BIDDING REQUIREMENTS AND CONDITIONS (DESIGN-BUILD)

TC-2.03 VALUE ENGINEERING CHANGE PROPOSALS

DELETE: This entire section.

ADD: 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.

TC 2.07 REQUEST FOR PROPOSALS (RFP)

2.07.01 Design-Build Concept

The Administration is soliciting Technical Proposals and Price Proposals for the design and construction of improvements along MD 4 from Forestville Road to MD 458 (Silver Hill Road). This project is located in Prince George's 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.

2.07.01.1 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 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:

- A. Jacobs Engineering Group
- B. Floura Teeter Landscape Architects
- C. Parsons Brinckerhoff
- D. Applied Research Associates, Inc.
- E. McCormick Taylor, Inc.
- F. RJM Engineering, Inc.
- G. Chesapeake Environmental Management, Inc.

H. Blackwater Environmental Group

In addition, the State Ethics Commission administers the provisions of the State Ethics Law, including § 15-508 of the State Government Article that contains various restrictions on participating in State procurements. Any questions regarding eligibility must be appealed to the Commission.

No official or employee of the State of Maryland, as defined under State Government Article, §15-202, 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 Consultant or an entity that is a subcontractor on this contract.

No official or employee of the Maryland Department of Transportation (MDOT), during his tenure or for one year thereafter shall have any interest, direct or indirect, in this Contract or the proceeds thereof, regardless of whether they participated in matters relating to this contract while in the employ of the MDOT.

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 the general conditions prohibiting a former MDOT employee from working on this contract for one year after leaving MDOT and 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.

2.07.02 Project Overview

2.07.02.01 Description of Work

The project consists of the design and construction of continuous pedestrian facilities along MD 4 between Forestville Road and MD 458 (Silver Hill Road) in Prince George's County including construction of sidewalk along southbound MD 4 and a shared-use path along northbound MD 4. Removal of existing pavement is proposed along the outside of northbound and southbound MD 4 to accommodate the construction of proposed pedestrian facilities and stormwater management facilities. The proposed MD 4 typical paved section includes 11' travel lanes, 2' foot median shoulders, and 8' outside shoulders. Curb and gutter is proposed along the outside shoulders of MD 4.

The project also includes full depth reconstruction, wedge and leveling, resurfacing of existing roadways and shoulders, construction of new drainage system and stormwater management facilities, signing, pavement markings, traffic signal reconstruction,

lighting, landscaping, reforestation, and relocation of utilities as needed. Traffic signing may extend beyond the project limits as defined above.

The overall concept design must be evaluated and design completed by the Design-Builder to ensure all project requirements are met, including drainage and stormwater management all within the right of way. The completion of the project documents shall be performed by the Design-Builder and approved by the Administration, subject to language included elsewhere in this Request for Proposal.

2.07.02.02 Project History

Maryland 4 (Pennsylvania Avenue) is a major highway located in Prince George's County. This roadway is a link between the District of Columbia, dense residential and commercial centers inside the Capital Beltway (I-95/I-495), large employment centers including Joint Base Andrews, and rural and suburban areas of Prince George's County outside the Capital Beltway. The limits of the project fall just inside the Capital Beltway along MD 4 between Forestville Road and MD 458 (Silver Hill Road). There is dense residential and commercial development within the project limits and, as a result, pedestrian traffic increases significantly compared to adjacent sections of MD 4. MD 4 is an open-section, four lane, divided highway with wide inside and outside shoulders and a wide median. Existing pedestrian facilities include sidewalk located at the six intersections within the project limits, which extends to the nearest bus stops, and a six foot wide asphalt trail along northbound MD 4 between Walters Lane and Parkland Drive. There is significant pedestrian traffic using the shoulders along MD 4 and crossing at mid-block locations because of the lack of continuous pedestrian facilities. There is no significant horizontal curvature of the roadway alignment, and the profile of the road has generally flat grades. The geometric character of the existing roadway encourages motorists to drive at high speeds. In recent years, the mix of high pedestrian traffic volumes, high vehicle speeds and the lack of adequate pedestrian facilities has led to several pedestrian related crashes along the corridor.

In 2010, SHA began developing concepts to improve pedestrian safety and accessibility along MD 4. The concepts included continuous pedestrian facilities along both sides of MD 4 between Forestville Road and MD 458 and a reduction of the paved width of the roadway, including reduced lane and shoulder widths. A shared-use path was proposed along northbound MD 4 as recommended by the Prince George's County Master Plan.

The MD 4 Community Task Force was assembled in April 2011 to ensure the involvement of all key stakeholders in the MD 4 Community Safety and Enhancement Project. The Task Force is comprised of members of the community, as well as representatives from the Prince George's County Department of Public Works and Transportation (DPW & T), the Prince George's County Executive's Office, the Prince George's County Council, the Maryland-National Capital Park and Planning Commission (M-NCPPC), and SHA. From 2011 to present, seven Task Force meetings have been held. Over that time, the Task Force has agreed to an overall project concept including the goals to be achieved by the project and the various infrastructural and non-infrastructural elements to be included in the project. In spring 2012, the Task Force

selected the design concept for the project which included the addition of vertical curb along the outside of northbound and southbound MD 4.

In April 2012, the Federal Highway Administration approved an adjustment of the functional classification of MD 4 between the Capital Beltway (I-495) and the D.C. Line from Urban Freeway Expressway to Urban Other Principal Arterial. This adjustment was proposed by SHA with the support of Prince George's County and the Maryland-National Capital Park and Planning Commission and will allow for the implementation of several design elements including a lower posted speed, vertical curb, and reduction of shoulder width.

A mid-block pedestrian crossing signal along MD 4 midway between Walters Lane and Donnell Drive was constructed and activated in summer 2013. This project was initiated by the SHA Office of Traffic and Safety (OOTTS) to improve safety at the highest volume location for mid-block pedestrian crossings along MD 4. Additional safety measures proposed as part of the MD 4 from Forestville Road to MD 458 project include a reduction in posted speed from 55 mph to 45 mph and the use of roadway lighting to improve visibility along MD 4, which has a nighttime crash rate well above the statewide average.

The project has been evaluated for compliance with the National Environmental Policy Act (NEPA). The NEPA document was approved on April 25, 2014.

2.07.02.03 Project Goals

1. To provide continuous education and outreach to the community and all roadway users.
2. To provide a safe and accessible facility for pedestrians along and across MD 4.
3. To provide a safe and accessible facility for bicyclists along and across MD 4.
4. To provide measures for traffic calming and increased driver awareness.
5. To provide a safe facility and maintain mobility for motorists along MD 4.
6. To provide a facility that is able to be adequately maintained.

2.07.02.04 Project Key Issues

Schedule

- Construction schedule will need to be coordinated with utility companies performing utility relocations within the project limits. Construction should be phased to avoid conflicts with utility relocation efforts and to minimize delay in the overall project schedule. For more information regarding utilities, see TC 3.15 - Utility Design and Relocation

Performance Specifications.

- Right-of-Way will not be clear by the Notice to Proceed date. Construction will need to be phased to complete work within State Right-of-Way prior to the Right-of-Way clear date and to minimize delay in the overall project schedule. See TC 2.07.02.05.6 for information regarding the Right-of-Way acquisition schedule.

Maintenance of Pedestrian Traffic

- Pedestrian safety and accessibility must be maintained throughout the project limits, especially within work zones.
- Given the high volume of pedestrian traffic and the history of pedestrian safety issues in the area, there should be an increased emphasis on the use of pedestrian guide signage and channelization through work zones. Signage should also be used to alert motorists to the increased presence of pedestrians at high volume pedestrian crossings.

On-going Coordination with Stakeholders

- Meet with the Task Force on a periodic basis to seek feedback on construction details and progress.
- Coordinate with SHA, Prince George's County DPW&T, and the Prince George's County Police Department to implement pedestrian education efforts in the community surrounding the project.

2.07.02.05 Project Status

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

2.07.02.05.1 Survey

Aerial photogrammetry was at 1"=50' prepared from photographs. A contour surface model and topographic base map were prepared on the basis of this photogrammetry. Supplemental data collector surveys were performed along all roadways to refine pavement elevations, ditch inverts, and pipe culverts. The data from these supplemental surveys were incorporated into the plan and the surface. This information provided by the Administration, 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.

2.07.02.05.2 Plans

A set of conceptual plans for the highway construction has been prepared in Microstation V8. Files are available in electronic format on ProjectWise.

2.07.02.05.3 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 purposes 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.

2.07.02.05.4 Geotechnical

The Administration has obtained soils borings at selected locations along the project corridor and performed 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 Contractor 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.

2.07.02.05.5 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 will be field collected by the Administration at single point locations. Once uncovered, the utility's horizontal and vertical location will be 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 is scheduled to be available on ProjectWise in July 2014 or before. 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. Existing utilities will be relocated by other contractors concurrent with 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 is responsible for the design and relocation of all WSSC facilities impacted by the construction of this project, as defined in TC 3.15 - Utility Design and Relocation Performance Specifications.

2.07.02.05.6 Right of Way

All right of way will be cleared by April 1, 2015. The Design-Builder may prepare design plans, permit applications, and any other engineering documentation related to the project and submit them for review and approval after Notice to Proceed and in advance of the right-of-way clear date. The Design-Builder may begin construction activity only on approved plans which are entirely within the available right-of-way prior to the right-of-way clear date with prior approval from the Administration. The Design-Builder may not proceed with construction on any properties not within SHA right-of-way until such time as the Administration issues a Right-of-Way Certification stating that right-of-way is clear for those properties. 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, and the Administration's approval 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.

2.07.02.05.7 Permits

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

- Nontidal Wetlands & Waterways Permit (from MDE and USACE)
- Natural Resources Reforestation Permit (from DNR)
- Stormwater Management Permit (from MDE)
- Erosion and Sediment Control Approval and National Pollution Discharge Elimination System Permit (from MDE)

Status of Nontidal Wetlands & Waterways Permit:

The Administration has applied for a Nontidal Wetlands and Waterways Permit based on the impacts depicted in the Conceptual Plans. SHA

anticipates approval of the permit prior to the Price Proposal Submittal for this project. Any impacts that are outside the current LOD depicted on the Wetland Impact Plates or are in excess of the current assessment may result in the need for a modification to the permits, in which case the Design-Build Team is responsible for supplying to the Administration all information needed in order to obtain approval and authorization from the regulatory agencies. The Design-Build Team shall be responsible for addressing any comments or issues the regulatory agencies and/or Administration may have, including those pertaining to avoidance and minimization measures. The Design-Build Team shall also be responsible for designing, implementing, and monitoring mitigation, if required. It is not the responsibility of, nor guaranteed by, the Administration that approval or authorization will be granted by the regulatory agencies.

Wetlands and waterways were identified and delineated within the project area. A copy of the delineation report will be made available on Projectwise. 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. Prior to performing any work on the project, the Design-Build Team shall be responsible for installing temporary orange construction fence and prohibitive signage around the wetland and waterways areas within the immediate work area, as described in the Special Provisions.

Status of Maryland Department of Natural Resources Reforestation Permit:

The Maryland Department of Natural Resources (DNR) has completed a Reforestation Site Review based on the current LOD impacts shown on the Forest Impact Plans provided on Projectwise. 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 shall request a field review with the SHA – Landscape Architecture Division and Landscape Operations Division 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-Builder to obtain and comply with the terms of the modified permit(s) from DNR.

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 Stormwater Management Review:

A Stormwater Management (SWM) concept design was developed by the Administration to establish Right-of-Way needs and to demonstrate to MDE that all of the SWM needs of the project can be met within that right-of-way. The SWM methodology is currently under review by MDE. Upon approval of the concept SWM report, a Letter of Intent will be provided from MDE to SHA. The Design-Build team is responsible to finalize the SWM design and obtain the final approvals.

Status of Erosion and Sediment Control Approval and National Pollutant Discharge Elimination System Permit:

Except as noted below, 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.

The Administration submitted a Notice of Intent (NOI) form to MDE for this project on April 29, 2014. There are no guarantees that this NOI will be approved. The ultimate responsibility of submitting a NOI, incorporating the required public notice period into the project schedule, obtaining necessary approvals, and any amendments thereto shall be the responsibility of the Design-Builder. Any delays resultant of obtaining the NOI will be the sole responsibility of the Design-Builder.

2.07.03 RFP Package

The following materials are being provided to all prospective Proposers:

A. One copy of this RFP.

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
- Intergraph Output/Coordinate files

C. Utility Files

- Utility designation files
- Proposed Test Hole Locations
- Test Hole Information

- D. Right-of-Way
 - Existing Right-of-way file
 - Proposed Right-of-Way Line file
 - Right-of-way Plats
- E. Landscaping, Reforestation Permit & Wetland Plats
 - Forest Impact Plans
 - Forest Impact Design Files
 - Wetland Impact Plats
 - Wetland Impact Plats Design Files
 - Wetland Delineation Memorandum
- F. Appendices
 - Pavement and Geotechnical Criteria and Data Report
 - Soil Survey Boring Logs
 - Soils Laboratory Test Results
 - Topography Tabulation
 - Existing and Proposed Traffic Data
 - Storm Drain Pipe Inspection Report
 - As-Builts
 - Design Requests
 - NEPA Document
 - Lighting Study
 - Adjacent Projects



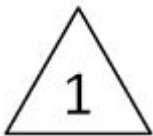
The following materials are being provided in electronic format on Projectwise. This material is considered Conceptual and the Administration makes no representation regarding its accuracy.

- G. Conceptual Plan Sheets
 - Title Sheet
 - Typical Section Sheets
 - Geometry Sheets
 - Roadway Plan Sheets

H. Design Files

- Roadway Design File
- Horizontal Baseline
- Vertical Alignment file
- Shading file
- Conceptual Cross Section files
- Border files
- Conceptual/Potential SWM area file

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



I. Design-Builder's Information Forms (.doc files)

- Form A-1 and Form A-2

J. Stormwater Management and Surface Drainage Information

- NOI Form (and attachment) submitted by SHA on (insert date)
- Concept Stormwater Management Report (.pdf file)
- BMP Checklists and As-Built Certification Formats
- SWM Report Format Guidelines
- SHA BMP Identification Form
- Water Quality Summary Sheet Format and Definitions
- Bioretention Facility Suggested Plants
- Geotextile Guidelines
- Maryland State Highway Administration Stormwater Management Site Development Criteria, prepared by Highway Hydraulics Division, Revised January 2010.

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

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 files names as outlined above.

2.07.04 Description of Work

2.07.04.1 Engineering/Construction Services

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 for Retaining Walls (if applicable)
- Hydraulic Analysis, Design, Construction and Agency Approval for Specific Structures identified in the Contract Documents.
- Temporary and Permanent Signing, Lighting, Traffic Signal and Pavement Marking Design and Construction.
- Roadside Landscape Planting, Stormwater Management Landscape Planting, Reforestation Design and Construction of the aforementioned.
- Utility Coordination for utility modifications regardless of whether designed and/or constructed by the Design-Builder.
- Utility Design and Relocations.
- Geotechnical Engineering and Pavement Design.
- Storm Water Management (SWM) Design, Approvals, Construction and As-Built Certification (including MDE approval).
- Erosion and Sediment Control (E&S) Design, Implementation and Approvals (including NPDES and MDE 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 (includes obtaining required approvals).
- Additional Data Collection (includes surveying, geotechnical, etc.).

- Produce Required Deliverables.
- Environmental Permit Activities (including obtaining permits as described herein).
- Community Relations as defined in TC 3.21 – Public Outreach Performance Specification.
- Traffic Control Design and Implementation including the preparation of a Transportation Management Plan (TMP).
- Maintenance of project site(s) including mowing, watering, and dust control.
- Obtaining all required permit modifications from the appropriate regulatory agencies for any additional impacts to roadside trees, stormwater management, erosion and sediment control, or any other impacts not authorized by the original permits.
- 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.

TC 2.08 PROPOSAL SUBMISSION REQUIREMENTS

2.08.01 Responsibilities of the Proposers

2.08.01.1 Review of RFP and Plans

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

2.08.01.2 Site Investigation

The Administration is acquiring the Right of Way necessary to construct this project. **As of the issuance of this RFP, the Administration has not commenced the acquisition of right-of-way not currently in the Administration's possession. 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-Builder that is invited to submit a 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 Technical Proposal and 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 Technical Proposal and 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 3 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.

2.08.01.3 Utility Coordination

Prior to submitting a 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 Price Proposal must represent a thorough consideration of these elements.

2.08.01.4 Additional Surveys

The Prospective Proposer will 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.

2.08.01.4 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 do so 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.

2.08.02 Pre-Submittal Requirements

2.08.01.1 Mandatory One-On-One Meetings

The Administration will require mandatory 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 Proposer's any issues raised during the one-on-one meetings, except to the extent the Administration determines, in its sole discretion, that 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 Administration intends to schedule these meetings within two weeks of notification of 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.

- 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.

2.08.02.1 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 Price Proposal must be delivered no later than **October 8, 2014 prior to 12 noon** (EST). The LOI must be delivered to the following email address:

PG7585184_MD_4@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 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 LOI.

2.08.02.2 Communications During Proposal Preparation

The Procurement Officer's Designate in this RFP, or a representative hereafter designated in writing by the Procurement Officer, is the Administration's single contact and source of information for this procurement.

The following rules of contact shall apply during the Contract procurement process, which began upon the date of issuance of the RFP and will be completed upon the earliest to occur of (1) execution of the Contract, (2) rejection of all Proposals or (3) cancellation of this procurement. These rules

process, which began upon the date of issuance of the RFP and will be completed upon the earliest to occur of (1) execution of the Contract, (2) rejection of all Proposals or (3) cancellation of this procurement. 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. After submission of the Technical Proposal, neither a Proposer nor any of its team members may communicate with another Proposer or members of another Proposer's team with regard to the PROJECT or the Proposals. However, a Proposer may communicate with a Subcontractor that is on both its team and another Proposer's team, provided that each Proposer has obtained a written certification from the Subcontractor that it will not act as a conduit of information between the teams.
3. Unless otherwise specifically authorized by the Procurement Officer, a Proposer may contact the Administration only through the Procurement Officer and only in writing (e-mail), and not orally. The Proposer's contacts with the Administration shall be only through a single representative authorized to bind the Proposer.
4. The Procurement Officer normally will contact a Proposer in writing through the Proposer's designated representative.
5. Neither a Proposer nor its agents may contact Administration employees, including 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.
6. Any contact by a Proposer determined to be improper may result in disqualification of the Proposer.
7. 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-mail with return confirmation receipt. No verbal requests or personal visits will be honored. All written contacts shall be addressed to:

Mr. Jason A. Ridgway
Director, Office of Highway Development
State Highway Administration
e-mail address: PG7585184_MD_4@sha.state.md.us

During the Technical Proposal Phase, only e-mailed inquires will be accepted. No requests for additional information or clarification to any other Administration office, consultant, or employee will be considered. All responses shall be in writing and will be disseminated only by posting on SHA's website at roads.maryland.gov under Contracts, Bids & Proposals. All responses to questions related to the Technical Proposal and any addenda to the RFP will be posted on this site. Responses to questions and addenda will not be mailed out.

Only requests received by 4:00 p.m. EST on May 28, 2014 will be addressed. Questions will not be accepted by phone. Questions, only from the primary or secondary contact, must include the requestor's name, telephone number, e-mail address, and the Proposer he/she represents.

A response to questions will be issued without attribution and posted sequentially on the SHA website. Multiple responses are anticipated. The last response will be posted not later than 5 calendar days prior to the Technical Proposal due date.

As discussed in GP 2.09, during the Price Proposal Phase, Prospective Proposers may make inquiries up to 4:00 p.m. (EST) on October 1, 2014. Inquiries received after that date and time will not be accepted. All responses to questions related to the Price Proposal Phase and any addenda to the RFP will be disseminated by email to the primary contact for those firms invited to submit Price Proposals.



2.08.02.3 Addenda

Interpretations, clarifications or modifications to this RFP or the Contract will be made by Addenda. Addenda will be disseminated only by posting on SHA's website at roads.maryland.gov under Contracts, Bids & Proposals until the completion of Step One of the Two-Step process.. Subsequent to the Technical Proposal submittal date, addenda will only be distributed to the primary contact for those firms invited to submit Price Proposals. Only interpretations, clarifications and answers to the questions included in Addenda or such writings shall be binding on the Administration.

2.08.02.4 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.

2.08.02.5 Alternative Technical Concepts

The Administration has chosen to use the alternative technical concept (ATC) process to allow innovation and flexibility to be incorporated into the Price Proposals submitted by the Reduced Candidate List (RCL) and to avoid delays and potential conflicts in the design associated with deferring or technical concept reviews to the post-award period. The Administration will only accept ATCs from members of the RCL.

The ATC process allows Proposers to submit for pre-approval proposed alternatives to the RFP requirements. The Administration will not approve any ATC that entails a deviation from the requirements of the as-issued Contract Documents, unless the Administration determines, in its sole discretion, that the proposed end product based on the deviation is equal to or better than the end product absent the deviation and is permitted by the Permit Approvals.

Any ATC that has been pre-approved may be included in the Price Proposal, subject to the conditions set forth herein.

The ATC process may be used to allow a Proposer to submit technical concepts for review by the Administration to determine if those technical concepts are consistent with the requirements of the RFP documents. The ATC submittal should clearly stipulate this reason for the review.

2.08.02.6 ATC Submittal and Review

The Proposer may submit an ATC for review by the Administration on or before **August 19, 2014 at 4:00 p.m.** (EST). Inquiries received after that date and time will not be accepted.

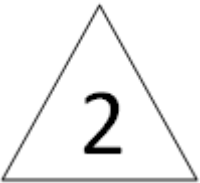
All ATCs shall be submitted in writing via email only to PG7585184_MD_4@sha.state.md.us, with a cover letter clearly identifying the submittal as a request for review of an ATC. If the Proposer does not clearly designate its submittal as an ATC, the submission will not be treated as an ATC by the Administration

The Administration will review each ATC submitted. If an ATC is summarily approved or not approved, 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 requirements. If the Administration needs more information to determine whether or not the ATC will be approved or not approved, 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 approve an ATC based on required revisions to a portion or portions of the ATC.

If an ATC is not approved or conditionally approved and the Proposer feels that the non-approval or the conditions for approval 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 PG7585184_MD_4@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.

The Proposer shall advise the Administration in its ATC if it believes a one-on-one meeting is appropriate.

The Administration will return its approval, non-approval, conditional approval, 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.



2.08.02.7 Content of ATC Submittal

Each ATC submittal shall include the following:

- A) Description: A detailed description and schematic drawings of the configuration of the ATC or other appropriate descriptive information (including, if appropriate, product details (i.e. specifications, construction tolerances, special provisions), and a traffic operational analysis);
- B) Usage: Where and how the ATC would be used on the Project;
- C) Deviations: References to any requirements of the RFP Documents or to any elements of the Contract Documents which are inconsistent with the proposed ATC, an explanation of the nature of the proposed deviation and a request for approval of such deviations or a determination that the ATC is consistent with the requirements of the RFP Documents;
- D) Analysis: An analysis justifying use of the ATC and why the deviations from the requirements of the RFP Documents should be allowed;
- E) Impacts: Discussion of potential impacts on vehicular traffic, environmental impacts (favorable and unfavorable) identified on appropriate environmental documents, community impacts, safety and life-cycle Project and infrastructure costs (including impacts on the cost of repair and maintenance);
- F) History: A detailed description of other projects where the ATC has been used under comparable circumstances, the success of such usage, and names and telephone numbers of project owners that can confirm such Statements;
- G) Risks: A description of added risks to the Administration and other Persons associated with implementing the ATC;
- H) Costs: An estimate of the ATC implementation costs to the Administration, the Design-Builder and other Persons; and
- J) Price: An estimate of the impact of the ATC on the Proposal Price.

2.08.02.8 Determination By The Administration

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

- A) The ATC is approved.
- B) The ATC is not approved.
- C) The ATC is not approved in its present form, but is approved subject to satisfaction, in the Administration's sole judgment, of specified conditions.
- D) The submittal does not qualify as an ATC but may be included in the Proposal without an ATC (i.e., the concept complies-with the RFP requirements).

E) The submittal does not qualify as an ATC and may not be included in the Proposal.

F) Decision on the ATC is pending receipt of additional information and/or one-on-one meeting.

Approval of an ATC will constitute a change in the specific requirements of the Contract Documents associated with the approved ATC and for that specific Proposer. 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.

2.08.02.9 Incorporation Into Proposal

Proposer may incorporate zero, one or more pre-approved ATCs into its Proposal including conditionally approved ATCs. If the Administration responded to an ATC by identifying conditions to approval, Proposer may not incorporate such ATC into the Proposal unless all conditions have been met. Copies of the Administration's ATC approval letters for each incorporated ATC shall be included along with the Price Proposal.

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

2.08.02.10 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.

2.08.02.11 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.

2.08.03 Proposal Delivery Formalities

2.08.03.1 Organization of Proposal Submittals

Prospective Proposers shall organize submittal of their Technical 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 TC Section 2.09 and, if invited to do so, a Price Proposal as described in TC Section 2.11.

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 4 – Forestville Road to MD 458 (Silver Hill Road) –
PG7585184

Container ____ of ____

c. Location and deadline for submittal of Technical Proposal Submittal

Technical Proposals must be delivered no later than June 11, 2014 **prior to 12 noon** (EST). The proposal must be delivered to the following location:

Ms. Norie A. Calvert
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.

e. Price Proposals (If Requested)

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 4 – Forestville Road to MD 458 (Silver Hill Road) –

PG7585184

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 4 – Forestville Road to MD 458 (Silver Hill Road) –
PG7585184

g. Location and deadline for submittal of Price Proposal Submittal

Price Proposals must be delivered no later than October 15, 2014 **prior to 12 noon** (EST). The proposal must be delivered to the following location:

Ms. Norie A. Calvert
Director, 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 including the Lump Sum Breakdown and copies of the Administration's ATC approval letters for each incorporated ATC.

2.08.03.2 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 TC 2.08.01.
- 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.

2.08.03.3 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.

2.08.03.4 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.

TC-2.09 TECHNICAL PROPOSAL

As described more fully in TC 2.12, the Administration will employ a two-step selection process in determining the successful Proposer. Step One will culminate with the submission of the Technical Proposal as described herein. For Step Two, the most highly qualified Design-Build Teams based on the Technical Proposals ratings will be considered Reasonably Susceptible for Award and may subsequently be invited to submit a Price Proposal as described more fully in TC 2.11. Any addenda issued subsequent to Step One will only be issued to the single point of contact for the prospective Design-Builder. **It shall be the responsibility of the Design-Builder to identify the single point of contact and confirm that all Design-Builder members, suppliers, etc. have received all addenda.**

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.

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
- Project Understanding and Approach
- Project Management
- Team Experience
- Environmental Approach and Environmental Past Performance

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. Pages are defined as one side of a paper, for example, 2 pages is defined as the front and back of the paper.
- Finding tools, such as tables of contents and page dividers shall be utilized to make the submittals easily usable.

2.09.01 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:

Attention: Maryland State Highway Administration (SHA)
Ms. Norie A. Calvert, Director
Office of Procurement and Contract Management
Fourth Floor, C-405
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 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 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 constructor 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 constructor 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 DB Team.
- f. Include a certification that the Design-Build Team is in compliance with the general conditions prohibiting a former Administration employee from working on this contract for one year after leaving the Administration and 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.

2.09.02 Project Understanding and Approach (Limit 8 Pages) - CRITICAL

General: Provide a narrative which addresses the following:

- A. Your approach to successfully delivering the project by meeting or exceeding the established Project Goals. - **CRITICAL**
- B. The significant issues and risks facing the selected Proposer and the Administration. - **SIGNIFICANT**
- C. Your understanding of the project's scope. – **IMPORTANT**
- D. At a conceptual level, your understanding of the established Project Goals. - **IMPORTANT**

2.09.03 Project Management (Limit 14 Pages) - SIGNIFICANT

- A. Provide an overall description of your Design-Build Team's Project Management Plan addressing the following elements. - **CRITICAL**
 - Project communication plan including how you will document and control communications internally within the Design-Build team, externally with the Administration, and externally with the public including roadway users, impacted stakeholders, community officials and the general public.
 - Coordination management including addressing issues related to right-of-way availability, utility impacts and relocations, site access, and construction sequencing.
 - Risk management including risks from a design, construction, and management perspective and how the Design-Builder will manage, avoid and mitigate the risks.
 - Design and construction management including quality control and partnering with the Administration.
 - Schedule management including measures the Design-Builder will employ to ensure the project meets the completion date and how it will adapt when expected dates are not met. Discuss specific issues that may affect the project schedule.
 - Change management including addressing potential changes within the scope of work, outside the scope of work, and designer involvement in changes to the "issued for construction" drawings for inclusion in the as-built plans.

understanding that the project and its stages are structured to be executable within the timeframes provided and for the resources indicated.

The Design and Construction Summary Schedule completion date and critical date(s) cannot exceed the dates located elsewhere in this RFP.

C. Organizational Structural - **IMPORTANT**

The Design - Build Team shall provide the following:

- A narrative description of the Team's approach to Design-Build Contracting. The narrative should describe the methodology for integrating the Design-Build entity and the different areas of expertise within the team into an efficient and effective organization.
- Provide an organizational chart showing the "chain of command" with lines identifying participants who are responsible for major functions to be performed, and their reporting relationships, in managing, designing, and building the project. Separate "lines of communication" between participants shall be identified on the organizational chart. Identify the critical supporting elements and relationships of project management, project administrations, construction management, quality control, safety, environmental compliance, and interfaces with third parties. The organizational chart shall reflect Key Staff and Discipline Leads as identified in the RFP. The chart shall indicate the planned percent commitment of time for each Key Staff during the duration of this project. The chart shall not exceed one page and may be submitted on an 11" x 17" page.

2.09.04 Team Experience (Page limits by subsection) - IMPORTANT

The Design-Builder must demonstrate their experience on comparable projects with detailed descriptions. Information that is not detailed or relevant may be considered below acceptable. The information for each staff member should be relevant to the role and function they will perform on this project. **The resumes for key staff must identify the function the staff member will fulfill on this project and include their role or function on relevant projects if they are different from that proposed.** The Administration strongly recommends that the single point of contact is a key staff member.

2.09.04.1 Lead Constructor firm experience: (Limit 8 pages) - SIGNIFICANT

Using Form A-1 – Lead Constructor Firm Experience, provide the required information for all Key Staff. Experience and qualifications requirements for Key Staff are defined in A. below. Form A-1 is not included in the page count.

- A. Experience and qualifications documentation

Submit resumes of the following key constructor firm management and staff, highlighting their relevant experience on similar type projects.

1. **Design-Build Project Manager** - Shall have a minimum of fifteen (15) years demonstrated experience in construction and management of construction on highway projects with similar size, type of work, and complexity as this PROJECT. Emphasize Design-Build experience and extensive project management experience.

2. **Construction Manager** - Shall have a minimum of ten (10) years demonstrated construction experience in civil works projects similar in nature to the PROJECT, and include highway construction, drainage construction, environmental sensitivity, utility coordination and relocation, and maintenance of traffic;

Resumes shall be a maximum of **one (1) page** each.

- B Using Form A-2 – Lead Constructor Firm, past Project Description, provide a listing of three (3) projects that highlight construction experience relevant to this project, which the lead constructor firm performed over the last ten (10) years. Projects should emphasize proposed Key Staff involvement, where feasible to demonstrate the team’s capability to perform work similar to that required for this contract. Relevant Design-Build experience is preferred, but not required. Use **one (1) form** per project and each form shall be a maximum of two (2) pages.

2.09.04.2 **Lead Design firm experience: (Limit 7 pages) - IMPORTANT**

Using Form A-1 – Lead Design Firm Experience, provide the required information for all Key Staff and Discipline Leads. Experience and qualifications requirements for Key Staff are defined in A. below. All Discipline Leads shall be a Maryland registered Professional Engineer or Maryland Licensed Landscape Architect as appropriate.

- A. Experience and qualifications documentation

Submit resumes of the following key design firm management and staff, highlighting their relevant experience on similar type projects. If more than one key position is filled by the same person, so indicate.

1. **Project Design Manager** - Shall be a Maryland registered Professional Engineer who is an owner or employee of the lead design firm and shall have a minimum of fifteen (15) years demonstrated experience in managing design for projects of similar scope and complexity as this PROJECT. Emphasize experience with highway, drainage design, utility relocations,

permitting and projects of similar size and type. Emphasize Design-Build experience.

Resumes shall be a maximum of **one (1) page** each and shall follow Form A-1 – Lead Design Firm Experience. Form A-1 is not part of the maximum page limit.

- B. Using Form A-2 – Lead Design Firm, past Project Description, provide a listing of three (3) projects that highlight design experience relevant to this project, which the lead design firm functioned as the lead design firm over the last ten (10) years. Projects should emphasize proposed Key Staff or Discipline Leads involvement, where feasible, to demonstrate the team’s capability to perform work similar to that required for this contract. Relevant Design-Build experience is preferred, but not required. Use **one (1) form** per project and each form shall be a maximum of two (2) pages.

2.09.05 Environmental Approach and Environmental Past Performance (Limit 8 Pages) - IMPORTANT

A. Environmental Approach - **SIGNIFICANT**

Provide an overall description of your Design-Build Team’s Environmental Approach addressing the following elements:

- The Design-Build Team’s understanding of the major environmental features on this project.
- Permit acquisition/compliance and addressing any non-compliance issues which may occur. Discussion shall include how the Design-Build Team will coordinate with Federal, State, and local environmental permitting agencies and the Administration.
- Implementation of an effective erosion & sediment control plan and measures to ensure proactive approach to maintaining functional erosion & sediment control.
- Measures to ensure compliance with commitments from the environmental document and with laws related to cultural resources and how the Design-Builder will address any unknown cultural resources if encountered.
- Techniques, products, practices or innovation that the Design-Builder proposes to incorporate into this project to protect environmental resources and to reduce impacts to environmental features, waste, or pollution.

B. Environmental Past Performance - **IMPORTANT**

Provide a narrative that addresses the following elements related to your Design-Build Team’s Environmental Past Performance:

- Project specific techniques, products, and practices incorporated into past projects which have resulted in a reduction in impacts to environmental features or a reduction to waste or pollution. Identify if these techniques, products, or practices were owner directed or suggested by the members of your team.
- Describe the circumstances of and the actions you have taken in past performance of work to correct any deficiencies related to measures to protect environmental resources or to address any environmental fines, stop work orders, or low ratings. Describe if and how these were addressed on the project and in future practices.

TC 2.10 EVALUATION OF TECHNICAL PROPOSALS

The Administration will use a two-step process to select the successful Proposer for this project. The Administration will first review and evaluate all Technical Proposals. Based on the results of these evaluations, a list of acceptable prospective Proposers will be developed.

2.10.01 Technical Proposal – Evaluation Factors

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

-
- Project Understanding and Approach - **CRITICAL**
- Project Management – **SIGNIFICANT**
- Team Experience - **IMPORTANT**
- Environmental Approach and Environmental Past Performance - **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.

2.10.01.1 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.

2.10.01.2 Evaluation Process

Each Evaluation Team will only evaluate a specific Evaluation Factor or Factors of the Technical Proposals and not the Technical Proposal 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.

2.10.01.3 Evaluation Results

The technical evaluation factors and the overall Technical Proposal will be rated by an 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 an approach that is considered to significantly exceed stated objectives/requirements in beneficial way to the Administration. This rating indicates a consistently outstanding level of quality, with very little or no risk that this Proposer would fail to meet the requirements of the solicitation. There are essentially no Weaknesses as defined below.

GOOD – The Proposer has demonstrated an approach that is considered to exceed stated objectives/requirements. This rating indicates a generally better than acceptable quality, with little risk that this Proposer would fail to meet the requirements of the solicitation. Weaknesses, if any, are very minor.

ACCEPTABLE – The Proposer has demonstrated an approach that is considered to meet the stated objectives/requirements. This rating indicates an acceptable level of quality. The Proposer demonstrates a reasonable probability of success. Weaknesses are minor and can be corrected.

SUSCEPTIBLE TO BECOME ACCEPTABLE – The Proposer has demonstrated an approach that fails to meet stated criteria as there are weaknesses and/or deficiencies, but they are susceptible to correction through Discussions. The response is considered marginal in terms of the basic content and/or amount of information provided for evaluation, but overall the Proposer is capable of providing an acceptable or better Proposal.

UNACCEPTABLE – The Proposer has demonstrated an approach that indicates significant weaknesses/deficiencies and/or unacceptable quality. The Proposal fails to meet the stated criteria and/or lacks essential information and is conflicting and/or unproductive. There is no reasonable likelihood of success.

weaknesses/deficiencies are so major and/or extensive that a major revision to the Proposal would be necessary.

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.

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.

2.10.02 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 on the Reduced Candidate List. 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.

2.10.03 Determination of Reduced Candidate List

Based upon the evaluation process described above, the Technical Proposals will be assigned an overall adjectival rating. The Proposers submitting the most highly rated Technical Proposals will be considered Reasonably Susceptible for Award and will be placed on the Reduced Candidates List (RCL) and invited to submit Price Proposals. Any Proposal which does not receive at least an “ACCEPTABLE“ on each technical evaluation factor will not be considered for the RCL.

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.

- Safety management for all roadway users including, but not limited to, workers, site visitors, pedestrians, motorists, and others.

B. Design and Construction Summary Schedule - SIGNIFICANT

Submit an integrated Design and Construction Summary Schedule and supporting narrative that logically details tasks and timing of the work effort and provide a realistic projection of project events and the expected dates. The following criteria should be met and information provided as part of the summary schedule:

- The schedule for design and construction will be task oriented, indicating dates by which milestones are to be achieved. The proposer may use a critical path scheduling approach and the schedules be graphically represented.
- The schedule is to be an integrated and networked multi-layered schedule of project tasks. It should identify project events and the expected dates. These dates should be based on the calendar dates as the starting point and the logical flow of dates provided by calculating the addition of duration of all tasks using typical schedule networking tools.
- Each major task will be directly traceable to the requirements of the project.
- All tasks/activities in the schedule will be logically linked together showing predecessor/successor relationships.
- All critical path areas/dates or fast track areas will be clearly identified including any critical schedule dates indicated by the Administration in the schedule requirements of this RFP.
- The proposer will submit a rationale explaining how the schedule will be achieved including any perceived benefits of the Design-Builder's schedule to the Administration and detailing methods to expedite the construction of critical path items.

The Design and Construction Summary Schedule should be a general representation of the Design-Build Team's approach to completing the entire project from notification of selection through design, construction, and Administration acceptance for maintenance. The number of tasks and the duration of each shall have no limit; however, the Design and Construction Summary Schedule should communicate the Design-Builder's general staging of design and construction along with the major activities associated with each stage. The Design and Construction Summary Schedule should have clear tracks for design, technical, schedule, management, permits, construction, etc. and the relationship will be presented in a way that provides the Administration the confidence and

However, the Administration does reserve the right to use the knowledge of good ideas of one team in discussions with the successful Team.

2.10.04 Discussions

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

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

2.10.04.2 Procedures

The following specific procedures will apply to Discussions:

- A) Discussions will be conducted with all Proposers whose Proposals are determined to be in the Competitive Range. To be considered in the Competitive Range, a Technical Proposal must be rated at least “SUSCEPTIBLE TO BECOME ACCEPTABLE” in all Technical Evaluation factors.
- 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.

2.10.04.3 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 the names of individuals providing references information about a Proposer's past performance; or
- C) Revealing selection information in violation of the Administration's procurement policies and the laws of the State.

2.10.05 Proposal Revisions

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

At the conclusion of Discussions (if held), the Administration may request revised proposals which will provide all Proposers in the Competitive Range an opportunity to revise their Proposals, 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 will allow adequate time, as determined by the Administration, for the Proposers to revise their Proposals. Upon receipt of the proposal revisions, 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.

TC 2.11 PRICE PROPOSALS

2.11.01 General

Price Proposals will be accepted only from those Proposers invited by the Administration in writing to submit Price Proposals. Price Proposals must be submitted using the Proposal Form included in this RFP.

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.

2.11.02 Contract Completion Incentive Procedure

Not Applicable

2.11.03 Wetland and/or Waterway Impact Reduction Incentive

Not Applicable

2.11.04 Erosion Sediment Control Incentive/Liquidated Damage 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 Provision 308.01.04, Quality Assurance Ratings contained within this RFP for the contract requirements.

2.11.05 Proposal Guarantee

The Contractor's bid guarantee shall represent 5% of Part "A" of the Contractor's bid in accordance with the provisions of GP 2.07.

2.11.06 Liquidated Damages

In the event a complete usable facility is not provided by the calendar date specified on page 39 of 41 in the Proposal Form of the Request for Proposals, 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 40 of 41 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.

TC 2.12 EVALUATION OF PRICE PROPOSALS AND AWARD

2.12.01 Submittal

If, in the judgment of the Administration, there are a sufficient number of top rated proposals, to ensure a competitive process, the Administration will invite the top rated firms to submit Price Proposals.

2.12.02 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. 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) Is significantly unbalanced relative to the scope of Work;
- B) Does not provide all information in conformance with the RFP, and/or
- C) Contains inaccurate, incomplete, and/or unreasonable prices on the Cost Breakdown

2.12.03 Communications

The Administration may engage in communications with the Proposers after receipt of Price 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.

2.12.04 Competitive Range

The term "Competitive Range" means a list of the Proposers invited to submit a Price Proposal which submitted Price Proposals determined to be responsible in Step Two.

2.12.05 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.

2.12.05.1 Purpose

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

- A) 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 other supplemental information to their Proposals;
- E) Facilitating execution of a contract that is most advantageous to the State.

2.12.05.2 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.

2.12.05.3 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.

2.12.06 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 Price Proposals, 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.

2.12.07 Determination of Successful Proposer

In accordance with COMAR 21.05.03.03(F), award of the Contract to the responsible offeror whose proposal is determined to be the most advantageous to the State, considering price and the evaluation factors set forth in the Request for Proposals. The Administration has determined that the most advantageous to the State will be the Proposer from the Reduced Candidate List which submits the lowest responsible Price Proposal in Step Two.

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. However, the Administration does reserve the right to use the knowledge of good ideas of one team in discussions with the successful Team.

2.12.08 Award and Execution of 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 the probability that the successful Proposer will need to start design activities as soon as possible after notification of selection and prior to 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 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 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 actual documentable design costs up to a maximum of \$50,000 or 1% of the Price Proposal, whichever is greater, incurred by the Design-Builder after approval of the Bid Bond. To receive reimbursement, the Design-Builder must submit all 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 erosion and sediment control plan approval, right-of-way acquisition, permits, design approval including appropriate maintenance of traffic approval, and pre-construction conference.

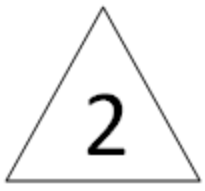
2.12.09 Stipend

The Administration understands that firms invited to submit Price Proposals on Design-Build projects may incur higher than normal bid preparation costs in their engineering effort to submit responsible 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 Proposal.

The Administration will agree to pay a stipend to the Design-Build Teams invited by the Administration to submit Price Proposals in the amount of \$40,000.00 to each Proposer if its Proposal was not selected for Award or it was awarded the Contract but the Contract was terminated prior to issuance of a Notice to Proceed for the Administration's convenience.

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 copies and hard copies of all documents used to develop the price bid. 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 Mr. Jason A. Ridgway, 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 Mr. Jason A. Ridgway, 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 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:

Invoice # - created by the Design-Build Team

Federal Tax I.D. number

Remittance Address

FMIS # PG758A51

Contract Description – MD 4 – Forestville Road to MD 458 (Silver Hill Road) –

Construction # - PG7585184

Payment Amount -

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

STIPEND AGREEMENT

Contract No.
Project Description:

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 _____, 201_, the SHA issued a Request for Proposals ("RFP") for design and construction of the MD 4 from Forestville Road to MD 458 (Silver Hill Road) Community Safety and Enhancement 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 MD 4 from Forestville Road to MD 458 (Silver Hill Road) Community Safety and Enhancement 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 bid 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

Maryland State Highway Administration

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. Compensation And Payment.

- 2.1** Compensation payable to Proposer for the Work Product described herein shall be \$40,000 if all of the following conditions are met:

Proposer’s Proposal, was not the apparent successful proposer or was not selected for award or it was awarded the Contract but the Contract was terminated by SHA for its convenience prior to issuance of a notice to proceed.

- 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 \$40,000 and will be subject to audit of the costs incurred by the Proposer in preparing its Technical Proposal and price bid. 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 within 10 days of price proposals being opened. Eligibility of receipt of a stipend is dependent upon meeting the conditions set forth in Section 2.1. of this Agreement and TC Section 2.12.05 of the RFP.

- (b) If the procurement is cancelled prior to the Bid Opening 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, when any complaint against award is administratively and judicially resolved. 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: _____

Maryland State Highway Administration

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 #

TC SECTION 3
SCOPE OF WORK FOR DESIGN-BUILD
TERMS AND CONDITIONS

ADD: After section TC 3.04

TC 3.05 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.

3.05.01 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:

- Section V Highway Design - (Phase IV)
- Section VI Structure Design - (Phase IV & V) Parts I through III
- Section VII Surveys and Plats (Phase IV)
- Section VIII Traffic Engineering (Phase IV)
- Section IX Landscape Architecture
- 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.

The Design- Build Team shall also comply with

3.05.02 Design Personnel Identified in Proposal

The designer and design subcontractors shall utilize the key personnel identified in their

Technical Proposal 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 technical proposal 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 technical proposal including requirements thereof. The Administration shall be the sole judge as to whether replacement staff members are acceptable.

3.05.03 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; Traffic Engineering including signing, marking, lighting, and traffic control. The Design-Build Team shall be knowledgeable in coordinating utility designs, utility connections and working with other agencies and the public.

3.05.04 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, block retaining walls, concrete barrier retaining walls, drainage pipes, etc.

3.05.05 Design Exceptions

Any elements of design that fall below the design standards listed in TC-3.09 through 3.21 and AASHTO 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 accident history within the area an exception is being sought.

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.

3.05.06 Quality of Design and Construction

3.05.06.1 Design Quality Control Plan

The Design-Build Team shall submit a Design Quality Control Plan (DQCP) for review and approval by the Administration, before notice-to-proceed will be given to begin work. 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.

3.05.06.2 Responsibility of Design-Build Team

The Design-Build Team 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 and receive written authorization from the Administration for modification to the plan. The Design-Build Team shall request from the Administration, in writing, all exceptions to the plan, and the Administration will respond in a timely fashion to each request in writing.

The Design-Build Team 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 an independent design firm other than the Design-Build Team.

All plans and specifications required for construction of a work element shall be checked prior to their transmittal to the Administration.

The Administration may require that the Design-Build Team provide checked calculations to the Administration for specific elements of the design prior to approving the design. The Administration will endeavor to provide the Design-Build Team with written requests for such submittals at least 7 days prior to the date the Administration requires the submittal. The Administration may request that checked calculations be submitted on demand. In such instances, the Design-Build Team shall provide the checked calculations immediately.

The checked calculations shall be submitted to the Administration with the other Record Documents submitted at the appropriate milestone reviews.

3.05.07 Calculation Certification

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

3.05.07.1 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.

3.05.07.2 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.

3.05.07.3 Transmittals

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

3.05.07.4 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 Designer, 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.

3.05.07.5 Professional Seals

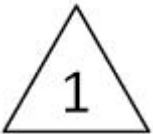
All calculations, plans, specifications and other technical documents transmitted to the Administration shall be signed and sealed by both of the Professional Engineers licensed in the State of Maryland who are responsible for the design and checking of that document. Landscape plans shall be prepared, 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 TC 3.07.03, 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, Designer and checker(s).

The Design-Build team must retain the services of a Professional Engineer licensed in the State of Maryland and certified as a MDE reviewer to review and certify by signature that the Erosion and Sediment Control plans have met the requirements of MDE prior to any submission to MDE for review.

3.05.07.6 Design Quality Assurance

The Administration may periodically audit the Design-Build Team's, the Designer's, and the checker's work to ensure that it is being done in conformance with the Contract requirements. The Administration will endeavor to perform these audits so as not to interfere with the progress in the work. The Design-Build Team shall fully cooperate with and assist the Administration in conducting such audits. The Design-Build Team shall maintain all records and any other elements of the work in a current and readily available manner so that, should the Administration audit the work, everything shall be readily available.

Any quality assurance reviews or audits conducted by the Administration shall in no way remove from the Design-Build Team the responsibility for designing and constructing all elements of the Work in conformance with its Design Quality Control Plan and all requirements of the Contract. The Administration shall at all times have the authority to require the Design-Build Team to re-perform any work that the Administration determines is not in conformance with any of the provisions of the Contract or with any



drawings, specifications, other documents prepared by the Design-Build Team. Any re-work shall not serve as the basis for claims for additional compensation or time by the Design-Build Team.

3.05.08 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.

3.05.09 Structural Engineering

The Design-Build Team shall develop all structural calculations, details, reports and plans for any incidental retaining walls proposed by the Design-Builder for this project. All plans developed shall meet the prescribed CADD Standards established for the overall project.

3.05.10 Noise Abatement

N/A

3.05.11 Geotechnical Engineering

The Design-Builder 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 this Geotechnical Performance Specification.

3.05.12 Pavement Engineering

The Design-Builder shall design and construct all pavement sections and perform all pavement engineering in accordance with the criteria established in the Pavement Performance Specification. All pavement sections shall perform under the given loading and environmental conditions for the specified service life periods.

The Design-Builder will have the flexibility to make Project changes that produce benefits or savings to the Administration 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.

3.05.13 Traffic Engineering

The Design-Build Team shall prepare signing, signal, roadway and sign lighting, and final pavement marking plans as part of the highway construction plans using the latest CADD Standards available from the SHA Office of Traffic & Safety (OOTS).

OOTS and District Traffic will review and approve all signing, signal, lighting, and pavement marking plans for this project. All catalog cuts and working drawings pertaining to traffic items

shall be reviewed and approved by the Design-Build Team.

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.

3.05.14 Roadside Landscape Planting and Reforestation

The Design-Build Team shall prepare landscape and reforestation plans with a scale appropriate for the project, but not less than 1"=50'. Plans shall include schedules of all materials proposed for use.

The Maryland Department of Natural Resources (DNR) has completed a Reforestation Site Review based on the current LOD impacts shown on the Forest Impact Plans provided on Projectwise. 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 shall request a field review with the SHA – Landscape Architecture Division and Landscape Operations Division 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-Builder to obtain and comply with the terms of the modified permit(s) from DNR.

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.

3.05.15 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, including utility relocations to be completed by the Design-Builder as specified in this RFP. See Section 3.15-Utility Design and Relocation Criteria.

3.05.16 Stormwater Management (SWM) Design and Approvals

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

Once the MDE review process is complete, the Design-Build Team shall obtain final approval from the Administration.

3.05.16.1 Maryland Department of the Environment (MDE) Review and Approval

A SWM concept design was developed to demonstrate to MDE that all of the SWM needs of the project can be met within the project corridor. It is anticipated that MDE will approve the methodology in the concept SWM report and provide a Letter of Intent to issue approvals. The Design-Build Team is responsible to finalize the SWM design. The final design shall be acceptable to both MDE and SHA. MDE will issue final SWM Approvals.

A Pre-Permitting meeting must be held once Notice to Award has been issued. This meeting will be scheduled by the Administration upon request by the Design-Build Team and will include the Design-Build Water Resource engineer, Design-Build Construction manager, Design-Build Project Design manager, Design-Build E&S manager, MDE reviewer and Administration Highway Hydraulics Division and Highway Design Division managers. The purpose of the meeting is to preview and discuss the SWM and erosion and sediment control concepts developed by the Design-Build Team, submission schedules proposed by the Design-Build Team, permitting timeframes, submission requirements and the Administration's quality expectations.

The Design-Build team's Professional Engineer licensed in the State of Maryland and certified as a MDE reviewer must review and certify by signature that the Erosion and Sediment Control plans have met the requirements of MDE prior to any submission to MDE for review.

Submissions for MDE and the Administration approval shall be delivered to both agencies concurrently. The SWM submission to the Administration shall be submitted directly to the Highway Hydraulics Division. The Administration shall be copied on all correspondence delivered to MDE at the same time it is delivered to MDE including comment letters, phone conversation transcripts, transmittals, reports, plans, revisions to plans and report, computations, and/or point-by-point response letters. Review time for submissions to the Administration or MDE shall not be the basis of a claim or time extensions against the Administration.

Deviations from the Concept SWM Report by the Design-Build Team are the sole responsibility of the Design-Build Team. The Administration will not pay for any additional design, MDE review coordination, construction or other costs incurred due to deviations from the Concept SWM Report.

SWM locations have been suggested by the Administration in the Concept SWM Report and on the Plans. If the Design-Build Team chooses other locations for SWM facilities, they must be reviewed and approved by the Administration prior to obtaining approval from MDE. Any proposed location shall not result in a net increase in wetland and/or waterway impacts.

The Concept SWM report proposes certain locations of SWM facilities. The Letter of Intent will be issued based upon the locations. Other types of facilities may be used, but

they shall meet all requirements of the 2000 Maryland Stormwater Design Manual and subsequent changes and 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.

3.05.16.2 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.

3.05.16.3 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. The As-Built Certification signature block, checklists and tabulations are also included on ProjectWise.

The Contractor shall submit the completed As-Built Certification Package to:

Highway Hydraulics Division Chief, Mail Stop C-201
Maryland State Highway Administration
707 North Calvert Street
Baltimore, Maryland 21202

3.05.17 Surface Storm Drainage Design and Approvals

The Design-Build Team shall design all surface drainage conveyances (including but not limited to open channels, 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. Approval for the drainage design and report shall be obtained from the Administration prior to construction. Review time for submissions to the Administration shall not be the basis of a claim or time extensions against the Administration.

If Waterway Construction (COMAR 26.17.04) review and approval is required, submittals for MDE approval shall be delivered to the Administration for review and approval prior to submittal to MDE. At the discretion of the Administration, Highway Hydraulics Division, subsequent submittals may be delivered directly to MDE. If this is allowed, a copy of the complete MDE submittal package, including MDE comment letter and point-by-point response to comments, shall be concurrently delivered to the Administration, Highway Hydraulics Division. Review time for submissions to the Administration or MDE shall not be the basis of a claim or time extensions against the Administration.

If the Design-Build Team adds any culverts within US Waters that were not previously reviewed by MDE, they shall obtain approval from MDE according to the process described above.

3.05.18 Erosion and Sediment Control (ESC) Design and Approvals

The Administration will not provide any ESC design. The Design-Build team will be responsible for 100% of design and for obtaining approvals for the erosion and sediment control plans from all appropriate agencies such as MDE.

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.

Approval for ESC has not been obtained from MDE. 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 SHA and MDE concurrently for review with final approval being issued by the MDE once the Administration has provided its approval in the form of a signed Title Sheet. MDE will not approve an ESC submittal until all permanent elements to be constructed as part of that ESC submittal have been approved by the Administration. A signed Title Sheet will not be provided to the Design-Build Team until all proposed elements and comments have been addressed to the satisfaction of the Administration. The Design-Build Team shall be responsible for addressing any comments that MDE and the Administration supplies. The Design-Build team must retain the services of a Professional Engineer licensed in the State of Maryland and certified as a MDE reviewer to review and certify by signature that the Erosion and Sediment Control plans have met the requirements of MDE prior to any submission to MDE for review.

A Pre-Permitting meeting shall be scheduled as discussed under SWM Design and Approvals

section above. Submittals for ESC approval shall be delivered concurrently to MDE and the Administration according to the review process for SWM approval described above under SWM Design and Approvals. Review time for submissions to MDE shall not be the basis of a claim or time extensions against the Administration.

3.05.19 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 SHA Consultant Services Specifications, Volume II.

3.05.20 Coordination with the Administration

3.05.20.1 Design Submission Requirements

3.05.20.1.1 Review Timeframes

The Design-Build Team **must notify the Administration 14 days prior to the date** of all intended submissions. If the Design-Build Team elects to break the project into smaller separate design packages or to employ a "rolling" process, the Administration will review the plan submittals and return comments **within 21 calendar days** of receipt of the plans, beginning on the day after receipt of the plans. If the Design-Build Team elects to submit plans using the normal milestone process, the Administration will review the plan submittals and return comments **within 45 calendar days** of receipt of the plans, beginning on the day after receipt of the plans. Multiple submissions sent concurrently or overlapping submissions may also result in a **45 calendar day** review and comment period depending on the material being submitted. Review time for submissions to the Administration shall not be the basis of a claim or time extensions against the Administration. The Administration will require the use of Project Wise as means to post plans, reports etc. for review. Comments will also be posted on Project Wise. Third party reviews such as Utilities, Local Jurisdictions and Environmental Agencies will still require hard copies. The Design-Build Team shall provide 10 sets of plans for third party reviews. The Design-Build team shall deliver plans directly to third parties.

The intent of this section is to provide some flexibility for the Design-Build Team in the schedule for design and construction such that the construction work may begin on one portion of the project before all of the design has been reviewed and approved for the entire project. For example, the Design-Build Team may elect to break the project into smaller separate design packages or to employ a "rolling" process of design and construction. Earthwork, for example, could begin after receipt of the MDE approval for a particular section and after all other requirements are met, but prior to final approval of the completed design for that

section. However, all roadway geometry, superelevation data, cross culverts and associated drainage design must be submitted and approval received prior to construction of earthwork.

Any adjustments made necessary by changes during the completion of the design and approval process shall be made at the Design-Build Team's expense. Use of this process will not alter the need to formally submit each element of the design for approval using the review process described below.

The Design-Build Team may follow the Administration's normal milestone review process in completing the design. Plans and specifications would be submitted for review and approval of the Administration's Director, Office of Highway Development, at the milestones listed below. The intent would be for the Administration to review the plans as design progresses, so that major changes can be avoided late in the process.

The Administration may conduct formal review meetings at these milestones and provide comments for the Design-Build Team to address. In either case, the Design-Build Team shall be required to address all issues identified, to the satisfaction of the Administration, before the Director will grant the milestone approval.

The Design-Build Team may, at their own risk, prepare the plans for any segment to the Final Plans and Specifications stage (100 percent). Any changes required to plans or field adjustments as a result of Administration comments shall not be the basis of a claim or time extensions against the Administration.

The traffic control plans for a particular phase of work must be approved by the Administration's District Traffic Engineer before Final Plans and Specifications approval will be given and before construction can begin for that phase of work.

For the protection of both the Design-Build Team and the Administration, all submittals prepared by the Design-Build Team shall be dated and initialed by the Design-Build Team as a file copy submission.

Plan reviews that result in "conditional approval" means the comments are minor in nature and should not have an adverse effect on construction activities. If "conditional approval" is granted, the Design-Build Team shall post a copy of their point-by-point responses on Project Wise outlining how the Design-Build Team will address the comments. If the comments are identified to be addressed as part of an "As-Built Drawing", the Design-Build Team shall follow the process outlined in Section 3.05.27.2.2. If the Design-Build Team elects to address all comments prior to proceeding towards construction, then the Design-Build Team shall follow the process for plan "approved" as noted below. In order to proceed towards construction the Design-Build Team shall submit the title sheet that is signed and sealed by the Design-Build Team's Engineer to the SHA Design

Project Manager. The title sheet shall be returned to the Design-Build Team with signatures from the appropriate officials of the Administration. The Design-Build Team shall then submit 20 sets of plans specifications and post a copy of their point-by-point responses on Project Wise for SHA internal distribution. One set of Reproduces shall also be submitted. The Design-Build Team is responsible for any external distributions associated with the Design-Build Teams personnel, subcontractors, sub consultants, suppliers etc.

Once the plans are “approved”, the Design-Build Team shall submit the title sheet that is signed and sealed by the Design-Build Team’s Engineer to the SHA Highway Design Project Manager. The title sheet shall be returned to the Design-Build Team with signatures from the appropriate officials of the Administration. The Design-Build Team shall then submit 20 sets of plans and specifications to the Administration for the SHA internal distribution. One set of Reproduces shall also be submitted. The Design-Build Team is responsible for any external distributions associated with the Design-Build Teams personnel, subcontractors, sub consultants, suppliers etc.

The Design-Build Team shall not proceed with the final construction of a particular portion of the project until:

- a. All Final Plans and Specifications comments have been addressed to the satisfaction of the Administration for that portion.
- b. All required permits for that portion of work have been received.
- c. Final Plans and Specifications approval is received in writing from the Administration for that portion.
- d. A title sheet is signed and sealed by the Design-Build Team’s Engineer and appropriate officials of the Administration.

Final contract plans submission shall meet file storage requirements and will be considered the record plan set for seals and signature. Electronic files shall be for documentation purposes only. All revisions to approved plans and as-built revisions shall be made on both the hard copy originals and in the electronic files.

3.05.20.2 Normal Milestone Review Process

If the normal milestone review process is chosen, the following submissions shall be made:

3.05.20.2.1 Semi-Final Review

The Design-Build Team shall post plans and specifications to Project Wise and

provide an email to the Administrations Project Manager that defines the link to where the plans and specifications reside. The Design-Build Team shall also produce 10 sets of plans and specifications if third party reviews are included. One set of reproducible plans shall also be submitted when the design is approximately 60 percent complete (including drainage layout, utility locations, TCP concept plans, SWM, etc.).

3.05.20.2.2 Final Plans and Specifications

The Design-Build Team will be required to submit Final Plans and Specifications when the portions of the design are 100 percent complete. The Design-Build Team shall post plans and specifications to Project Wise and provide an email to the Administrations Project Manager that defines the link to where the plans and specifications reside. The Design-Build Team shall also produce 10 sets of plans and specifications if third party reviews are included. One set of reproducible plans shall also be submitted.

This review will verify that all comments from semi-final review have been addressed and may include additional comments on the plans, and/or specifications due to the Design-Build Team's subsequent design submittals.

3.05.20.3 Structural Review Process

All structure plans for structures, including culverts (those meeting MD SHA criteria for small structure) and retaining walls shall follow the process outlined in TC-3.11.

3.05.21 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.

3.05.22 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 prosecution of the Work. This includes approvals for on-or off-site staging, stockpiling areas, disposal sites and borrow pits.

The Design-Build Team cannot alter the concept activities in such a manner that increases or creates new wetland, buffer, waterway, floodplain impacts compared to those impacts which were authorized by the original permit, without obtaining all required permits or modifications from the appropriate regulatory agencies. If the Design-Build team determines that wetlands, buffers, or floodplains will be impacted, the Design-Build team shall be responsible to obtain the permits from MDE and USACE. The Design-Build Team 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. The Design-Build Team shall also be responsible for designing, implementing, and monitoring any mitigation which may be required due to the additional wetlands, buffers, or floodplain impacts proposed by the Design-Builder. It is not the responsibility of, nor guaranteed by, the Administration that approval or authorization will be granted by the regulatory agencies.

If the Design-Build Team proposes any impacts to trees that are outside the current LOD or are in excess of the impacts in the approved Reforestation Permit, 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. 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.

A. The Administration will provide, either as part of the original advertised RFP or by Addendum, the following permits and approvals based on the proposed activities:

- 1) Nontidal Wetlands & Waterways Permit (from MDE and USACE)
- 2) Natural Resources Reforestation Permit (from DNR)

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

- 1) Erosion and Sediment Control Approval (from MDE)
- 2) Stormwater Management Permit (from MDE)
- 3) NPDES Construction Activity Permit (MDE)
- 4) 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.

3.05.23 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.

3.05.24 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 said Statement 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 technical proposal. The format for replacement staff must be the same format as required for the technical proposal 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.

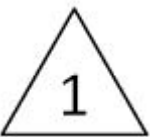
3.05.25 Conformance with Contract and Proposal

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.

3.05.26 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 Design-Build Team 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 SHA 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 structures shall be reviewed in accordance with *SHA OBD PPM No. OP-82-34 (G), Checking of Working Drawings, Form Plans and/or Erection Plans*. The primary review shall be undertaken by the Design-Build Team. A secondary review shall be undertaken by SHA. Once reviewed and approved by SHA, the structural shop drawings shall be stamped as approved and returned to the Design-Build teams 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 during QA-QC of such approved shop drawings 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 Engineer, attesting to their review and approval by the Design-Build Engineer. This work is to be done under the supervision of and shall be the responsibility of a Maryland Registered Professional Engineer.

3.05.27 Conformance with Approved Plans and Specifications

3.05.27.1 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.

3.05.27.2 Plan Revisions after Approval of Final Plans and Specifications

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

3.05.27.2.1 Revisions

Redesigns after Final Plans and Specifications approval shall be superimposed on the original project plans in red. Old design details, dimensions and notes shall not be erased, but X'd out in red. The date that the revision was made shall be indicated in the title block of each revised plan sheet. Revisions require prior approval of the Division that is affected by the change and finally the Administration's Director, Office of Highway Development.

Any revisions to the structural drawings must be submitted in writing to the Administration's Director, Office of Structures and approved prior to proceeding with any change to the approved structural drawings. All changes must be documented as Red Line Revisions in accordance with *SHA OBD PPM No. P-75-6(4), Revisions to Advertised Plans*. The Design-Build team is responsible for preparation of all Red Line Revisions. All Red Line Revisions shall be reviewed and approved by SHA prior to implementing any changes to the contract documents.

3.05.27.2.2 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 CAD 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 3.05.16.3.

3.05.27.2.3 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: PG7585184.1001.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.

3.05.27.2.4 Traffic Control Plans

Any deviations from the approved traffic control plans, details or concepts must have prior approval of the Administration's Assistant District Engineer, Traffic.

3.05.27.2.5 Permits

The Design-Build Team shall obtain approvals from the appropriate regulatory

agencies for any changes in design and/or construction activities that affect any permit conditions.

3.05.28 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, Prince George's 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.

It is anticipated that PEPCO, Comcast, Washington Gas and Verizon will relocate their underground and overhead facilities prior to and during the construction operations. See the Section 3.15 – Utility Design and Relocation Criteria of this RFP for the appropriate contacts for each Utility Company.

3.05.29 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, as well as with local groups including the MD 4 Community Task Force. This program shall meet the requirements outlined in TC 3.21, 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 TC Section 3.21, Public Outreach Performance Specification, for all the requirements.

3.05.29.1 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.

3.05.29.2 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.

TC 3.06 ADMINISTRATION SERVICES

The Administration will provide the following services:

3.06.01 General Administration Services

- 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.
- Provide erosion and sediment control standard sheets, traffic design standard details, Maintenance of Traffic (MOT) standard plates, etc.
- Schedule and coordinate all milestone meetings for this project.
- Provide accident statistics and other traffic data Average Daily Traffic (ADT), Design Hourly Volume (DHV), percentage of trucks, etc.
- Provide review of all redesign and revisions.
- Provide overall management and liaison services related to project phases.
- Coordinate times and places of all of the Design-Build Team's community and public meetings.
- Review and approve design concepts, plans, contract drawings, documents and estimates.
- Provide existing Right-of-Way plats and/or Right-of-Entry agreements.
- Acquire Right-of-Way for roadway construction as determined by the Administrations design concept plans.

3.06.02 Traffic Services

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

- A review of signing, signal, pavement marking and lighting plans.

- Design charts for ground mounted sign supports and foundations.
- Copies of existing standard sheets; however, these may require some revisions by the Design-Build Team.
- Engineering standards, design criteria, and copies of the past design projects for use as examples or guides.
- Functional operation and requirements for the traffic signals.
- When the Design-Build Team proposes any item that differs in any way from the Administration's Standards, OOTS will review those shop drawings for signs, foundation details for sign structures, fabrication drawings for sign structures, and catalog cuts for electrical items.
- Handwritten Structure Design Sheets.
- 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.
- 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.

3.06.03 Structural Services

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

- A review of all plans, reports, calculations, shop drawings etc. related to the structures on this project.
- Respond to all Requests for Information on the structures during the design and/or construction.
- Copies of existing standard sheets; however, these may require some revisions by the Design-Build Team and/or SHA.
- Engineering standards, design criteria, and copies of the past design projects for use as examples or guides.

3.06.04 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.

3.06.05 Conduct Pre-Construction Conference

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

3.06.05.1 Preconstruction Conference Attendees

- A responsible officer of the Design-Build Team;
- The Project Manager;
- The SHA Construction Project Engineer;
- The SHA Highway Design Engineer;
- Public Affairs Representative;
- Maryland DNR and SHA Landscape Operations representative;
- SHA Landscape Architecture representative;
- A responsible officer of any major subcontractors.
- The Environmental Monitor and SHA Environmental Programs Division representative.
- SHA Highway Hydraulics Division representative
- SHA Office of Structures representative

3.06.05.2 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 protection 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 TCD's.

3.06.06 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 weekly. 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.

3.06.06.1 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.

3.06.06.2 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.

3.06.07 Permits

As part of this RFP, the Administration is providing the permits and approvals based on the proposed activities. See Section 3.05.22, Environmental Permits, for a list of the permits that have been obtained by the Administration.

TC 3.07 DELIVERABLES

Deliverables will be produced in both the design and construction phases. They include construction documents, reports, an engineer's office, public relations materials, design

exceptions and property owner information.

3.07.01 Plans

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

- Title Sheet
- Index of Drawings
- Typical Sections
- Superelevation Charts
- Paving Details
- Geometry and Coordinates
- Roadway Plans
- Roadway Profiles
- Traffic Control Plans
- Traffic Signal Plans
- Structure Plans (if applicable)
- Storm Drain Profiles and Structure Schedules
- Drainage Details, including ditch type/linings, outfall protection, and non-standard structures
- Erosion and Sediment Control Plans and Details
- Signing and Pavement Marking Plans
- Stormwater Management Plans and Details
- Cross Sections
- Landscape/Reforestation/SWM Planting Plans
- Lighting Plans
- Utility Relocation Plans

3.07.01.1 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.

3.07.01.2 Refinements to Contract Documents

The Design-Build Team shall develop refinements to the contract documents within the parameters of the proposed cost that better achieve the project goals. This includes Semi Final and Final Design plans, Final SWM Report, Drainage Calculations and Contract Documents based on refinements and revisions to the Administration-furnished Contract Documents. The Design-Build Team may modify the files provided by the Administration, or start from new, blank files. In some cases, the Design-Build Team will have to start from new, blank files and redraft everything required for the permit.

3.07.01.3 Contract Plans and Specifications

The Design-Build Team shall provide contract plans and any required specifications, in accordance with "Volume II" 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.

3.07.01.4 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 V8 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.

3.07.01.5 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. = 50 ft. horizontal and 1 in. = 5 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 3.05.16.3). 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.

3.07.01.6 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 MDE 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.

3.07.01.7 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 shall be submitted for final review, and 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, and shall be approved by and coordinated with the District 3 Traffic Office of the State Highway Administration.

3.07.01.8 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).

3.07.01.9 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, e.g. 8 in. Sanitary, 4 in. H.P. Gas, 200 K.V. Transmission, etc. This map is to be kept current with 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.

3.07.01.10 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"=50'. 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 foot of radius per inch of DBH (Diameter at Breast Height), for trees 30 inches DBH or less; and 1.5 feet of radius per inch of DBH for trees greater than 30 inches DBH
- 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.

3.07.02 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 wall, 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 .2 in. horizontal and .2 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.

3.07.03 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.

3.07.03.1 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 Administration. During the review and approval process, the report can be submitted in phases.

3.07.03.1.1 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 an 8½ x 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 pages and pages to be added, replaced or removed shall be designated. Revisions shall be 3-hole punched for easy placement in the reports.
- 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.

3.07.03.1.2 SWM Report Contents

The SWM report shall contain the following:

- 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.
- 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.

3.07.03.2 Surface Drainage Report

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.

3.07.03.2.1 Surface Drainage Report Format

- All the pages within the report shall be numbered and dated.

- The report shall be placed in an 8½ x 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.
- 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.

3.07.03.2.2 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, spacing, capacity, spread, 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.
- 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.

3.07.03.3 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 (3.07.03.1.1).

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.
- Identification of and placement of controls in sensitive areas.

3.07.03.4 Final Geotechnical Reports

The Design-Builder shall prepare Final Geotechnical Reports for individual Project elements or groups of Project elements consistent with the Geotechnical Planning Reports and the Interim Design Memoranda 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 Interim Design Memorandum;
- C. Locations 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. A description 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 results checked and initialed by a Professional Engineer licensed in the State of Maryland;
- K. Conclusions and recommendations for foundation types for structures, embankments, cut slopes, retaining walls, ground improvement, requirements for backfill materials;
- L. Groundwater problems encountered, means of dewatering and/or other solutions;
- M. Designs for support of excavation;
- N. Results of instrumentation and monitoring and post-construction monitoring summaries;
- O. Potential settlement problems; and
- P. Potential stability problems and analysis results;
- 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.

For each of the following Project elements, the Design-Builder shall submit the following items with the Final Geotechnical Reports.

S) Embankments

- 1) The results of the slope stability analyses, including external loading from live and seismic loading, the recommended side-slopes of all embankments and the search limits and the most critical failure surface should be highlighted; input and output files should be included.
- 2) The results of settlement analyses, including predictions of the magnitude and duration of primary, secondary, and post-construction settlements;
- 3) The results of the liquefaction analyses and the proposed methods of mitigation for any location deemed necessary to protect the integrity of bridges and adjacent walls;
- 4) The proposed method(s) of protecting and abandoning utilities.

T) Cut Slopes

- 1) The results of the slope stability analyses, including external loading from live and seismic loading, and the recommended side-slopes of all cuts;
- 2) Evaluation of rock cut slopes shall clearly describe the rock bedding characteristics, including strike and dip and a detailed description of the analysis completed to assure stability. Software and references used shall be from industry accepted sources, preferably Government Agencies such as the FHWA or the Army Corps of Engineers.

U) Instrumentation

- 1) All items included in TC 3.14.04.06.01 "Geotechnical Instrumentation".

3.07.03.5 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.

3.07.04 Engineers Office

The Design-Build Team shall supply one (1) Engineer's Office Type C, 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 one (1) digital camera, two (2) cellular phones, and one (1) desktop computer system, as is 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.

The Design-Build Team shall provide the Protection Vehicle, as is described in the special provision in this RFP.

TC 3.09 ROADWAY PERFORMANCE SPECIFICATION

3.09.01 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.

3.09.02 Guidelines and References

3.09.02.01 Guidelines

Roadway design and construction shall be in accordance with this specification and requirements of the following Guidelines unless otherwise stipulated in this specification. Guidelines and References specifically cited in the body of this specification establish requirements that shall have precedence over all others. 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. Unless noted below, the most recent version as of the date of issuance of this RFP for each Guideline shall apply.

Table 1
Guidelines for Roadway

Author or Agency	Title
SHA	Accessibility Policy & Guidelines for Pedestrian Facilities along State Highways - 2010
AASHTO	A Policy on Geometric Design of Highways and Streets, 2001
AASHTO	Roadside Design Guide
SHA	2011 Maryland Manual on Uniform Traffic Control Devices (MD MUTCD) – 2011 Edition
FHWA	Manual on Uniform Traffic Control Devices 2009 (MUTCD)
SHA	Bicycle Policy & Design Guidelines - 2013
AASHTO	Guide for the Development of Bicycle Facilities,

Table 1
Guidelines for Roadway

Author or Agency	Title
	2012
SHA	Highway Design Policy and Procedure Manual
ADA	Americans with Disabilities Act Accessibility Guidelines
SHA	Standard Specifications for Construction Materials
SHA	Book of Standards Highway and Incidental Structures
SHA	Guidelines for Traffic Barrier Placement and End Treatment Design, dated March 2006
WMATA	Guidelines for the Design and Placement of Transit Stops, 2009
TRB	TCRP Report 19 – Guidelines for the Location and Design of Bus Stops

3.09.03 Performance Requirements

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

- A. Meet or exceed all Maryland Department of Transportation State Highway Administration, AASHTO and other roadway design and safety guidelines as referenced above, outlined in the Contract Documents, and in accordance with sound engineering principles.
- B. Accommodate traffic volumes and levels of service as outlined in Traffic Performance Specification.
- C. All Roadway components shall be constructed within the defined right of way and easements.

3.09.04 Design and Construction Criteria

The Design-Builder shall design and construct all roadway geometries 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 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 some elements that require modification to meet the requirements of this Performance Specification. The Design-Builder shall verify all information prior to use to ensure compliance with the requirements of this Performance Specification.

3.09.04.01 Design Criteria

MD 4 Mainline Criteria	
Design Speed	45 mph
Posted Speed	45 mph
Functional Classification	Other Principal Arterial
Terrain	Rolling
Minimum length of Horizontal Curve	Per AASHTO
Normal Cross Slope – Per AASHTO	2%
Maximum Superelevation	6%
Maximum Grade	4%
Minimum Grade	0.5%
Superelevation Transition Design	Per AASHTO Method 5

MD 458 Roadway Criteria	
Design Speed	40 mph
Functional Classification	Other Principal Arterial
Posted Speed	35 mph
Terrain	Rolling
Normal Cross Slope – Per AASHTO	2%
Maximum Superelevation	6%
Maximum Grade	4%
Minimum Grade	0.5%
Superelevation Transition Design	Per AASHTO Method 5

County Roadway Criteria	
Design Speed	40 mph
Functional Classification	Minor Collector/Local
Posted Speed	25 to 35 mph
Terrain	Rolling
Normal Cross Slope – Per AASHTO	2%
Maximum Superelevation	6%
Maximum Grade	6%
Minimum Grade	0.5%
Superelevation Transition Design	Per AASHTO Method 5

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

3.09.05 Typical Section

Typical Section elements including number of lanes, lane widths, and shoulders shall be in accordance with the following criteria:

Typical Section Vehicular Lanes								
Station*			Northbound			Southbound		
Begin	End		Right Turn/ Accel Lanes	Thru Lanes	Left Turn Lanes	Left Turn Lanes	Thru Lanes	Right Turn/ Accel Lanes
22+75	32+66	No. of Lanes	1	2	3	0	2	1
		Width of Each Lane	11'	11'	11'	N/A	11'	11'
32+66 50+89 87+60	34+96 76+92 93+29	No. of Lanes	0	2	0	0	2	0
		Width of Each Lane	N/A	11'	N/A	N/A	11'	N/A
34+96 76+92	39+20 81+80	No. of Lanes	1	2	0	1	2	1
		Width of Each Lane	11'	11'	N/A	11'	11'	11'
39+20	50+89	No. of Lanes	1	2	1	0	2	1
		Width of Each Lane	11'	11'	11'	N/A	11'	11'
81+80	87+60	No. of Lanes	1	2	2	0	2	1
		Width of Each Lane	11'	11'	11'	N/A	11'	11'
93+29	102+09	No. of Lanes	1	2	0	2	2	1
		Width of Each Lane	11'	11'	N/A	11'	11'	11'
102+09	108+16	No. of Lanes	1	2	1	0	3	0
		Width of Each Lane	11'	11'	11'	N/A	11'	N/A
108+16	126+79	No. of Lanes	0	2	0	0	3	0

Typical Section Vehicular Lanes								
Station*			Northbound			Southbound		
Begin	End		Right Turn/ Accel Lanes	Thru Lanes	Left Turn Lanes	Left Turn Lanes	Thru Lanes	Right Turn/ Accel Lanes
		Width of Each Lane	N/A	11'	N/A	N/A	11'	N/A
126+79	134+00	No. of Lanes	1	2	0	1	3	1
		Width of Each Lane	11'	11'	N/A	11'	11'	11'

*Station limits follow the baseline stationing shown on the Concept Plans.

Minimum width 8' outside shoulders shall be provided throughout the project limits where right turn lanes or acceleration lanes are not provided. A 34' minimum width median shall be provided. A 45' minimum width median shall be provided adjacent to the triple left-turn lanes on northbound MD 4 approaching MD 458. A minimum 2' paved inside shoulder shall be provided adjacent to open section medians.

Any proposed modifications to these typical sections shall be consistent with requirements outlined in these Performance Specifications and Project commitments. Modifications to typical sections shall be subject to approval by the Administration and may require approval by additionally affected agencies, including Prince George's County.



The Design-Builder shall design and construct smooth transitions to tie into the existing roadways at the limit of road work. At a minimum, the limits of resurfacing as required in TC 3.10 shall extend to the termination of the curb radii along each intersecting cross street. At the intersections of MD 4 with Forestville Road and MD 458, the minimum limits of resurfacing along MD 4 shall extend through the entire intersection to the termination of the curb radii on each leg of the intersection.

3.09.06 Cross Street Improvements

The Plans include improvements to local owned roadway crossings with MD 4. The general extent and limits of these improvements are shown in the Concept Plans. Cross streets shall be constructed to the full cross street typical section within the required limits of work based on the required horizontal and vertical changes. Cross streets shall match the existing typical section.

3.09.07 Design Vehicle

The design vehicle for turning movements shall accommodate the WB-67 vehicle at the MD 458 (Silver Hill Road), Donnell Drive and Forestville Road intersections. All other intersections shall be designed for the WB-50 design vehicle.

3.09.08 Roadside Barriers

Use of any type of roadside barrier shall be minimized to the extent practicable in favor of a clear zone graded typical section.

3.09.08.01 Traffic Barrier W-Beam

Where a roadside barrier is warranted by AASHTO or other Guidelines, traffic barrier W-beam shall be used. Existing roadside traffic barrier and end-treatments within the project limits shall be replaced if not compliant with current standards or if warranted based on the proposed design.

Only galvanized steel traffic barrier W-beam shall be used for all areas.

The number and type of end treatments shall be minimized to the extent practical. Permanent Sand Filled Barrels will not be allowed. Traffic barrier end treatments shall match the finish of the adjacent W-beam traffic barrier.

3.09.08.02 Median Traffic Barrier

Median barrier shall be placed throughout the project limits. Only traffic barrier w-beam median barrier or cable barrier systems may be used on this project. Proposed cable barrier systems shall be designed and installed per the manufacturer's specifications and in accordance with the following guidelines:



- Line post spacing shall be a minimum of 6'6" and a maximum of 20'.
- Where feasible, cable barrier shall be installed a minimum of 8' offset from the ditch bottom. Cable barrier shall not be installed within a range of 1' to 8' from the ditch bottom. Cable barrier may be installed between 0' and 1' from the ditch bottom only if it cannot be installed a minimum of 8' offset from the ditch bottom.
- High tension cable barriers shall not cross a median flow line unless the median slope is 10:1 or flatter.
- Cable barrier should be installed a minimum of 10' from the edge of travelway.
- Cable barrier should not be placed more than 4' horizontally from the top of slope.
- Cable barrier shall not be placed on slopes steeper than 4:1.
- Maximum run length between end anchors should not exceed 10,000'.
- Cable barrier should continue 50' beyond hazard before connecting to the end anchor
- Cable barrier shall not be connected to rigid barriers.
- Where cable barrier and traffic barrier w-beam are installed adjacent to each other, cable barrier shall be tapered to within 3' of the backside of traffic barrier w-beam.

Existing median barrier and end-treatments within the project limits shall be replaced if not compliant with current standards or if warranted based on the proposed design.

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

3.09.08.03 Single Face Concrete Traffic Barrier

Proposed use of single face concrete barrier will be subject to Administration approval and is generally to be avoided. Flaring of the barrier such that it reduces the width of the roadway including shoulder will not be permitted. Concrete barrier shall be 42" F-shape and shall include two 3" diameter PVC conduits.

3.09.08.04 Curb

Type 'A' combination curb and gutter shall be placed along the outside shoulders on MD 4. Curb and gutter shall be constructed of concrete. Asphalt curb will not be allowed.

3.09.09 Bicycle and Pedestrian Facilities



A shared-use path shall be provided along the north side of MD 4 and a sidewalk along the south side of MD 4 for the full project limits. Accessible connections shall be provided to access any existing bicycle or pedestrian facility within the public right-of-way that is to remain under proposed conditions. A minimum 5' grass buffer shall be provided between the back of curb and sidewalk where feasible within existing conditions and physical constraints. Where a 5' buffer cannot be attained, the grass buffer shall be reduced to no less than 3' between the back of curb and sidewalk. Where a minimum 3' grass buffer cannot be provided, either a hardscape buffer shall be provided or the facility placed adjacent to the curb.

buffer shall be reduced to no less than 3' between the back of curb and sidewalk. Where a minimum 3' grass buffer cannot be provided, either a hardscape buffer shall be provided or the facility placed adjacent to the curb.

The width of all curb ramps shall be the full width of the path or sidewalk approaching. Where feasible, curb ramps should not be within the travel way. When curb ramps must be placed within the travel way, the minimum possible rise shall be placed within the travel way. When any one leg of an intersection is impacted by the project, all legs of the intersection shall be upgraded for ADA compliance.

Continuous bicycle lanes, through the marking of shoulders and the provision of pocket bicycle lanes adjacent to right turn lanes and acceleration lanes, with the appropriate signing and marking, shall be placed throughout the project limits. Shoulder widths shall meet the requirements in TC 3.09.05 and pocket lane widths shall be a minimum of 5'.

3.09.10 Noise Walls

Not applicable.

3.09.11 Access to SWM facilities

Maintenance vehicle access shall be provided to SWM and other facilities in accordance with Planting and Landscape Architecture and Drainage Performance Specifications.

3.09.12 Planned Projects

The MD 4/Suitland Parkway Interchange Construction (PG6185170 and PG6185370) project and the MD 458 (Silver Hill Road) from MD 5 (Branch Ave.) to Walker Mill Road - Safety and Resurfacing (PG7865777) project will be under construction concurrently with this project. The Design Builder shall coordinate their efforts with these projects.

3.09.13 Construction Stakeout

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

3.09.14 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 with privacy slats. The fence shall be reset or replaced on the same day it is taken down. Once construction is complete, the existing fence which has been removed shall be reset or replaced by the Design-Builder. Any existing fence that is 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, including those who have animals on the property.

3.09.15 Airport Safety Certification

The MD 4 from Forestville Road to MD 458 project is located in the vicinity of the Joint Base Andrews. An Airport Safety Certification may be required if a project is within 20,000 feet of an airport or seaplane base, or within 5,000 feet of a heliport. These certifications ensure compliance with Federal Aviation Administration (FAA) guidelines for air navigation safety outlined in 14 CFR Part 77.

The Administration has reviewed the Concept Plans and found that no coordination is needed with FAA for this project provided the Design Builder does not violate any of the provisions of 14 CFR Part 77. If at any time the project meets any of the criteria of 14 CFR Part 77 that would require approval from FAA or Joint Base Andrews, the Design-Builder shall be responsible for notification to, and all subsequent coordination with the Administration, Joint Base Andrews and FAA to obtain the required approvals.

3.09.16 Transit Stops

Washington Area Metropolitan Transit Authority (WMATA) and Prince George's County Department of Public Works and Transportation (DPW&T) maintain existing bus transit routes within the project limits. The following existing WMATA Metrobus bus stops are located within the project limits:

- A. MD 4 (Northbound) approximately 200' south of Donnell Drive
- B. MD 4 (Southbound) approximately 200' north of Donnell Drive
- C. MD 4 (Northbound) approximately 200' north of Parkland Drive
- D. MD 4 (Southbound) approximately 350' north of Parkland Drive

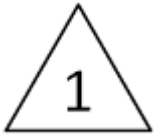
The following existing bus stops serve both WMATA Metrobus and Prince George's County The Bus bus routes:

- E. MD 4 (Northbound) approximately 600' north of Forestville Road
- F. MD 4 (Southbound) approximately 800' north of Forestville Road

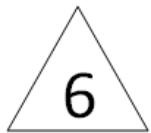
Prince George's County DPW&T will discontinue service to existing bus stops E and F, as defined in the list above, prior to or during construction of this project.

3.09.16.01 Relocation of Transit Stops

3.09.16.01 Relocation of Transit Stops



The Design-Builder is responsible for providing the necessary infrastructure for the proposed bus stops including a sidewalk connection pad connecting the proposed sidewalk to the back of curb at the location of the bus stop. The sidewalk connection pad shall be constructed of the same material as the adjacent proposed sidewalk or shared-use path and shall be a minimum of 5' wide and shall extend a minimum of 8' behind the back of proposed curb. Necessary infrastructure for proposed bus stops may also include placement of an in-road Portland Cement Concrete Bus Stop Pad at the location of the bus stop per the requirements in TC 3.10.06.04.01.02. The width of proposed Portland Cement Concrete Bus Stop Pads shall equal the width of the lane in which the bus is stopping. The length of proposed Portland Cement Concrete Bus Stop Pads should be sufficient to accommodate the anticipated length of the bus that will use the bus stop. The Design-Builder shall replace-in-kind any existing bus shelter pads and connecting sidewalk to those pads that are impacted by the proposed improvements. The Design-Builder shall not remove, relocate, or replace any existing signs, sign poles, flags, shelters, benches, or any other transit infrastructure owned by the transit agency. The Design-Builder shall contact the responsible transit agency to coordinate the relocation of existing signs, sign poles, flags, bus shelters, benches, or any other transit infrastructure owned by the transit agency. The existing bus stops shall be relocated per the criteria below:



Existing bus stop D shall remain on the near side of the Parkland Drive intersection and shall be relocated as close to Parkland Drive as is feasible. No part of the bus stop zone shall be located on the curve radius. Buses departing bus stop D turn right onto Parkland Drive.

Existing bus stop E shall remain on the far side of the Forestville Road intersection and shall be relocated as close to Forestville Road as is feasible. Buses turn left from northbound Forestville Road onto northbound MD 4. The proposed location of bus stop E shall allow sufficient space for busses approaching and departing the bus stop to safely navigate into and out of the acceleration lane on northbound MD 4 at Forestville Road.

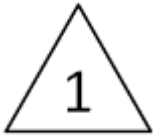
Existing bus stop F shall remain on the near side of the Forestville Road intersection and shall be relocated as close to Forestville Road as is feasible. No part of the bus stop zone shall be located on the curve radius. Buses departing bus stop F turn right onto Forestville Road.

3.09.16.02 Coordination with Transit Agencies

The Design-Builder shall coordinate with WMATA regarding the relocation of existing bus stops during the design and construction of this project. Access to WMATA bus stops shall be maintained during construction per the requirements in TC 3.16 – Maintenance of Traffic Performance Specification. The final location of all WMATA

bus stops shall be coordinated with and approved by WMATA prior to the relocation of bus stops. The WMATA Metrobus contact for this project is listed below:

Mr. Jamie Cepler
 Washington Metropolitan Area Transit Authority
 600 5th Street NW, 7B-11
 Washington, DC 20001
 (202) 962-6085



The Design-Builder shall coordinate with Prince George’s County DPW&T regarding existing bus stops, as necessary. Impacts to existing bus shelters within the project limits shall be coordinated with Prince George’s County DPW&T. Access to The Bus bus stops shall be maintained during construction per the requirements in TC 3.16 – Maintenance of Traffic Performance Specification. The Prince George’s County The Bus contact for this project is listed below:

Mr. Robert Lancaster
 Prince George’s County Department of Public Works and Transportation
 9400 Peppercorn Place
 Suite 300
 Largo, MD 20774
 301-883-5679

3.09.17 Auxiliary Lanes

The minimum required lengths for auxiliary lanes are provided in the table below.

Minimum Auxiliary Lane Lengths						
Intersection with MD 4	Northbound			Southbound		
	Right-Turn	Accel. Lane	Left-Turn	Right-Turn	Accel. Lane	Left-Turn
MD 458	160'	N/A	650'	N/A	440'	N/A
Parkland Drive	945'	160'	270'	200'	235'	240'
Walters Lane	230'	240'	300'	275'	260'	310'
Donnell Drive	340'	260'	440'	315'	N/A	600'
Forestville Road	N/A	255'	N/A	520'	N/A	500'



TC 3.10 PAVEMENT PERFORMANCE SPECIFICATION

3.10.01 General

The Administration has provided pavement sections for various Roadway Elements in TC Section 3.10.06 of this RFP. The Design-Builder may utilize these pavement sections in accordance with TC Section 3.10.02 below.

If the Design-Builder utilizes only the Pavement Sections provided in TC 3.10.06 in accordance with TC Section 3.10.02, the Design-Builder shall use patching quantities noted in TC 3.10.06 in the determination of their Price Proposal for this project. This quantity refers to roadway patching only and does not account for any patching necessary for installation of pipe culverts or utilities. It is the responsibility of the Design-Builder to identify specific patch locations.

The Design-Builder may elect to design one or more alternate pavement sections, in accordance with TC 3.10.03, in lieu of utilizing the pavement sections in TC Section 3.10.06. 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 TC Section 3.10.06. The design and construction of alternate pavement sections shall be at no additional cost to the Administration.

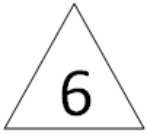
The Design-Builder shall develop pavement sections for any Roadway element that is needed but not outlined in TC Section 3.10.06 of this RFP. The Design-Builder shall develop these pavement sections in accordance with TC 3.10.03.

If the Design-Builder elects to design one or more alternate pavement sections in accordance with TC 3.10.03, in lieu of utilizing the pavement sections in TC Section 3.10.06, it is then the responsibility of the Design-Builder to determine patching quantities in the determination of their Price Proposal and assume all risks associated.

3.10.01.01 Guidelines and References

Design and construction of all pavements shall be in accordance with this Pavement Performance Specification and the relevant requirements of the following Guidelines and References. Guidelines and References specifically cited in the body of this Pavement Performance Specification establish requirements that shall have precedence over all others. Should the requirements in any Guideline conflict with those in another, the Guideline listed with highest priority in Table 1 shall govern unless otherwise stipulated in this specification.

Listed under References are reports and resources that the Design-Builder may use to address the pavement design requirements as the Design-Builder sees fit. It is the Design-Builder's responsibility to obtain clarification for any unresolved ambiguity prior to proceeding with any



design and construction.

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TABLE 1
GUIDELINES FOR PAVEMENT

Priority	Author or Agency	Title
1	SHA	2014 Pavement Design Guide
2	AASHTO	1993 Guide for Design of Pavement Structures
3	SHA	2008 Standard Specifications for Construction and Materials
4	SHA	Book of Standards Highway and Incidental Structures
5	ASTM	D 6433-Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys
6	ASTM	D 4694-Standard Test Method for Deflections with a Falling-Weight Type Impulse Load
7	ASTM	E -274 Standard Test Method for Skid Resistance of Paved Surfaces Using a Full-Scale Tire
8	ASTM	E 501-Specification for Standard Rib Tire for Pavement Skid-Resistance Tests
9	AASHTO	M320 - Performance-Graded Asphalt Binder
10	AASHTO	M323 - Superpave Volumetric Mix Design
11	AASHTO	R25 - Superpave Volumetric Design for Hot-Mix Asphalt
12	AASHTO	M 288 – Geotextile Specification for Highway Applications
13	ASTM	E 950 - Test Method for Measuring the Longitudinal Profile of Traveled Surfaces within an Accelerometer Established Inertial Profiling Reference
14	County	County Roadway Standards

Use the references listed in Table 2 as supplementary guidelines for the design and construction of the Pavement. These publications have no established order of precedence.

TABLE 2
REFERENCES FOR ROADWAY

Author or Agency	Title
AASHTO	DARWin Pavement Design Software
SHA	MSMT 563 – Operation of the Inertial Profiler
SHA	Book of Standards Highway and Incidental Structures
FHWA	FHWA-RD-03-031 June 2003-Distress Identification Manual for the Long-Term Pavement Performance Program

3.10.02 Use of Pavement Sections Provided by SHA

3.10.02.01 General

The Design-Builder may use the pavement sections provided in Section 3.10.06.

3.10.02.02 Submittals

If the Design-Builder uses only the pavement sections provided in Section 3.10.06, the Design-Builder is required to submit the following, subject to review and approval as per Section 3.07:

- (1) An Interim Pavement Report. This report shall state that the provided pavement sections will be used. If not all pavement sections provided in Section 3.10.06 are used, the report shall state for which Roadway Elements the provided pavement sections will and will not be used. Refer to Section 3.10.03 for submittal requirements if using pavement sections developed by the Design-Builder. This Interim Pavement Report may be submitted separately from those submitted under Section 3.10.03.
- (2) The results of all provided soil borings and pavement cores shown in TC 3.10.06 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.

3.10.03 Use of Pavement Sections Developed by the Design-Builder

3.10.03.01 General

The Design-Builder may elect to design one or more alternate pavement sections in lieu of utilizing the pavement sections in TC Section 3.10.06. 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 determined by the Administration, at its sole discretion, to be equal to or better than the sections provided in TC Section 3.10.06. 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 TC Section 3.10.06 of this RFP. The Design-Builder shall develop these pavement sections in accordance with TC 3.10.03.

If a Roadway Element is not specifically identified in TC Section 3.10.06 to be mainline/shoulder/ramp 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 Section 3.10.06. Ramp sections end at the gore, unless otherwise provided in Section 3.10.06. All new shoulders shall use the design traffic from the adjacent Roadway Element. 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.

3.10.03.02 Requirements

3.10.03.02.01 Pavement Engineering

The Design-Builder shall be responsible for all pavement engineering for Roadway Elements for which Section 3.10.03.01 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.

3.10.03.02.02 Pavement Investigation

3.10.03.02.02.01 Preliminary Pavement Investigation

Any preliminary pavement investigation performed by the Administration is contained in Section 3.10.06. 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.

3.10.03.02.02.02 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.

3.10.03.02.03 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 Section 3.10.06. The Design-Builder shall maintain a consistent pavement type throughout each Roadway Element.

3.10.03.02.04 Pavement and Subgrade Materials

All materials used on the Project shall meet or exceed the requirements established in the documents noted in Section 3.10.03.02 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.

3.10.03.02.04.01 Drainable Granular Pavement Base Materials

Materials containing any Recycled Concrete Aggregate (RCA) and 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.

3.10.03.02.04.02 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 2008 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.

3.10.03.02.04.03 Restricted Materials

The following materials shall not be used on the Project:

- A) Rubber asphalt in hot mix asphalt materials;
- B) Bottom ash; and
- C) Slag, with the exception of blast furnace slag cement.

3.10.03.02.04.04 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.

3.10.03.02.05 Pavement Analysis and Design

The Design-Builder shall design pavement sections in accordance with the requirements set forth in the "1993 AASHTO Guide for Design of Pavement Structures" (1993 AASHTO), the "SHA Pavement Design Guide", and with the criteria in Section 3.10.06.

The Design-Builder may elect to use either flexible or rigid pavement sections, unless otherwise restricted in 3.10.06. 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.

If a flexible pavement is selected by the Design Builder, the pavement shall be constructed with hot mix asphalt layers developed using the Superpave mix design criteria. No flexible/rigid combination pavement (composite) shall be constructed for the Project, except for 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.

3.10.03.02.05.01 Traffic

Refer to Section 3.10.06 for all traffic data to be used for pavement design purposes.

3.10.03.02.05.02 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 Section 3.10.06. The Design-Builder shall design all pavements with the following design requirements:

- A) The pavement design standards provided in Section VII of the SHA Pavement Design Guide may be used for the specific roadway facilities that are identified in Section VII;
- B) The minimum, maximum and preferred lift thickness for all pavement layers are specified in the "SHA Pavement Design Guide" in Sections VI.B.1.3 and X.C.;
- C) The layer coefficients utilized in the Design-Builder's pavement sections shall be the "Desired Structural Coefficient" as specified in the "SHA Pavement Design Guide" in Section X.C.; and
- D) No structural coefficient or pavement layer moduli improvement or structural

benefit shall be considered through the incorporation of geosynthetic materials in the pavement structure.

3.10.03.02.05.02.01 New Flexible Pavement Design Criteria

The Design-Builder shall design and construct all flexible pavement sections with hot mix asphalt 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, $M_r = 10,500$ psi;
- 2) Cement Modified Subgrade, $M_r = 10,500$ psi;
- 3) Graded aggregate base, $M_r = 15,000$ psi;
- 4) Soil Cement Base Course, $M_r = 400,000$ psi;
- 5) Any bound pavement layer, $M_r = 40,000$ psi;

3.10.03.02.05.02.02 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 long-term performance than SHA Mix #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 $\frac{1}{8}$ " 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 Design-Builder to 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.

The maximum resilient modulus (Mr) for various pavement layers used in the rigid pavement design process used for developing the modulus of subgrade reaction (k) shall be as specified below:

- 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 = 15,000 psi;
- 4) Asphalt Treated Base, Mr = 150,000 psi; and
- 5) Soil Cement Base Course, Mr = 400,000 psi.

3.10.03.02.05.02.03 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.

3.10.03.02.05.02.04 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 3.10.06 shall apply for temporary roadways.

3.10.03.02.05.03 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 Section 3.10.06. 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.

All pavement sections shall include, at a minimum, a 4” granular base layer in the pavement section to facilitate pavement drainage, and between the hot mix 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.

3.10.03.02.05.04 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.

3.10.03.02.05.04.01 Design of Subgrade for Pavements

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.

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. 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 or FWD testing 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. Falling-Weight-Deflectometer (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. FWD testing



is only required for design subgrade resilient modulus values greater than 4500psi.

3.10.03.02.05.04.02 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.

3.10.03.03 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 TC Section 3.10.02.

All submittals shall be subject to review and approval as per TC Section 3.07.

3.10.03.03.01 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.

3.10.03.03.02 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 professional engineer, shall supervise all work and also 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 (k).
- 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.

3.10.04 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.

3.10.04.01 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.

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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 (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 for cases where the required design subgrade modulus is greater than 4500 psi 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.

The FWD test set-up, load packages, test 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	$M_r = \frac{1.5pa}{\Delta_z}$	p = applied load (psi) a = radius of load plate (in) Δ_z = measured deflection (in)

Any FWD test location of a roadway element that does not meet the minimum subgrade strength specified by the Design-Builder at the Top of Subgrade shall be improved to a point that it reaches or exceeds the minimum subgrade strength specified by the Design-Builder. The 100 yd² of prepared subgrade that does not meet or exceed the design strength shall be improved for any failing FWD test point. Improvements shall be made to ensure that the subgrade strength at the Top of Subgrade reaches or exceeds the minimum subgrade strength specified by the Design-Builder. 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.

3.10.04.02 Removal of Pavement Markings

The Administration will allow the Design-Builder to eradicate all existing pavement markings that conflict with the Design-Builder's MOT markings by means of water blasting, sand blasting, covering with black tape, spot grinding, etc. 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. The grinding 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 on final roadway surfaces.

3.10.04.03 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.

3.10.05 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.

3.10.05.01 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.

3.10.05.02 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.

3.10.05.03 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.

3.10.05.04 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.

3.10.06 Project-Specific Data and Criteria

3.10.06.01 General

This section includes geotechnical and pavement data, pavement sections, and criteria for design. This section shall control any conflicts between other TC 3.10 sections and this section.

3.10.06.02 Scope of Work

Based on the Concept Plans provided on ProjectWise, the current scope of the project includes the following items of work:

- Base widening and Shoulder Reconstruction along MD 4.
- Construction of hiker / biker trail.
- Grinding and resurfacing of MD 4.
- Full-depth and partial-depth patching.
- Utility patching.
- Curb and gutter placement.
- Sidewalks.

3.10.06.03 Roadway Elements

The following Roadway Elements have been identified:

1. MD 4. This includes travel lanes and shoulders.
2. Hiker / Biker Trail.

3.10.06.04 Pavement Sections

For each Roadway Element, a Hot Mix Asphalt (HMA) pavement section is being provided.

The Design-Builder may choose to design the pavement for each Roadway Element as per TC 3.10.03. 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 TC 3.10.03.

3.10.06.04.01 Roadway Element 1 – MD 4

3.10.06.04.01.01 Base Widening and Shoulder Reconstruction along MD 4:

Shoulders are not traffic bearing for travel-lane traffic and shall be reconstructed or rehabilitated to make them structurally adequate to support travel-lane traffic. The following minimum HMA pavement section shall be placed for the base widening and shoulder reconstruction of MD 4 within the project limits.

- 2" Gap Graded Stone Matrix Asphalt 12.5 mm, PG 76-22
- 4" Hot Mix Asphalt Superpave 25.0 mm for Base, PG 64-22, Level 2 (One Lift)
- 7" Foamed Asphalt Stabilized Base (One Lift)
- 4" Graded Aggregate Base (One Lift)

3.10.06.04.01.02 Portland Cement Concrete Bus Stop Pad:

If the existing pavement at or near the location of the proposed bus stops exhibits any of the following distresses as defined in the Pavement Design Guide, a Portland Cement Concrete Bus Stop Pad shall be required:

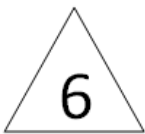
- Medium to high severity Alligator Cracking
- Medium to high severity Rutting
- Medium to high severity Shoving
- Other medium to high severity structural distresses

The following minimum pavement section shall be placed for the Portland Cement Concrete Bus Stop Pads.

- 9" Jointed Plain Portland Cement Concrete Pavement, Mix No. 9
- 6" Graded Aggregate Base Course

Longitudinal and transverse joints for the Jointed Plain Portland Cement Concrete shall have the following design:

1. Maximum transverse joint spacing 15 feet without mid-slab reinforcement.
2. Dowel bars for transverse joints:
 - a. # 10 dowel bars, 18" long, epoxy coated and 12" spaced center to center.
3. Longitudinal tie bars at longitudinal slab/curb joint:



- a. # 4 smooth plain bars, 14" long, epoxy coated and spaced 36" center to center.
- 4. Joints saw cut:
 - a. Single 1/8" saw-cut to a depth of 2" as per Section 520 of the Specifications.
 - b. No joint sealant shall be used.


3.10.06.04.01.03 Patching:

3.10.06.04.01.03.01 Full-Depth Patching:

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.


The following shall be placed if the patching area consists of HMA on top of concrete:

Variable Depth Hot Mix Asphalt Superpave 25.0 mm for Partial-Depth Patching,
PG 64-22, Level 2
Variable Depth Plain Portland Cement Concrete Pavement Type I Repair, Mix No. 9

 It is estimated that 125 SY of Plain Portland Cement Concrete Pavement Type I Repair and 60 tons of Hot Mix Asphalt Superpave 25.0 mm may be required for full-depth patches of composite pavements.

The following shall be placed if the patching area consists of HMA on top of granular base:

Variable Depth Hot Mix Asphalt Superpave 25.0 mm for Full-Depth Patching,
PG 64-22, Level 2

 It is estimated that 130 tons of Hot Mix Asphalt Superpave 25.0 mm may be required for HMA full-depth patches.

If the underlying granular base layer is found to be deteriorated at the time of pavement removal, it should be removed and replaced with minimum 6" Graded Aggregate Base. It is estimated that 10 CY of Graded Aggregate Base may be required for removal and replacement of unsuitable material.

3.10.06.04.01.03.02 Partial-Depth Patching:

Partial-depth patches shall be minimum 5" thick or to the top of the concrete, whichever occurs first. The following shall be placed for partial-depth patches:

Variable Depth Hot Mix Asphalt Superpave 25.0 mm for Partial-Depth Patching,
PG 64-22, Level 2

 It is estimated that a total of 940 tons of Hot Mix Asphalt Superpave 25.0 mm may be required

for HMA partial-depth patches.

3.10.06.04.01.03.03 Utility Patching:

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.

The following shall be placed if the utility patch consists of HMA on top of concrete:

Variable Depth Hot Mix Asphalt Superpave 25.0 mm for Patching, PG 64-22, Level 2
Variable Depth Plain Portland Cement Concrete Pavement Type I Repair, Mix No. 9
6" Graded Aggregate Base

The following shall be placed if the utility patch consists of HMA on top of granular base:

Variable Depth Hot Mix Asphalt Superpave 25.0 mm for Patching, PG 64-22, Level 2
6" Graded Aggregate Base

3.10.06.04.01.04 Grinding:

The pavement surface of MD 4 shall be ground minimum to a depth of 2". The following shall be used for grinding:

0" – 2" Grinding Hot Mix Asphalt Pavement with Carbide Cutting Bits

3.10.06.04.01.05 Wedge/Level:

If wedge/level is needed to make grade or cross slope corrections, use the following material:

For Wedge/Level layers less than 2" thick, use the following:
Hot Mix Asphalt Superpave 9.5 mm for Wedge/Level, PG 64-22, Level 2

For Wedge/Level layers more than 2" thick, use the following:
Hot Mix Asphalt Superpave 19.0 mm for Wedge/Level, PG 64-22, Level 2

3.10.06.04.01.06 Resurfacing:

The following surface layer shall be placed for the resurfacing of MD 4.

2" Gap – Graded Stone Matrix Asphalt 12.5 mm, PG 76-22

3.10.06.04.01.07 Curb and Gutter Placement:

3.10.06.04.01.07.01 Option I:

Excavate maximum 1' wide for the placement of the curb and gutter form. Excavation width is to be filled with a minimum of 4" GAB and variable depth Jointed Plain Portland Cement Concrete Mix No. 3 from the bottom of the standard curb and gutter to 2" below the final HMA surface elevation. Transverse joints shall match those of the curb and gutter. Dowel bars are not necessary.

3.10.06.04.01.07.02 Option II:

Saw-cut the existing pavement and place the new curb and gutter directly against the sawed edge.

3.10.06.04.01.08 Existing Outside Shoulder for Maintenance of Traffic:

The existing outside shoulder can be used for maintenance of traffic (MOT) for no more than one year. If the MOT timeframe exceeds one year, the existing outside shoulder shall be reconstructed or reinforced to make it traffic bearing for the duration of the MOT.

3.10.06.04.02 Roadway Element 2 – Hiker/Biker Trail

The following minimum flexible pavement section shall be placed for the construction of the hiker/biker trail within the project limits.

- 2” Hot Mix Asphalt Superpave 9.5 mm for Surface, PG 64-22, Level 2
- 2” Hot Mix Asphalt Superpave 12.5 mm for Base, PG 64-22, Level 2
- 4” Graded Aggregate Base (One 4” Lift)

3.10.06.05 Traffic Data

The Design-Builder shall use the following traffic data if developing alternate pavement designs for the Roadway Element 1.

	Roadway Element 1 – MD 4	
Year	2013	2033
Average Daily Traffic (ADT)	42,500	51,900
Percent Trucks	5%	5%
Truck Factor – PCC	1.15	1.15
Truck Factor – HMA	0.71	0.71
Directional Distribution	50%	50%
Lane Distribution – Rehabilitation Existing Pavement	90%	90%
Lane Distribution – Left-Side Base-Widening and Shoulder Reconstruction	40%	40%

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.

Roadway Element 2 is standard pavement section. Refer to the MDSA Pavement and Geotechnical Design Guide.

3.10.06.06 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	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	1
Minimum Modulus of Subgrade Reaction (static) *	N/A	228 psi/in
Minimum Resilient Modulus of Subgrade *	4,500 psi	N/A
Maximum Modulus of Subgrade Reaction (static) *	N/A	533 psi/in
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 Section 3.10.03.03.05.04 of the Pavement Performance Specification and is approved by the Office of Materials Technology.

Roadway Element 2 is standard pavement section. Refer to the MDSHA Pavement and Geotechnical Design Guide.

3.10.06.07 Geotechnical Design Criteria

Refer to the Geotechnical Performance Specification (TC 3.14) for Geotechnical Design Criteria.

3.10.06.08 Minimum Pavement Thickness for 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 14 inches. The frost protection pavement depth includes the hot mix asphalt surface or Portland cement concrete layer, the granular and bound pavement base layers, and the granular and bound subgrade improvement layers.

3.10.06.09 Soils Laboratory Test Results and Soil Samples Availability

Soils in jar samples from SPT borings are available for visual inspection and testing upon request. Soil samples from auger borings were discarded after testing and they are not available for visual inspection.

The following soil laboratory testing was performed on selected soil samples recovered from auger cuttings:

- Soil Classification

- Natural moisture content
- Gradation
- Atterberg Limits
- Soil PH
- Modified Proctor
- Resilient Modulus

All lab results are in Projectwise.

3.10.06.10 Boring Logs

Geotechnical information obtained from soil borings is summarized in the profile boring logs located on Projectwise.

3.10.06.10.01 Soil/Pavement Auger Boring Logs

Sixty Five (65) soil borings were drilled on mainlines, shoulders and base widening areas. Bulk samples from some soil borings were obtained from auger cuttings for soil classification and Proctor testing.

All soil boring logs are included in Projectwise.

3.10.06.10.02 SWM-Boring Logs

Twenty Seven (27) Storm Water Management (SWM) borings were drilled. Bulk samples were collected from auger cuttings for soil classification and Proctor testing. Field infiltration testing was performed at some SWM boring locations. Geotechnical information obtained from borings is summarized in the profile boring logs.

All SWM boring logs, profile boring logs and the In-situ Infiltration Log are in Projectwise.

3.10.06.10.03 SPT-Boring Logs

Six (6) Standard Penetration Test (SPT) boring were drilled. Jar samples were collected for soil classification.

SPT boring logs are included in Projectwise.

3.10.06.10.04 Top Soil

Top soil samples for lab testing were taken for development of the Nutrient Management Plan. Top soil lab results and the topography tabulation showing locations of top soil are available in Projectwise.

TC 3.11 STRUCTURAL PERFORMANCE SPECIFICATION

3.11.01 General.

Design and construct all retaining walls in accordance with requirements of this specification and the structure description in the Special Provisions, 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.

The requirements in this specification apply to the design and construction of all temporary and permanent structures, including retaining walls. Retaining walls may be utilized to stay within the existing right of way or to avoid adverse environmental impacts. Efforts should be made to reduce and eliminate the need for retaining walls wherever possible.

3.11.02 Guidelines and References

3.11.02.01 Guidelines

Structural design and construction shall be in accordance with this performance specification and the relevant requirements of the following Guidelines listed in Table 1, unless otherwise stipulated in this specification. Guidelines specifically cited in the body of this performance specification establish requirements that shall have precedence over all others. Should the requirements in any Guideline below conflict with those in another; the Guideline listed with the higher priority shall govern. It shall be the Design-Builder's responsibility to obtain clarification for any unresolved or perceived ambiguity prior to proceeding with design or construction.

Use the most current version of each listed Guideline, including interim revisions, as of the initial publication date of this RFP unless modified by addendum or change order.

Priority	Author or Agency	Title
1	SHA	Office of Structures, Policy and Procedure Manual (PPM)
2	SHA	Office of Structures, Structural Standards Manual, Volumes I and II (www.marylandroads.com)
3	SHA	Special Provisions and Special Provision Inserts to the Standard Specifications
4	SHA	Standard Specifications for Construction and Materials
5	AASHTO	AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications
6	ACI	Building Code Requirements for Structural Concrete, ACI 318
7	AASHTO	D1.5M/D1.5: Bridge Welding Code
8	AASHTO	Standard Specifications for Transportation Materials and Methods of Sampling and Testing

9	AASHTO	Roadside Design Guide
10	AASHTO	A Policy on the Geometric Design of Highways and Streets
11	AASHTO	Manual on Subsurface Investigations
12	FHWA	FHWA Memorandum, Bridge Rails, Dated August 1986 and updated May 1997

3.11.02.02 References

Use the references listed in Table 2 as supplementary materials for the design and construction of the structures. These references have no established order of precedence and are not intended to be all-inclusive.

Table 2
References for Structures

Author or Agency	Title
FHWA	Design and Construction of Driven Pile Foundations, Volumes 1 and 2
FHWA	Geotechnical Engineering Circular No. 5: Evaluation of Soil and Rock Properties
FHWA	The Osterberg Load Cell for Load Testing Drilled Shafts and Driven Piles
FHWA	Publication No. FHWA-SA-98-074, Driven 1.0 User's Manual
FHWA	Publication No. FHWA-SA-91-048, Laterally Loaded Pile Program
FHWA	Publication No. FHWA-SA-96-038, Geotechnical Engineering Circular No. 2: Earth Retaining Structures
SHA	Standard Specifications for Subsurface Explorations

3.11.03 General Structure Design Requirements

Design calculations shall be performed in Customary U.S. units. Only Customary U.S. units shall appear on the plans.

3.11.03.01 Loads and Forces

- (a) Dead Loads (DL).

Unit weights of materials shall conform to AASHTO.

- (b) Highway Loads (LL).

Retaining walls shall be designed to accommodate the horizontal surcharge caused by live load per AASHTO criteria. Consideration shall be taken for horizontal surcharge from construction loads.

(c) Seismic Analysis.

Structures will be within seismic zone 1. No detailed seismic analysis need be performed.

3.11.03.02 Structural Analysis

For determination of forces and deflections, all analysis methods and computer models shall use gross sectional properties.

3.11.03.03 Structure Design Loading

Conform to AASHTO.

3.11.03.04 Materials

(a) Concrete.

- (1) Concrete for parapets shall be normal weight Mix No. 6 (4500 psi) concrete.
- (2) Concrete for retaining walls shall be normal weight Mix No. 3 (3500 psi) concrete.
- (3) Concrete for drilled shafts and augered piles shall be normal weight Mix No. 4 (3500 psi) concrete.
- (4) Subfoundation concrete shall be normal weight Mix No. 4 (3500 psi) concrete.
- (5) The use of lightweight concrete is prohibited.
- (6) Grout for steel mini/pin piles shall be non-shrink grout conforming to 902.11 (c).

(b) Reinforcement Steel.

- (1) All 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 and WWF shall conform to 917.02 shall be used at the following locations:

Parapet Portion of Retaining Walls
Portions of Retaining Walls located within 10 ft of the outside edge of shoulder measured vertically and/or horizontally.

- (3) Unless noted otherwise minimum clear cover to reinforcement steel shall be as follows:

Abutment Footings – Bottom and Sides	3 in.
All other Locations – Main Reinforcement	2 in.
All other Locations – Stirrups	2 in.

- (4) Welding of reinforcement steel is prohibited.
- (5) Structural elements shall be designed so that the largest reinforcement steel bar utilized will be No. 11 bars.

(c) Structural Steel.

- (1) Steel H-piles shall conform to A 36, Grade 36 or A 709, Grade 50 steel.
- (2) Steel pipe piles shall conform to A 252, Grade 3 steel ($f_y = 45,000$ psi)
- (3) Steel mini/pin piles shall conform to A 252, Grade 3 steel ($f_y = 80,000$ psi).

3.11.03.05 Geometric Design Criteria

- (a) Retaining walls on curved horizontal alignments may be constructed on chords provided the angle of deflection between segments does not exceed 5 degrees, unless otherwise indicated in the aesthetic guidelines specified in TC3.11.03.01.
- (b) The horizontal offset of the retaining 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 to accomplish a change in elevation. The top shall be level or shall vary using a smooth linear transition.
- (d) The completed retaining wall 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.

3.11.03.06 Structural Details and Standard Details

Standard Details, as developed in the Administration's Structural Standards Manual shall be utilized whenever possible. Any proposed deviation from the established standards shall be approved in writing by the Office of Structures.

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 either 34" or 42" in accordance with the roadway design requirements.
- (b) For F-Shape 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 F-Shape Barrier shall be cast-in-place.
- (c) For retaining walls adjacent to and supporting sidewalks, a 2'-3" barrier with a one strand rail shall be utilized. For retaining walls adjacent to and supporting hiker/biker facilities, a 2'-3" barrier with a two strand rail shall be utilized.
- (d) For retaining walls supporting private property or other facilities that are accessible to pedestrians, fencing shall be provided on top of the wall. The minimum height of the fence shall be 3'-0" and detailed in accordance with Standard No. BR-SS(3.11)-96-317 and BR-SS(3.12)-96-318. If an ornamental fence is required per the aesthetic guidelines specified in TC-3.11.03, 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(0.01)-80-100.

3.11.03.06 Design Alternates for Retaining Walls

The design for permanent retaining walls shall follow one of the following alternates, unless otherwise stated in the structure description. Only one alternate shall be used per wall location.

- (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(6.02)-83-133 through RW(6.14)-89-201 and AASHTO.
- (b) **Proprietary Retaining Walls.** The Design-Build Team shall design and detail proposed proprietary retaining walls in accordance with the manufacturer's details. The list of proprietary retaining wall systems that have been pre-approved by the

Administration are located on the Maryland State Highway Administrations website <http://www.roads.maryland.gov/obd/MSEWallList.pdf> under the section Business with SHA.

- (1) Mechanically Stabilized Earth (MSE) retaining walls that are to be placed adjacent to streams, floodplains, SWM ponds, or other water feature 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 bottom of footing for Mechanically Stabilized Earth (MSE) retaining walls 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.
 - (3) The reinforced zone backfill for Mechanically Stabilized Earth (MSE) walls shall be comprised of No. 57 stone.
- (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.
 - (3) A concrete facing shall be provided that will not be considered structural in nature.
 - (4) Portions of permanent steel elements, which are exposed after excavation, shall be coated in accordance with Section 465 of the Administration's Standard Specifications for Construction and Materials.

3.11.03.07 Foundations

3.11.03.07.01 General Requirements

The Design-Builder shall prepare a Foundation Plan and Report for each structure in conformance with the Administration's Office of Structures Policy and Procedure Memorandum D-79-17(4) and the following 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 MD 21076, 443-572-5176. The Administration has evaluated the borings and recommendations and/or restrictions have been established for each structure as indicated in 3.11.02.09.03.

The Design-Builder 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 in accordance with the Administration's Standards for Subsurface Exploration. Supplemental borings shall be obtained if the foundation borings provided by the Administration are more than 10 ft outside the proposed footprint of the structure foundation or if proposed pile tip elevations are below the foundation boring depths provided by the Administration.

For retaining walls, borings shall be spaced at 75 ft intervals along the alignment of the wall. The Design-Builder's geotechnical engineer may request in writing that the Administration allow them to eliminate every other boring provided the soil conditions along the wall alignment appear to be consistent. If approved by the Administration, wall borings shall be spaced at a maximum of 150 ft. Supplemental foundation borings, rock cores, laboratory testing, etc. shall be in conformance with appropriate Administration, AASHTO and ASTM policies and specifications

Scour evaluations shall be required for any proposed structure adjacent to a waterway and a Scour Report shall be included with the Design-Builder's Foundation Report, where applicable.

3.11.03.07.02 Foundation Specific Requirements

- (a) **Spread Footings.** The bottom of a spread footing or 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 a minimum depth as determined by the scour analysis and shall be at least 1 ft. The Plans developed by the Design-Builder shall specify the maximum allowable bearing pressure for each substructure element.

Setting spread footings in embankment or fill material is prohibited. Any spread foundation, either concrete footing or MSE wall shall be set into existing in-situ soil (see chart at the end of this section) or sound rock.

The Design-Builder shall have the exposed subgrade of any spread foundation inspected by their geotechnical engineer with a written recommendations of their findings forwarded to the Administration.

- (b) **Driven Piles.** Steel H-piles and steel pipe piles are acceptable for use on this project. No other driven pile type will be considered. The bottom of footing for

retaining walls may be placed in fill provided they sit on pile-supported foundations with the pile tips set into in-situ soil or rock. Pile tips shall be applied to driven piles where warranted.

The design of the foundation piles shall not exceed the values established from indicator piles. The foundation piles shall be driven to achieve the minimum penetration elevation that has been established for each structure.

Any driven pile that reaches refusal with less than 20 feet of pile length embedment in in-situ soils shall be extracted and holes shall be augured a minimum of 5 ft 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 piles shall not exceed 8 ft.
- (2) Spacing for all other rows shall not exceed twice the spacing of the front row.
- (3) The Design-Builder shall use battered piles to resist all horizontal loads.
- (4) Pile patterns shall be designed so that no piles are in tension.

As-built pile foundation data should be documented in the final As-Built plans in conformance with the Administration's Office of Structure's Policy and Procedure Memorandum P-93-35(4).

- (c) **Augered or Drilled Piles.** Augered or drilled piles, including steel mini/pin piles, reinforced cast in placed drilled shafts (caissons), and steel H-piles placed in augured holes with voids filled with concrete, are acceptable for use on this project. Any augered or drilled pile foundation that encounters rock shall have its final tip elevation a minimum of 5 ft into sound rock (see sketch provided on CD). Steel mini/pin piles shall have a 5' deep grout bulb below the final tip elevation (see sketch provided on CD). 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. Design strength shall be maintained for the full length of the pile.
- (d) **Minimum Subsurface Condition Requirements for Foundation Types.** The following chart represents the minimum subsurface requirements for the various structure and foundation types allowed on this Contract. This information does not supersede any other foundation design criteria.

Structure /Foundation Type	MSE Wall	Spread Footing	Deep Foundation (Piles)
Subsurface Conditions	N > 15 for 10 feet of sampling*	N > 30 for 10 feet of sampling*	N > 50 blows per 1 inch 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

3.11.04 Aesthetic Criteria

If required per the structure description in the Special Provisions, the Design-Build Team shall use the architectural treatment specifications found elsewhere in the Contract Documents for design and plan development of structures for which architectural treatments are specified.

3.11.05 Information to be Provided by the Office of Structures

The Administration’s Office of Structures or Office of Structure’s Consultant Engineering Firm will provide the following:

- (a) Copies of Boring Logs included with the Contract Documents.
- (b) Copies of Plan Development Checklists for requirements at various plan review submission stages included with the Contract Documents.
- (c) A review of all plans, reports, calculations, shop drawings, etc. related to the structures on this project.
- (d) Responses to all Requests for Information on the structures during the design and construction stages.
- (e) Copies of standard sheets and any standards created specifically for this project; however, these may require some revisions by the Design-Builder or the Administration.
- (f) Copies of design plans for structure projects for use as examples or guides, if requested.

3.11.06 Structure Plan Development

The Design-Builder shall prepare structure plans as part of the Contract using the latest SHA MicroStation CADD Standards and Plan Development Checklists available from

the Administration's Office of Structures. All structure plans shall be prepared on the Office of Structure's standard border and title block sheet.

The Plan Development Checklist included with the Contract Documents indicates 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-Builder, the existing checklist shall be used as a general guide to provide similar information.

The Design-Builder shall also conform to the following requirements in the development of Structure Contract Plans:

- (a) The development of views on all Structure Contract Drawings shall be in conformance with the Administration's Office of Structures Policy and Procedure Memorandum P-75-7(4).
- (b) Retaining Wall Plans shall be developed in accordance with the Administration's Office of Structures Policy and Procedure Memorandum P-94-38(4).

3.11.07 Required Plan Review Submission for Structures

All retaining walls 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 subject structures Type, Size and Location (TS&L) or combined Type, Size and Location/Foundation review shall be made one at a time with a minimum of 7 calendar days between submissions. This schedule shall be presented in the Design-Build Team's original submission schedule. As noted, the Design-Build Team shall notify the Administration at least 14 days in advance of all submissions.

The Design-Build Team shall include a minimum of six full size sets and one half-size set of structure plans with any plan review submission containing structures in addition to the requirements of TC-3.06.19. These plan sets are for review by the Office of Structures and the Office of Structures' Consultant Engineering Firm, if specified. Official review comments will be conveyed back to the Design-Build Team via correspondence and plans with comments noted. The Design-Build Team shall provide a point-by-point written response to all official comments received and receive concurrence from 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 response 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.

3.11.07.01 Type, Size, and Location Submission.

The first submission required for the structures 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. Prior to this submission, the roadway alignment and profile shall have been finalized and accepted by the Administration's Office of Highway Development. Any other pertinent information such as grading plans or drainage features that impact the proposed structures shall also be accepted by the appropriate Administration Design Division prior to submitting the structure plans for review. All plans shall be developed in conformance with Structure Plan Development requirements. Comments for TS&L submissions will be provided within 21 calendar days of receipt of the submission.

3.11.07.02 Foundation Report

The Foundation Report and Plan submission shall be made in conformance with the Administration's Office of Structures Policy and Procedure Memorandum D-79-17(4), the Structure Descriptions, and other requirements specified in TC-3.11.02.10. 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 Office of Structures/Consultant Engineering Firm. All plans shall be developed in conformance with Structure Plan Development requirements. 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.

3.11.07.03 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. All plans shall be developed in conformance with Structure Plan Development requirements. The Design-Build Team shall submit a structure submission schedule that outlines the anticipated structural detail submissions. 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. Structural details for an individual structure may be submitted as a number of sub-plan set packages or as a complete set. Comments for each structural detail submission will be provided back to the Design-Build Team within 21 calendar days of receipt of the submission

3.11.07.04 Modifications to Structure Plans

Any modifications or revisions to the structural drawings after acceptance has been received shall be submitted in writing to the Office of Structures 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 Office of Structures along with a detailed list documenting all of the changes that have been made.

3.11.07.05 Working Drawing Review Process

All working drawings relating to the structures shall be reviewed in accordance with the Administration's Office of Structures Policy and Procedures Memorandum OP-82-34 (G) and Section 499. The Design-Build Team shall undertake the primary review and shall be stamped by the Design-Build Team as accepted prior to submitting the working drawings to the Office of Structures/Consultant Engineering Firm. A secondary review shall be undertaken by the Office of Structures/Consultant Engineering Firm. Once reviewed and accepted by the Office of Structures/Consultant Engineering Firm, the structural working drawings shall be stamped as accepted and returned to the Design-Build Team with the stamped plans being designated as the documented acceptance. No construction activities are permitted in conjunction with any structural working drawings that have not been accepted in writing by the Office of Structures/Consultant Engineering Firm. Acceptance by the Office of Structures/Consultant Engineering Firm does not relieve the Design-Build Team of the responsibility or liability for all design and construction activities.

3.11.07.06 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 mylar originals, four full size paper print sets and four half size paper print sets. The General Plan & Elevation sheet for each of the structures shall be sealed by the Design-Build Team structural key staff member thus denoting it as the final construction documents.

The Design-Build Team shall submit a complete set of structure computations once all structural details have been accepted for each structure including all designed elements. All computations shall be on 8 ½" x 11" paper with the initials of the designer and checker indicated on each page. The computations shall be submitted in a three ring binder and subdivided into relevant design sections. A coversheet shall be included in each binder and shall be signed and sealed by the Design-Build Team structural key staff member responsible for performing or oversight of the pertinent design work.

3.11.07.07 Completed Project Plans

Field changes/variances from the details and dimensions shown on the plans shall be superimposed on the original project plans in green. Old 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. The As-Built Plans shall reflect any field revision made during construction. The Design-Build Team shall submit reproducible As-Built plans at the completion of the project that are signed and sealed by their Engineer.

Field changes/variances from the details and dimensions shown on the plans shall be superimposed on the original project plans in green. Old 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. The As-Built Plans shall reflect any field revision made during construction. The Design-Builder shall submit reproducible As-Built plans at the completion of the project that are signed and sealed by their Engineer.

TC 3.12 TRAFFIC PERFORMANCE SPECIFICATION

3.12.01 General

The Design-Builder shall provide a Traffic Engineer who is a Maryland registered Professional Engineer and a Professional Traffic Operations Engineer (PTOE) with a minimum of ten (10) years demonstrated experience in traffic operations, traffic safety, designing temporary and permanent traffic control devices, and traffic analysis. Must have experience in preparing Transportation Management Plans (TMP); and in developing, managing or implementing unplanned incident management scenarios for expressway projects. The administration reserves the right to request a resume to verify said qualifications.

The Design-Builder shall be responsible for the design and construction of the Project signing, pavement markings, roadway lighting, intersection lighting, and sign lighting, traffic signals, and signal systemization. The Design-Builder is responsible for coordinating all Traffic Control Devices, including signing and lighting, with all other disciplines involved with the Project.

Signing consists of guide, supplemental, route marker, regulatory, and warning signs for MD 4 from Forestville Road to MD 458 (Silver Hill Road). The Design-Builder shall be responsible for the design and construction of sign structures (overhead, cantilever, and ground mounted), including foundations, protection (placement outside clear zone or traffic barrier), and access for maintenance. Sign lighting for all overhead and cantilever structures shall be provided in accordance to Administration standards and guidelines.

The Design-Build Team shall prepare Signing and Pavement Marking plans for all phases of construction (including temporary traffic shifts, detours, median cross-overs, etc.), which may extend outside the limits shown on the Concept Plans. These shall be prepared in accordance with the latest accepted editions of the MUTCD, Maryland MUTCD, and SHA standards as provided by OOTS.

The Design-Build Team shall prepare plans for application of the Final Pavement Markings, including Plowable Raised Pavement Markers (RPM), in accordance with the latest edition of the MUTCD, Maryland MUTCD, and SHA standards as provided by OOTS. The Design Builder shall be responsible for the design and construction of the Pavement Markings within the project limits along MD 4 from Forestville Road to MD 458 (Silver Hill Road).

Continuous roadway and intersection lighting shall be provided within the project limits as specified in the RFP and as required to meet IES and AASHTO criteria and the Administration's policies and procedures. The Design-Builder shall be responsible for the design and construction of all light poles, including foundations, conduit systems, circuitry, power supplies, lighting cabinets, and coordination with the power company to obtain power service for the lighting

devices.

The Design-Builder shall provide traffic signals at each intersection as stated in this performance specification, including foundations, traffic signal poles, signal heads, conduit system, circuitry, detection devices, required signal cabinets and controller equipment, metered service pedestals, intersection lighting, and signal related signing. The work shall include:

- Coordinating utility connections with the proper utility company to obtain power service for all signal equipment;
- Coordinating the signal cable connections with the Administration to complete the traffic signal installation;
- Connecting each proposed signalized intersection to the Administration's interconnect system, as required; and
- Coordinating with the Administration to maintain and relocate existing traffic signal system equipment/cables and fiber optic cable infrastructure, as required.

The general geometric layout, lane configurations, and lane utilization at the existing signalized intersections within the project limits are maintained in the Concept Plans and per the specifications found elsewhere in this RFP. Existing signal timing and functional operation of traffic control devices shall be maintained at each existing signal within the project limits, except where otherwise noted in this RFP. If the Design-Builder proposes modifications to the general geometric layout (including changes to lane configurations/utilization, ramp configurations, and/or the alignments of intersections or ramp terminals), the Design-Builder shall be responsible for performing all necessary traffic analyses to determine the impact to traffic operations as a result of the geometric modifications and preparing and submitting for approval any Design Requests for changes to the functional operation of traffic control devices. Specific details of the analysis/submittals required for modifications to the general geometric layout are included within this performance specification.

3.12.02 Standards and References

3.12.02.01 Standards

Traffic analysis, design, and construction shall be in accordance with this performance specification and the relevant requirements of the following standards, unless otherwise stipulated in this specification. Standards specifically cited in the body of this specification establish requirements that shall have precedence over all others. Should the requirements in any standard below conflict with those in another, the standard listed with the higher priority 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.

Use the most current adopted version of each listed standard as of the publication date of this RFP.

All traffic analysis shall be in accordance with the relevant requirements of the standards listed by priority in Table 1.

TABLE 1
STANDARDS FOR TRAFFIC ANALYSIS

<i>PRIORITY</i>	<i>AUTHOR OR AGENCY</i>	<i>TITLE</i>
1	TRB	Highway Capacity Manual
2	ITE	Traffic Engineering Handbook
3	ITE	Manual of Transportation Engineering Studies
4	SHA	Office of Traffic and Safety's Capacity / Queuing Analysis Procedures for Intersections
5	SHA	Maryland Manual on Uniform Traffic Control Devices (MD MUTCD), 2011
6	FHWA	Manual on Uniform Traffic Control Devices (MUTCD), 2009 Edition

All traffic design and construction for signing, pavement markings, and traffic signals shall be in accordance with the relevant requirements of the standards listed by priority in Table 2.

TABLE 2
STANDARDS FOR TRAFFIC DESIGN CRITERIA
(SIGNING, PAVEMENT MARKINGS & TRAFFIC SIGNALS)

<i>PRIORITY</i>	<i>AUTHOR OR AGENCY</i>	<i>TITLE</i>
1	SHA	List of Qualified Permanent Pavement Markings
2	SHA	List of Qualified Loop Sealants
3	SHA	List of Qualified Detectable Warning Surfaces
4	SHA	2008 Standard Specifications for Construction and Materials
5	SHA	Maryland Manual on Uniform Traffic Control Devices (MD MUTCD), 2011
6	FHWA	Manual on Uniform Traffic Control Devices (MUTCD), 2009
7	AASHTO	Roadside Design Guide
8	SHA	Standard Office of Traffic and Safety Shelf Typicals
9	SHA	Book of Standards for Highway and Incidental
10	SHA	Maryland State Highway Standard Sign Book, 2009 Revision
11	MDTA	Standard Sign Book
12	MDTA	Guidelines for Express Toll Lane Signing on Managed Lanes / Managed Facilities
13	FHWA	Standard Highway Signs Book
14	AASHTO	Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*
15	SHA	Administration, Section VIII, of the Specifications for Consulting Engineers' Services, Volume II
16	NFPA	National Electric Code
17	IEEE	National Electric Safety Code
18	SHA	Office of Traffic and Safety's Traffic Engineering Design Division's Traffic Control Devices Manual
19	SHA	Maryland State Highway Line Striping Material Selection Policy
20	SHA	Roundabout Traffic Design Manual
21	AASHTO	Highway Safety Design and Operations Guide
22	SHA	Accessible Pedestrian Signals – Design and Installation Guidelines
23	SHA	Accessibility Policy and Guidelines for Pedestrian Facilities along State Highways
24	ADA	Americans with Disabilities Act Accessibility Guidelines
25	SHA	Roadway Delineation Policy
26	SHA	Guidelines for Application of Rumble Strips and Rumble Stripes
27	NCHRP	Report 350. Recommended Procedures for the Safety Performance Evaluation of Highway Features

*Note: For traffic signal structures the Design-Builder shall utilize the 3rd edition. For Sign Structures (overhead, cantilever, and ground mounted) the Design-Builder shall utilize the 4th edition.

All traffic design and construction for roadway and sign lighting shall be in accordance with the relevant requirements of the standards listed in Table 3.

TABLE 3
STANDARDS FOR ROADWAY, INTERSECTION, PEDESTRIAN AND SIGN LIGHTING

PRIORITY	AUTHOR OR AGENCY	TITLE
1	SHA	2008 Standard Specifications for Construction and Materials
2	State of MD	Maryland High Voltage Line Act
3	NFPA	National Electric Code
4	IEEE	National Electric Safety Code
5	NFPA	502-Standard for Road Tunnels, Bridges and Other Limited Access Highways
6	SHA	Maryland Manual on Uniform Traffic Control Devices (MD MUTCD), 2011
7	FHWA	Manual on Uniform Traffic Control Devices (MUTCD), 2009
8	SHA	MSHA Lighting Guidelines
9	IES	RP-8-00, American National Standard for Roadway Lighting
10	IES	DG-5-94, Recommended Lighting for Walkways and Class 1 Bikeways
11	IES	RP-22-05, American National Standard for Tunnel Lighting
12	IES	RP-19-01, Roadway Sign Lighting
13	AASHTO	Roadway Lighting Design Guide
14	AASHTO	Roadside Design Guide
15	SHA	Book of Standards for Highway and Incidental
16	AASHTO	Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 4th Edition
17	SHA	Office of Traffic and Safety's Traffic Engineering Design Division's Traffic Control Devices Manual
18	AASHTO	Highway Safety Design and Operations Guide
19	SHA	Accessibility Policy and Guidelines for Pedestrian Facilities along State Highways
20	ADA	Americans with Disabilities Act Accessibility Guidelines
21	AASHTO	Guide for the Planning, Design and Operation of Pedestrian Facilities
22	AASHTO	Guide for the Development of Bicycle Facilities
23	NCHRP	Report 350. Recommended Procedures for the Safety Performance Evaluation of Highway Features

3.12.02.02 References

Use the references listed in Table 4 as supplementary materials for traffic analysis. These publications have no established order of precedence.

TABLE 4
REFERENCES FOR TRAFFIC ANALYSIS

AUTHOR OR AGENCY	TITLE
NONE	

Use the references listed in Table 5 as supplementary materials for the design of signing, pavement markings, and traffic signals. These publications have no established order of precedence.

TABLE 5
REFERENCES FOR TRAFFIC DESIGN CRITERIA
(SIGNING, PAVEMENT MARKINGS & TRAFFIC SIGNALS)

AUTHOR OR AGENCY	TITLE
SHA	Roundabout Traffic Design – SHA Roundabout Guidelines
KDOT	Kansas Roundabout Guide – A Supplement to FHWA's Roundabouts: An Information Guide
FHWA	FHWA Roundabouts: An Informational Guide 2000 FHWA-RD-00-067
TRB	Transportation Research Board's Accessible Pedestrian Signals Synthesis and Guide to Best Practices

3.12.03 Coordination with Other Contracts

The Design-Builder shall coordinate the design and construction of all traffic control devices for the Project with those required for other SHA, Prince George's County, and local jurisdiction Projects.

3.12.04 Traffic Operational Analysis – Procedures and Application

3.12.04.01 Approved Analysis Techniques and Software

3.12.04.01.01 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.

3.12.04.01.02 Synchro and SimTraffic – Latest Version

For corridors with multiple intersections, or for individual signalized intersections, the Design-Builder shall use Synchro and SimTraffic to analyze 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.

3.12.04.01.03 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 listed above. Results will be considered by the Administration in conjunction with the above when assessing design alternatives proposed by the Design-Builder.

3.12.04.01.04 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, as recommended by the software manufacturer when analyzing roundabouts in the U.S. The volumes should also be checked against the capacity thresholds outlined in NCHRP 3-65, Applying Roundabouts in the United States. The results shall demonstrate that the roundabout operation will be no worse than the corresponding intersection operations proposed in the RFP. An analysis that results in a degree of saturation of 0.85 or more on any movement shall be considered a Level of Service F condition.

3.12.04.01.05 Critical Lane Technique

For all signalized intersections, the Design-Builder shall calculate the level of service for the proposed design and each MOT phase of operation using the Administration's Critical Lane Volume methodology, as outlined in the Office of Traffic and Safety's Capacity / Queuing Analysis Procedures for Intersections memorandum, latest version.

3.12.04.01.06 Queuing Analysis Technique

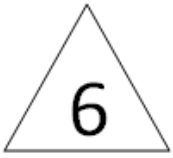
To determine the appropriate length of left and right turn bays, the Design-Builder shall calculate the queue length for both the through lane/s and the turn lane/s for the proposed design and each MOT phase of operation using the Administration's Queuing Analysis methodology, as outlined in the Administration's Procedures for Intersections memorandum, latest version. Minimum required lengths for auxiliary lanes are provided in TC 3.09.17.



The queuing analysis shall be supplemented with simulation analysis if the queue length exceeds 85% of the design storage length or if the v/c ratio exceeds 0.85.

3.12.04.01.07 Operational Assessment of Design Alternative/s

It shall be the Design-Builder's responsibility to perform traffic analyses for each MOT phase using the tools and techniques listed above, as appropriate.



If a change is proposed to the general geometric layout shown in the concept plans included in the RFP, the Design-Builder shall use the 2033 Build Volumes to develop and test the final design plans. All modifications to the general geometric concept shall provide traffic operations that are acceptable to the Administration. The Design-Builder shall also provide a corridor analysis using CORSIM and Synchro to review corridor-wide operations for the proposed change. Where interpretation of the traffic analyses is required (i.e. if a change results in some improvements and some decreases in operations), it will be the Administration's determination whether the change is acceptable.

In addition to the above, the Design-Builder shall also be responsible for reviewing the anticipated 2033 operational and design speed(s) for each segment of roadway and shall provide the operational and design speed differentials between adjacent lanes (i.e. mainline versus merging ramp) in tabular form for review by the Administration.

3.12.04.01.08 Signal Warrant Analysis

Traffic analyses for the general geometric layout shown in the concept plans included in the RFP have been completed and approved by the Administration. The following intersections require signalization based on the concept plans included in the RFP:

- MD 4 and MD 458 (Silver Hill Road)
- MD 4 and Parkland Drive
- MD 4 and Walters Lane
- Mid-block signal at MD 4 1000 feet west of Donnell Drive
- MD 4 and Donnell Drive
- MD 4 and Forestville Road



The Design-Builder shall be responsible for performing a signal warrant evaluation to determine if signalization is appropriate at other locations than those stated above, based on the MD MUTCD, if the Design-Builder proposes modifications to the general geometric layout shown in the concept plans included in this RFP. Study findings shall be presented in a report which outlines the warrants evaluated, consideration given to safety, operations, delay, and available gaps in traffic resulting from adjacent signalized intersection. Recommendations shall also be included in the report and shall be attached to the Administration's Office of Traffic and Safety's Traffic Control Device Design Request Form, as discussed in the "Preparation and Submittal of Administration's Office of Traffic and Safety's Traffic Control Device Design Request Form." All signal warrant evaluations shall be presented and reviewed prior to final design.

3.12.04.02 Preparation and Submittal of Administration's Office of Traffic and Safety's Traffic Control Device Design Request Form

Traffic Control Device Design Request Forms have been prepared by the Administration

3.12.04.02 Preparation and Submittal of Administration's Office of Traffic and Safety's Traffic Control Device Design Request Form

Traffic Control Device Design Request Forms have been prepared by the Administration based on the general geometric layout shown in the concept plans included in the RFP. If the Design-Builder proposes modifications to the general geometric concept that would necessitate a change in the operation of traffic control devices, the Design-Builder shall submit the Administration's Office of Traffic and Safety's Traffic Control Device Design Request Form to the Administration with accompanying traffic operational analysis/documentation and signal warrant analysis. The following are changes to traffic control devices that warrant the preparation of the Traffic Control Device Design Request Form:

- A. New traffic signals, intersection control beacons, or hazard identification beacons;
- B. Removal of existing traffic signals, intersection control beacons, or hazard identification beacons;
- C. Functional change of any existing signal, such as adding or changing signal phases;
- D. Any type of signal preemption or priority;
- E. Any existing traffic signal modification such as relocating poles, strobes, optically programmed heads, LED heads, back plates, adding or shifting signal heads, addition of accessible pedestrian signals and countdown pedestrian signals, etc.;
- F. Additional signal detection or changes to existing detection;
- G. Signal detector repair/replacement as part of a reconstruction or resurfacing effort;
- H. All highway lighting or major change to an existing lighting system;
- I. All new overhead or cantilevered sign structures or modifications to existing;
- J. All revisions to the legend of major guide signs; and
- K. Signing and pavement markings for new facilities and modifications to existing facilities.

To initiate the Definitive Design process, the Design-Builder shall prepare each Design Request Form in accordance with the procedures outlined in the Administration's Design Request Form Instructions and Guidelines, and shall submit the Design Request Form and supporting traffic studies and documentation to the Administration. All Design Request Forms will be submitted to the Administration for consultation and written comment, prior to the Design-Builder proceeding with the design, installation, or modification to any traffic control device.

3.12.05 Signing

3.12.05.01 Signing Functional Operation Requirements

3.12.05.01.01 Temporary Signing Requirements

Temporary signing for this Project shall include the design and installation of temporary traffic control signs, as per Category 1 of the Administration's Book of Standards, and use of temporary guide signing (including the installation of new guide signs and/or the modification of existing guide signs). Temporary signing shall be shown on the Traffic Control Plans (TCP). For more information on the requirements for temporary signing, refer to section 3.16 of the performance specifications.

3.12.05.01.02 Permanent Signing Requirements

Permanent guide signing for this Project shall have the following functional requirements:

- Signing along MD 4 shall be based on the MD MUTCD Expressway sign sizes
- Advance guide signing for I-95 and I-495 shall be provided along southbound MD 4, to include a ½ mile guide sign on a Cantilever structure
- Distance and Destination signing along MD 4 within the projects limits and within ½ mile outside the project limits

Route marker, regulatory, and warning signs shall be provided based on MD MUTCD requirements and the Administration's Traffic Control Devices Design Manual. 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 within the Project Limits that meets all applicable standards.

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, if 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.

3.12.05.02 Design and Construction Requirements

All temporary signing shall be shown on the Traffic Control Plans (TCP). The Design-Builder shall design and install temporary signing to provide motorist guidance throughout and within the Project limits

All proposed signing shall be shown on a definitive design signing roll plan and reviewed by the Administration prior to advancing the design. The Design-Builder shall be responsible for the design and construction of all signing.

3.12.05.02.01 Definitive Design Signing Roll Plan

The Design-Builder shall prepare a Definitive Design Signing Roll Plan and present the plan at a review meeting with the Administration. The roll plan shall include proposed sign locations (overhead, cantilever, ground mounted, etc.) and messages for all guide, supplemental, route marker, regulatory, and warning signs. All existing signs to be removed or relocated shall also be shown along with the proposed locations for the relocated signs. The roll plan shall display signing for MD 4 as well as for the cross-streets, frontage roads, and any other roadways that contain signing that is affected by the Project. The Design-Builder shall also provide for the modification or removal of any signage outside the limits of the Project that is no longer appropriate or pertinent as a result of changes associated with this Project. The signage shall be removed or modified regardless of whether it falls within or outside the limits of construction along the mainline and cross-street approach roadways. Existing sign modifications shall conform to the latest applicable standards and may include sign overlays, replacement of the entire sign panel, or complete sign structure replacement. The use of full sign overlays is not permitted. The Design-Builder shall be fully responsible for replacing existing sign structures with new structures on new foundations as required to accommodate new and/or modified signs. The Design-Builder shall provide signing for roadways where existing access has been modified. The signing modifications due to the access modifications shall be shown on the definitive plan. The plan shall also denote which agency is responsible for ownership and maintenance of each sign and structure (i.e. SHA or local jurisdiction). The definitive plan features shall include, but are not limited to, the existing and proposed roadway alignments, right-of-way, utilities, baseline of construction (including stationing), and existing topography at the tie-in points of the roadway limits of work. The proposed pavement markings shall also be shown on the definitive plan.

3.12.05.02.02 Plan Sheet Requirements

Once the roll plan is reviewed by the Administration, 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, MD MUTCD or MUTCD sign designation (if applicable), size 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. All existing signs to be removed or relocated shall also be shown along with the proposed locations for the relocated signs. The plans shall also include the location and type of delineation devices (including pavement markings). The owner of each sign/structure shall be clearly noted on the plan sheets. 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. 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. If 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 may be included which summarizes the quantities and materials in table format being used for this Project. If the SN-11 sheet is submitted, every sign location shall have a separate line.

3.12.05.02.03 Design of Sign Locations

The Design-Builder shall design, fabricate and install all the overhead and ground mounted signs shown on the definitive plan, within 25-feet of the location shown on the definitive plan or as approved otherwise by the Administration. 800 foot spacing shall be maintained between overhead signs and traffic signals. For signing along MD 4 and cross-streets, 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. To the extent possible, the Design-Builder shall provide minimum 200 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.

3.12.05.02.04 Sign Design and Construction Requirements

The Design-Builder shall design, fabricate, and install all guide, supplemental, route marker assemblies, regulatory and warning required for this Project, including approaches outside Project limits. The Design-Builder shall modify all existing signs requiring message modification, including approaches outside Project limits.

The messages, fonts, font sizes, arrows, shields, colors, borders, and type of supports for the overhead and ground mounted signs shall be designed and constructed according to the MD MUTCD. The Clearview font shall be utilized for all positive contrast guide signs. Positive contrast guide signs are signs that utilize white text/copy on a dark colored background (i.e. green, blue, black, brown, etc.)

All Advisory, Regulatory, and Warning Signs and route marker assemblies installed along MD 4 shall be expressway size. All Advisory, Regulatory, and Warning Signs and route marker assemblies installed along all other roadways shall be standard size. The sizes of the signs shall adhere to the latest edition of the Maryland State Highway Standard Sign Book and the FHWA Standard Highway Signs Book.

Guide signs indicating left or exit only movements entering or exiting freeways or expressways shall have the action message (i.e. NEXT LEFT, LEFT LANE, EXIT ONLY, etc.) in black legend on fluorescent yellow background. Fluorescent yellow background sheeting shall be used for all yellow traffic signs. When a sign contains more than one background color, the signs shall have two separate borders corresponding to each background color where the background colors meet. If the background colors utilize the same border color, then only one border is necessary where the background colors meet.

All signs greater than 4' x 8' shall be manufactured using extruded aluminum sign material. All new signs for this Project shall be constructed with non-reflective (black copy and background) or retroflective (all other colors) sheeting background and copy. The retroflective sheeting for sign copy shall comply with Section 950.03.07 of the Administration's Standard Specification for Construction and Materials. All retroflective sheeting for sign backgrounds except for fluorescent yellow and fluorescent yellow-green shall comply with Section 950.03.08 of the Administration's Standard Specification for Construction and Materials. All fluorescent yellow and fluorescent yellow-green sign backgrounds shall comply with Section 950.03.07 of the Administration's Standard Specification for Construction and Materials.

3.12.05.02.05 Sign Support Design and Construction

All overhead and cantilever sign structures installed under this Project shall be located at a minimum of 50 feet from any roadway lighting.

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 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. Using the sign structure cross-section, the Design-Builder shall correctly fill out the Administration's sign structure input sheet for each overhead/cantilever sign structure. The sign structure input sheet and associated cross section shall be submitted during the definitive design for Administration review and written comment. Comments on the input sheets will be provided within 21 calendar days and returned to the Design-Builder for revisions, if needed. Once comments to input sheets have been satisfactorily resolved, the Design-Builder shall develop the standard SN-8 and SN-9 sheets for the sign structures. The Administration will provide current SN-8 and SN-9 sheets upon request.

For signs using Breakaway wood supports, Non-Breakaway wood supports, or Non-Breakaway steel supports, the Design-Builder shall utilize the support selection charts provided in the Administration's Traffic Control Device Design manual. For sign structures (Overhead, Cantilever, and Breakaway Steel Ground Mounted) the Design-Builder shall utilize the 4th edition of AASHTO's Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals. 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 CD provided by the manufacturer of the breakaway system and follow the ground mounted steel post breakaway system selection process provided by the Administration. All posts except for W6X9 wide flange steel I-beams shall have at least 7 foot clear distance between adjacent posts. 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 square tubular steel posts. Signs over 32 square feet shall be installed on steel posts, unless otherwise noted by the Administration for a particular sign. 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 steel supports.

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 OOTS 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.

3.12.05.02.06 Modification to Existing Overhead Signs

The Administration will provide the Design-Builder with blank 'Structure Verification for Adding, Deleting or Modifying Signs on Existing Structures' sheets. Any modifications to the existing overhead sign structures, including replacement of sign panels, shall be presented to the Administration for review and written comment. Review and written comments, if necessary, will be provided within 21 calendar days. Upon satisfactory resolution to comments, the Design-Builder shall draft the plans and/or notes using CADD for review with the Administration.

Modifications to existing overhead signs may require new sign structures. The Design-Builder is fully responsible for determining when new sign structures are required, and for the design and construction of all new sign structures and the removal of existing sign structures no longer needed.

3.12.05.02.07 Sign Lighting

The Design-Builder shall provide sign lighting for in accordance with the Administration's Lighting Guidelines for all new and existing overhead and cantilever sign structures within the Project limits and/or modified by the Project and shall be in accordance with the lighting section of this RFP. All sign lighting shall be on dedicated circuits. The sign lighting design shall be shown on the roadway lighting plans.

3.12.05.03 Submittals

The Design-Builder shall submit the following items prior to the Final Design Signing Review:

- A) Definitive Design Signing Roll Plan;
- B) For all proposed sign structures, the Administration's sign structure input sheet for each overhead/cantilever sign structure along with the associated cross-sections; and
- C) For all existing sign structures, the Administration's 'Structure Verification for Adding, Deleting or Modifying Signs on Existing Structures' sheets.

3.12.06 Pavement Markings

3.12.06.01 Design and Construction Requirements

All temporary pavement markings shall be shown on the Traffic Control Plans (TCP). Temporary pavement markings shall be designed and installed to provide motorist guidance throughout and within the Project limits. Temporary pavement marking tape shall be used on all concrete surfaces. Temporary tape or paint is permitted on asphalt surfaces.

All proposed permanent pavement markings shall be shown on definitive plans for signing and reviewed by the Administration prior to advancing the design.

All proposed pavement marking shall be shown on the same plan sheets as the signs. All single longitudinal lines shall be 5 inches wide, and all double width lines shall be 10 inches wide. The plans are to show color, size, location, and material type for markings within the limits of work. The final design marking plans shall be indicated on the signing plan with the same scale as the signing plan. The lanes shall be dimensioned based on the typical sections for the Project. Dimensions shall be included for each change in the roadway typical. The plan shall also clearly define locations where pavement markings change color, width, or material.

The Design-Build Team shall be responsible for the design and construction of all pavement markings. For all final pavement marking lane lines, including parallel, acceleration/deceleration lanes for ramps, intersection auxiliary lanes, and Raised Pavement Markers (RPMS), the following Pavement Marking Material Table shall be adhered to:

Pavement Marking Abbreviations

RPMs – Snowplowable Raised Pavement Markers

PPPRP – Permanent Patterned Preformed Retro-Reflective Pavement Markings

Durable Markings – Includes thermoplastics, patterned 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).

Paint – Whenever paint is listed as an application, the 50/50 blend of large and standard glass beads is required.

Pavement marking types and locations shall be in accordance with Table 6 – Roadway



Pavement Markings. Use 2013 AADT where applicable in Table 6.

Table 6
Roadway Pavement Markings

CATEGORY	Roadway Type		Line Striping Material	
		CENTER LINES	LANE LINES	EDGE LINES
Portland Cement Concrete (PCC) (Including Bridge Decks)				
1	Interstate Highway / Freeway / Expressway	-----	Contrast PPRP with RPM's	PPPRP**
2	Highway (other than Interstate / Freeway / Expressway) AADT ≥ 50,000	PPPRP with RPM's	Contrast PPRP with RPM's	PPPRP
3	Highway (other than Interstate / Freeway / Expressway) AADT < 50,000	PPPRP with RPM's	Contrast PPRP with RPM's	PPPRP
HOT MIX ASPHALT (HMA)				
1	Interstate Highway / Freeway / Expressway	-----	PPPRP with RPM's	PPPRP
2	Multi-lane or Divided Highway (other than Interstate / Freeway / Expressway) AADT ≥ 50,000	PPPRP with RPM's	PPPRP with RPM's	PPPRP
3	Multi-lane or Divided Highway (other than Interstate / Freeway / Expressway) AADT < 50,000	Durable with RPM's	Durable with RPM's	Durable
4	2-Lane 2-Way Roadway AADT ≥ 30,000	Durable	-----	Durable
5	2-Lane 2-Way Roadway AADT < 30,000	Paint	-----	Paint
6	2-Lane 2-Way Roadway AADT < 30,000	All pavement markings (center lines, lane lines, and edge lines) on Prince George's County roadways shall be of thermoplastic material.		
** Note: Contrast Markings shall be utilized for the right edge (white) lines. The left edge (yellow) lines shall not utilize contrast markings.				

For pavement markings along ramps, the Design-Builder shall utilize the highest category markings of the intersecting roadways, with 1 being assigned the highest category marking and 3 assigned the lowest.

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.

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.

3.12.07 Traffic Signals

3.12.07.01 Traffic Signal Functional Operation Requirements

Based on the general geometric layout shown in the concept plans included in the RFP, Design Request Forms have been completed and approved for permanent traffic signals at the intersections of MD 4 at MD 458 (Silver Hill Road), MD 4 at Parkland Drive, MD 4 at Walters Lane, MD 4 at Donnell Drive and MD 4 at Forestville Road and the mid-block pedestrian crossing approximately 1000 feet west of Donnell Drive. Permanent traffic signals shall be designed as per the requirements outlined in the Design Request Forms, and as noted below (if the general geometric layout remains the same at the listed intersections). Uninterruptible Power Supply (UPS) shall be installed at all intersections with double left turn movements, associated with a ramp to/from a major highway, with the master system controller and as requested by the Administration.



Reconstruction of Traffic Signals shall include but not be limited to installing new signal poles, pedestrian poles, intersection lighting, signal heads, pedestrian heads, handholes, wiring, cabinets, meter service pedestals, non-invasive detection (as required), video detection systems (including cameras and all necessary wiring), and signal related signing and marking in accordance with Administration standards and typical practice.

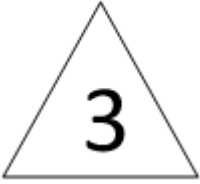
Modification of Traffic Signals shall include specific upgrades as identified in the Design Requests Forms as well as upgrading to meet current SHA standards.

MD 4 and MD 458 (Silver Hill Road)

- Traffic Signal Reconstruction
- Pedestrian crossing shall be provided across all legs
- Existing Interconnect shall be replaced
- Where possible, twin mast arms installed in the median shall be utilized
- Nearside signal heads will be required for all approaches
- Typical signing, marking and lighting
- Typical signal design layout, features, and materials
- New NEMA "S" cabinet with battery backup required
- Pedestrian ramps to meet Accessible Pedestrian Signal/Countdown Pedestrian Signal (APS/CPS) guidelines as well as ADA guidelines



MD 4 and Parkland Drive



- Traffic Signal Reconstruction
- Pedestrian crossing shall be provided across all legs and tie into existing hiker/biker trail along southbound MD 4
- Existing Interconnect shall be replaced
- Where possible, twin mast arms installed in the median shall be utilized
- Nearside signal heads will be required for MD 4 approaches
- Typical signing, marking and lighting
- Typical signal design layout, features, and materials
- New NEMA “S” cabinet required
- Pedestrian ramps to meet APS/CPS guidelines as well as ADA guidelines
- Existing opticom detection shall be replaced
- Existing communication wires may need to be relocated to accommodate new signal design

MD 4 and Walters Lane



- Traffic Signal Reconstruction
- Pedestrian crossing shall be provided across all legs
- Existing Interconnect shall be replaced
- Existing GPS unit shall be relocated to a new signal pole
- Where possible, twin mast arms installed in the median shall be utilized
- Nearside signal heads will be required for MD 4 approaches
- Typical signing, marking and lighting
- Typical signal design layout, features, and materials
- New NEMA “S” cabinet with battery backup required
- Pedestrian ramps to meet APS/CPS guidelines as well as ADA guidelines
- Existing communication wires may need to be relocated to accommodate new signal design

MD 4 and Donnell Drive



- Traffic Signal Reconstruction
- Pedestrian crossing shall be provided across all legs.
- Existing Interconnect shall be replaced
- Existing GPS unit shall be relocated to a new signal pole
- Signal equipment should be installed away from the medians
- Nearside signal heads will be required for MD 4 approaches
- Typical signing, marking and lighting
- Typical signal design layout, features, and materials
- New NEMA “S” cabinet required
- Pedestrian ramps to meet APS/CPS guidelines as well as ADA guidelines
- Existing communication wires may need to be relocated to accommodate new signal design

MD 4 approximately 1000 feet west of Donnell Drive



- Traffic Signal Modification
- Mid-block pedestrian crossing
- Existing Interconnect shall be replaced
- Pedestrian ramps to meet APS/CPS guidelines as well as ADA guidelines
- Hazard Identification Beacons in both directions

MD 4 and Forestville Road



- Traffic Signal Modification
- Pedestrian ramps to meet APS/CPS guidelines as well as ADA guidelines
- Replace existing pushbuttons
- Typical signing, marking, and lighting
- Typical signal design layout, features, and materials

3.12.07.02 Design and Construction Requirements

3.12.07.02.01 Definitive Design Traffic Signal Roll Plan

The Design-Builder shall prepare a Definitive Design in the form of a traffic signal location roll plan for Administration review that includes all existing signal equipment and interconnect, and displays all proposed signal equipment and interconnect within the Project. The plan shall also display all existing and proposed crosswalks within the Project. Any temporary Maintenance of Traffic (MOT) Signal Plan(s), and signal plans showing the phasing of signal construction, shall also be presented at this time.

3.12.07.02.02 Plan Sheet Requirements

The Design-Builder shall prepare Traffic Signal plans to address any new traffic signals, temporary traffic signals, or modifications to existing traffic signals that are required. The traffic signals shall be designed as per the approved Design Request and as specified in section 3.12.07.01 Traffic Signal Functional Operation Requirements for each intersection. All traffic signal plans shall be drawn in accordance with the Administration's Traffic Control Device design manual, CADD standard requirements, and the MD MUTCD.

Existing traffic signal operation and detection shall be maintained during all phases of the roadway construction and all stages of Maintenance of Traffic.

Design and construction of all permanent traffic signals shall use mast arm signal poles unless otherwise noted by the Administration. The use of diagonal single mast arms is not permitted, unless approved by the Administration. 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.

Lighting shall be provided on signal poles on the far side of the mainline approaches to the intersection wherever feasible, and shall be coordinated with adjacent existing and/or proposed roadway and/or sign lighting and in accordance with the lighting section of this RFP. Electrical cables for intersection lighting shall not pass through the signal cabinet. Electrical cables for intersection lighting shall not pass through the same conduit nor handhole as interconnect cable. Electrical cable for lighting shall only pass through the same conduit as signal cable when lighting is installed on signal poles; electrical cable for lighting on dedicated lighting poles shall pass through separate conduit and handholes.

3.12.07.02.03 Interconnect Plans

The Design-Builder shall prepare traffic signal interconnect plans as indicated in the Design Request and section 3.12.07.01 Traffic Signal Functional Operation Requirements. Interconnect plans shall be drawn at a scale of 1"=50'. The Design-Builder shall obtain all existing interconnect information and all existing interconnected signals shall remain connected under the final design. Interconnect plans shall include controller cabinet locations, conduits, handholes, sampling stations, wiring diagram, cables, construction details, and equipment list in accordance with the Administration's design and CADD requirements. All existing traffic signal interconnect shall be maintained throughout construction, which may require relocation or temporary interconnect. Along any run of interconnect, there shall be no net increase in splice points. The Design-Builder shall utilize at least twelve-pair communication cable for all proposed interconnect. All impacted or damaged interconnect cables shall be replaced in-kind.

Traffic signal interconnect cables shall not utilize conduit or handholes/manholes/junction boxes that contain electrical cables.

The Design-Builder shall be responsible for all work and costs associated with maintaining communication cable throughout construction for affected traffic signals. The Design-Builder shall be responsible for utility pole removals required when relocating existing interconnect. 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 fiber optic cable impacted by construction. The Design-Builder shall coordinate with SHA to facilitate the relocation of existing interconnect and fiber optic cables and equipment. All proposed splices shall occur in signal or splice 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.

3.12.07.02.04 Utility Requirements

The Design-Builder shall be responsible for locating and marking all underground and overhead utilities prior to any signal installation 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 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 (see TYP. 807.07-01 and 807.07-02) 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.

3.12.07.02.05 Sight Distance Requirements

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 also provide 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.

The Design-Builder shall prepare and present sightline plans for all traffic approaches to the Administration for review and written comment.

The Design-Builder shall also prepare and submit to the Administration for review and written comment sightline profiles for all overhead signs, bridges, and hazard identification beacons that are on traffic signal approaches. The Design-Builder shall prepare and present to the Administration for review and written comment separate sightline plans and profiles for each MOT phase that has different sightlines approaching a traffic signal. If sight lines do not meet the MD MUTCD requirements, the Design-Builder shall provide a recommendation for meeting the requirements to the Administration, such as red signal ahead warning signs or flashing beacon signs.

3.12.07.02.06 Materials

Traffic signals shall be designed and constructed in accordance with the following:

- A) Using Video Detection systems for vehicle detection;
- B) Using passage detection on intersection approaches, as per SHA's Traffic Control Devices Design Manual;
- C) 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;
- D) Wiring required;
- E) Using Light-Emitting Diode (LED) traffic signal heads and countdown pedestrian signal heads;
- F) Using schedule 80 rigid PVC conduit for underground installations;
- G) Furnishing and installing required signal related signing; and
- H) All exposed conduit shall be constructed of galvanized rigid steel.

3.12.07.03 Temporary Traffic Signals

The Design-Builder shall provide temporary traffic signals as required by the traffic control plans and Design Request Forms. If the Design-Builder anticipates the need for the installation of temporary traffic signals, the Design-Builder shall perform all studies as necessary for placement of Temporary Traffic signals, complete the Design Request Forms, and present all information to the Administration for review. and written comment. Temporary traffic signals, if needed, shall be designed as per the requirements outlined in the Design Request Form and section 3.12.07.01 Traffic Signal Functional Operation Requirements. If a temporary traffic signal is used, all associated signal equipment will be removed at the conclusion of the associated phase of construction and after ultimate equipment is installed.

3.12.07.04 Submittals

The Design-Builder shall submit the Definitive Design Traffic Signal Roll Plan prior to advancing design to the readiness for construction review. The Design-Builder shall submit the traffic signal roll plan at the same time of submitting the signing roll plan.

3.12.08 Lighting

3.12.08.01 Design and Construction Requirements

The Design-Builder shall design all Lighting, prepare contract documents, and construct all lighting within the Project limits in accordance with the approved Design Request Forms.

For existing lighting, the maximum outage time for luminaires shall be 24 hours unless otherwise approved by the Administration. All proposed and existing luminaires within the Project limits shall be working upon completion of the Project.

All underground lighting conduits shall be schedule 80 rigid PVC conduit. All exposed conduits shall be galvanized rigid steel conduit.

All roadway lighting installed under this Project shall be located a minimum of 50 feet from any overhead or cantilever structure.

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 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. Power supply for roadway lighting shall be installed in separate conduits and on independently metered circuits for respective jurisdictional owners.

The Design-Builder shall provide voltage drop calculations for all circuits. The voltage drop for each branch circuit shall not exceed three percent for new circuits and five percent for 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.

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 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. 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. No electrical handholes/handboxes/manholes shall be placed in drainage ditches. 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 handboxes, handholes, and manholes) and on independently metered circuits for respective jurisdictional owners.

An inventory of all lighting equipment within 500 feet of the project limits along MD 4 and all cross-streets shall be provided to the Administration prior to commencing construction. This shall also include the location and condition of the lighting for the ramp from eastbound MD 4 to southbound I-95/495. This inventory shall include photos and functionality status for each light pole/fixture. 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 unless it is being removed. All abandoned cables shall be made safe.

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 the scheduled equipment removal.

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/junction boxes separate from the traffic signal equipment.

The Design-Builder shall place roadway luminaries approximately one foot over the pavement marking edge line. To avoid foundation conflicts, the luminaire location may be adjusted approximately 3 feet over the pavement marking edge line, subject to review and concurrence by the Administration.

3.12.08.01.01 Definitive Design Lighting Roll Plan

A lighting roll plan shall be presented at the definitive review and concurrently with the signing and signal roll plans for review and written comment by the Administration. The lighting roll plans shall include proposed locations for all lights and photometric calculations supporting the light locations. The lighting roll plan shall be submitted to the Administration for consultation and written comment prior to the Design-Builder proceeding with the design, installation, or modification of lighting.

The Design-Builder shall provide spacing computations showing illuminance and veiling luminance calculations, as appropriate. The 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. The computations shall use the lamp lumen requirements in Section 950.12.02 of the Administration's Standard Specifications for Construction and Materials. 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.

The Design-Builder shall design, fabricate, and install all roadway lighting shown on the definitive design plan within 5 feet of the location shown on the definitive design plan or as otherwise approved by the Administration.

3.12.08.01.02 Plan Sheet Requirements

The Design-Builder shall prepare and present lighting plans with a scale appropriate for the Project, generally 1"=50'. 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 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 on 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 manholes/junction boxes. Voltage drop calculations shall be provided concurrently with the lighting plan sheets.

3.12.08.01.03 Existing Lighting

All impacted existing roadway lighting shall be replaced by the Design-Builder. Lighting shall incorporate the same luminaire and pole type as on the rest of the roadway in order to maintain consistency. An inventory of all lighting equipment within 500 feet of the project limits along MD 4 and all cross-streets shall be provided to the Administration prior to commencing construction. This shall also include the location and condition of the lighting for the ramp from eastbound MD 4 to southbound I-95/495. This inventory shall include photos and functionality status for each light pole/fixture.

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.

3.12.08.01.04 Continuous Roadway Lighting

The lighting system shall be installed in the form of continuous roadway lighting along MD 4 between Forestville Road and MD 458. All continuous roadway lighting shall be prepared using the SHA Lighting Guidelines for Major Roadway with High Pedestrian Conflicts. A photometric analysis along the roadway is required as a part of the Definitive Design roll plan. All continuous roadway lighting shall be on dedicated circuits.

3.12.08.01.05 Intersection Lighting

All intersections (both signalized and unsignalized) along MD 4 within the project limits shall have intersection lighting. The Design-Builder shall combine intersection lighting with the traffic signal plans whenever possible. All intersection lighting shall be prepared using the Administration's guidelines for partial intersection/entrance lighting. See the guidelines for the design and photometric (and calculation zone) requirements of intersection lighting. A photometric analysis at each intersection is required as part of the Definitive Design roll plan.

3.12.08.01.06 Sign Lighting

Sign lighting shall be installed and designed in accordance with the SHA Lighting Guidelines. Signs shall only be lit from beneath the signs. Acceptable lighting shall consist of a long-life system, meeting the following requirements:

Using Light Emitting Diode (LED) luminaires approved by the Administration;

- A) Having a functional life time of at least 100,000 hours, including lamp and ballast;
- B) Having < 50% failure of any component at 60,000 hours, including lamps; and
- C) 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 OOTS standard lighting charts.

All other 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.

3.12.08.01.07 Pedestrian Lighting

Pedestrian lighting fixtures shall not be installed. The Design-Builder shall provide lighting for the pedestrian walkway utilizing the roadway lighting fixtures. The lighting along the pedestrian walkway shall be designed to accommodate the values stated in the SHA Lighting Guidelines for Medium Pedestrian Conflict Areas for Average Horizontal Illuminance at the walkway/bikeway and Uniformity. However, the illuminance requirement outlined in this RFP for roadway lighting shall not be compromised. The design

of lighting along the pedestrian walkway shall be on a 1 foot grid from stopline to stopline along MD 4 between intersections. Sidewalks and shared use paths shall be considered the same lighting application as pedestrian walkways. A photometric analysis at each pedestrian walkway is required as part of the Definitive Design roll plan.

The Design-Builder shall design and construct lighting that consists of cobrahead luminaires mounted at a maximum of 40 feet above the pavement with Type III full cutoff optics.

Non-Interchange Lighting

In locations where the Project will impact existing SHA or Prince George's County lighting shall be replaced by the Design-Builder. Lighting shall incorporate the same luminaire and pole type as on the rest of the roadway in order to maintain consistency.

3.12.08.01.07 Leased Lighting

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. The Administration will be responsible for coordinating agreements with the utility company.

3.12.08.01.08 Temporary Lighting

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 shown on the Concept Plans 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.

3.12.08.01.09 Electrical Service for Lighting

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.

3.12.08.01.10 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). House side shielding shall be provided where necessary to achieve the 0.05 fc horizontal or vertical illuminance requirement. House side shielding shall also be provided with all roadway lighting within 75 feet of a residential structure. All photometric analyses for light trespass at residential property lines shall utilize a light loss factor of 1.00.

3.12.08.01.11 FAA Approvals

The MD 4 from Forestville Road to MD 458 project is located in the vicinity of the Joint Base Andrews. An Airport Safety Certification may be required if a project is within 20,000 feet of an airport or seaplane base, or within 5,000 feet of a heliport. These certifications ensure compliance with Federal Aviation Administration (FAA) guidelines for air navigation safety outlined in 14 CFR Part 77.

The Administration has reviewed the Concept Plans and found that no coordination is needed with FAA for this project provided the Design Builder does not violate any of the provisions of 14 CFR Part 77. If at any time the project meets any of the criteria of 14 CFR Part 77 that would require approval

from FAA or Joint Base Andrews, the Design-Builder shall be responsible for notification to, and all subsequent coordination with the Administration, Joint Base Andrews and FAA to obtain the required approvals..

The Design-Builder is required to comply with FAA requirements while designing and constructing light poles/structures.

3.12.08.02 Submittals

The Design-Builder shall submit the Definitive Design Lighting Roll Plan prior to or at the same time of submitting the Definitive Design Signing Roll Plan.

3.12.09 Advisory Speeds

The Design-Builder shall be responsible for providing a report to the Administration that documents all advisory speeds. The report shall include an investigation of the horizontal geometrics based on AASHTO roadway design guidelines. The investigation shall define the critical stopping sight distance for each curve. These above values shall be field verified to determine if the actual conditions provide the critical distances required. Pavement conditions of the roadway shall also be noted. Photographs for each curve shall be taken and included in the report. The Design-Builder shall evaluate curves with an electronic accelerometer (CurveRite Model 1100 or approved equivalent). All electronic accelerometer measurements shall follow the manufacturer's instructions. The field testing shall not exceed the posted regulatory mainline speed limit and shall be stopped if g-force measurements exceed 0.40 g-ft/sec^2 . The recommended average g-force for determining advisory speeds is 0.28 g-ft/sec^2 and the advisory speeds should be posted in 5 MPH increments.

3.12.10 Regulatory Signing

The Design-Builder shall be responsible for providing an engineering study to the Administration that documents all regulatory signing (i.e., speed limits, truck restrictions, etc.) installed under this Project.

3.12.11 Traffic Control Device Verification

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

TC 3.13 LANDSCAPE PERFORMANCE SPECIFICATIONS**3.13.01 Preservation of Trees and Woodlands**

The Administration has imposed restrictions on construction activities that increase the removal of existing trees. The Administration will also require that the project design minimize the amount of trees removed and avoid or minimize impacts to existing tree stands and specimen trees through sound tree protection measures including implementing the 700 Tree Preservation Program Special Provision (TPP) of which a template can be obtained from SHA/OED/ LAD.

- A. All trees removed or trimmed within the project shall be in accordance with the Roadside Tree Law and Section 120-Tree Preservation of the Administration's Standard Specifications. All tree removal and tree protection efforts shall be shown on the construction plans. All forest removed within this project shall be conducted in accordance with the Reforestation Law. Forest impacts are estimated to be approximately **5.97 acres**.
- B. On-site reforestation as shown on the Forest Impact Plans and described in this document shall be made part of this contract. Any proposed revisions to the Reforestation Site Review Approval shall be coordinated with SHA/LOD/LAD and DNR. Any DNR requirements or conditions associated with the modification of the Reforestation Site Review Approval shall be the responsibility of the Design-Build Team as stated elsewhere.
- C. The order of preference for the location of reforestation is as follows:
 1. Cleared land within project limits that is not otherwise allocated for reforestation due to other current or future SHA projects.
 2. Offsite area in adjacent SHA lands, within the same watershed, and in coordination with and with the approval of the SHA.
- D. The Design-Build Team must employ the services of an ISA Certified Arborist and a MD Licensed Tree Expert, who shall perform the following activities:
 1. Conduct an on-site inspection to determine the presence and location of any and/or specimen or significant trees within the limits of disturbance (LOD) plus 30 feet beyond the limits of disturbance. Specimen trees are defined as trees with a Diameter at Breast Height (DBH) of 30" or greater or at least 75% of the DBH of the MD State Champion of the species, whichever DBH measurement is smaller.
 2. Prepare a Tree Impact Avoidance and Minimization Report and TPP as described under Deliverables and consistent with the Administrations 2008 Standard Specifications Section 120-Tree Preservation.

3.13.02 Guidelines and References**3.13.02.01 Guidelines**

Design and construct the Landscape & Aesthetics in accordance with the relevant requirements of the Guidelines listed by priority in Table 1, unless otherwise stipulated in this specification. Guidelines specifically cited in the body of this specification establish requirements that shall have precedence over all others. Should the requirements in any Guidelines below conflict with those in another, the Guideline listed with the higher priority 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.

Use the most current version of each listed Guideline as of the initial Publication Date of this RFP.

Table1**Guidelines for Landscape**

Priority	Author or Agency	Title
1	SHA	Standard Specifications for Construction and Materials
2	SHA	Landscape Design Guide
3	SHA	Category 700 Landscape Cost Estimating Manual
4	MDE	2000 Maryland Stormwater Design Manual, Appendix A, Landscaping Guidance for Stormwater BMPs and 2009 Chapter 5 Environmental Site Design (ESD)
5	ANSI A300 Part 1	Tree Care Operations – Tree, Shrub and Other Woody Plant Maintenance – Standard Practices
6	ANSI A300 Part 2	Tree Care Operations – Tree, Shrub and Other Woody Plant Maintenance – Standard Practices – Part 2 – Fertilization
7	ANSI A300 Part 3	Tree Care Operations – Tree, Shrub and Other Woody Plant - Standard Practices – Part 3 – Tree Support Systems
8	ANSI Z60.1	American Standard for Nursery Stock
9	AASHTO	Roadside Design Guide Chapters 4, 5, 6 and 10

Table1
Guidelines for Landscape

Priority	Author or Agency	Title
10	AASHTO	T88 and T194
11	SHA	Highway Hydraulic Division Stormwater Management Facility Safety Policy for Design
12	COMAR	Nutrient Management Law

3.13.02.02 References

Use the references listed in Table 2 as supplementary materials for the design and construction of the Landscape & Aesthetics. These publications have no established order of precedence.

Table **2**
References for Landscape

Author or Agency	Title
ANSI Z133.1	Safety Requirements for Pruning, Trimming, Repairing, Maintaining, and removing Trees, and for Cutting brush
Hortus Third	A Concise Dictionary of Plants Cultivated in the United States and Canada (L. H. Bailey Hortorium 1976)
AASHTO	A Guide for Transportation Landscape and Environmental Design
DNR	Department of Natural Resources Article 5-103 – Maryland Reforestation Law; and Maryland Forest Conservation Act

3.13.03 General

The Design-Builder shall design and construct Landscaping and Mitigation Plantings associated with the Project in accordance with these specifications.

- A. The Design-Build Landscape Architect shall prepare a set of Landscape Plans for Landscaping, Reforestation, and other Plantings, based on specifications and Forest Impact Plans included in this Request for Proposals document. Plans shall be at the scale equal to the sediment and erosion control plans, but not less than 1"=50'. Plans shall include schedules of all materials proposed for use, and shall be submitted to the Administration, Landscape Architecture Division (LAD) and Landscape Operations Division (LOD), for review and approval. Roadside Landscape and Reforestation Plans should include the following information:
1. Vicinity Map of site location for both on-site and off-site reforestation areas
 2. Critical Root Zones for individual significant or specimen trees, as defined by the Maryland Department of Natural Resources: Measured from the center of the trees trunk; 1 foot of radius per inch of DBH (Diameter at Breast Height), for trees 30" DBH or less; and 1.5 feet of radius per inch of DBH for trees equal or greater than 30" DBH.
 3. 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 and the TPP.
 4. 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.
 5. Existing roadway and incidental structures, including utilities.
 6. Proposed Roadway Improvements, including traffic control devices, highway and incidental structures, drainage features and SWM facilities, utilities, etc.
 7. Limit of Disturbance (LOD).
 8. Density and quantity of plantings area provided for mitigation.
 9. A schedule of materials, indicating 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.
 10. Defined limits of mowing and limits of mulching where applicable.

11. Additional information as required by the Administration.

- B. The Design-Build Team shall coordinate the Landscape Plans with all other design disciplines and elements of work to be performed under the Contract including, but not limited to: roadway and sidewalk alignments, grading, stormwater management facilities and ancillary structures, drainage swales, storm drain, stormwater management BMP outfalls and cross culvert outfalls, utilities, other paved areas, maintenance access ways, and traffic control devices, signage and lighting.
- C. Landscape Plantings required as part of the stormwater management plans shall be coordinated with the landscape and reforestation plans to ensure that a unified planting theme is created for the project.
- D. Landscape design shall conform to the Administration's *Integrated Vegetation Management Manual for Maryland Highways*.

3.13.03.01 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 to ensure adequate opportunity for coordination and integration with other engineering and design disciplines.

- A. Preliminary Landscape Plans shall be prepared by the Design-Build Team based on the specifications in this RFP and Forest Impact Plans included on ProjectWise.
 - 1. The development of the Preliminary Landscape Plans shall be done in close coordination with the development of the various engineering plans to identify and reduce any potential conflicts.
 - 2. The preliminary plans shall be at a scale appropriate for the project but no less than 1"= 50' and may include graphics, sketches and illustrations to convey the Landscape Architect's design intent in complying with the requirements of RFP.
 - 3. Information shown on the Preliminary Landscape Plans shall include, but not be limited to: existing conditions, proposed and existing utilities, proposed roadway and paved areas, tree preservation areas, reforestation areas, general plant types, locations and potential species selections, stormwater management facilities and landscaping concepts, cut and fill lines, limit of disturbance lines, right-of-way lines, and other information deemed necessary for adequately evaluating the proposed planting locations.

- B. The Design-Build Team shall prepare meeting minutes and distribute them to attendees for review and comments. After approval of the Preliminary Landscape Plans by OED-LAD, the Design-Build Team may then begin to develop Semi-final and Final Landscape Plans.
- C. 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 recommend remedies that may be considered by the Administration.

3.13.03.02 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 and mitigation plantings according to the following criteria:

A. The Administration does not anticipate that existing topsoil can be salvaged in sufficient quantities for proposed work based on the preliminary soil analysis provided on Projectwise. The Design-Builder may determine through additional analysis whether existing subsoil and topsoil in salvageable condition is available in sufficient quantities for proposed work.

- 1. The Design-Builder shall ensure that soil which is to be planted, seeded, or sodded is properly prepared in accordance with an approved Nutrient Management Plan (701.03.01 (b) SSCM) to provide successful plant establishment. Nutrient Management Plans for furnished soil will be provided by the SHA – Landscape Operations Division (LOD) during construction subsequent to the selection and analysis of the furnished soil supply. Nutrient Management Plans for salvaged soil will be provided by the SHA – Landscape Operations Division (LOD) as requested by the Design-Builder and subsequent to the submission of all analysis and documentation requested by SHA-LOD necessary to prepare the Nutrient Management Plan. An approved Nutrient Management Plan shall be obtained from SHA-LOD prior to the application of soil amendments.
- 2. The Design-Builder shall provide the appropriate soil profile, including subsoil and topsoil, where necessary for proposed vegetative treatment and/or healthy landscaping as specified in the Contract Documents.
 - a. Existing soils within landscaped areas of the project are approved for use as subsoil.
 - b. All disturbed areas to be landscaped shall be restored to a condition that provides at least 12 inch depth of subsoil, and topsoil as described below. If disturbed area is less than 4 inches, then turf area shall be filled with all topsoil

or 6 inch depth of topsoil for landscape beds.

- c. Full depth pavement removal of existing roadways to be restored with landscaping shall be excavated as necessary to remove pavement and sub-base to allow placement of minimum 12 inch depth of subsoil and topsoil as described below.
 - d. In locations where individual landscape trees and shrubs in planting pits or planting beds are to be installed or landscaped medians, a minimum of 18 inch depth subsoil is required.
 - e. Install a minimum of 4 inch depth topsoil in Turfgrass Establishment and Turfgrass Sod Establishment areas. This requirement may be reduced to 2 in. topsoil on 2:1 or greater slopes and reinforced slope systems.
 - f. Install a minimum of 6 inch depth topsoil in planting bed locations and in curbed medians that are to receive Turfgrass Establishment, Turfgrass Sod Establishment, or planting.
 - g. Install a minimum of 6 inch depth topsoil and 12 inch depth subsoil in all landscape beds.
3. The Design-Builder shall be responsible for removing unsuitable subgrade, loosening highly compacted subgrade to a minimum 6 inch depth, and furnishing additional subsoil and topsoil as necessary to provide successful plant, turfgrass and turfgrass sod establishment.
- B. If the Design-Builder or SHA identifies a conflict between the Landscape Plans and other plan sheets or as-built conditions, the Design-Builder shall be responsible for modifying the plans to the satisfaction of SHA.
- C. Areas used for stormwater management shall not be used for Reforestation plantings or Landscape plantings other than what is required or recommended as part of the stormwater management design performance specifications or as according to the Guidelines referenced or contained in the Contract specifications.
- D. The Design-Builder shall furnish seed and seed mixes according to the *SSCM* and in accordance with applicable State and Federal Law.
- E. Select landscape plants using the SHA/OED/LAD preferred plant list. Diversity is encouraged. Landscape plants 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, sizes, forms, and spacing or density requirements are listed in each of the Landscape Zones. Requests for substitution of other

species, selections, and cultivars, sizes, forms, or root conditions submitted in writing will be reviewed by OED-LAD and approved where appropriate.

- F. Utility and Safety Setbacks. Reference the SHA/OED/LAD Landscape Design Guidelines for utility and safety setback requirements. The Design-Builder shall avoid conflicts between trees and shrubs and existing and proposed/relocated utilities (overhead and underground), roadway pavements, guardrails, signage, lighting, etc. during design and shall be responsible for resolving conflicts during construction, subject to approval by OED-LAD.

3.13.03.03 Low Maintenance Landscape Design.

Roadside plantings, including but not limited to: landscape enhancement, screening, reforestation, revegetation, and stormwater management facility landscaping shall be designed following a design approach that balances aesthetic appeal, safety, and environmental stewardship with maintenance requirements. The Design-builder shall develop designs that minimize landscape maintenance requirements as follows:

- A. Arrange individual tree plantings, planting beds, and plant massings to accommodate mowing such as placing trees in planting beds instead of having them in the open.
- B. The Design-Builder shall use Turfgrass Establishment (*SSCM 705*) or Turfgrass Sod Establishment (*SSCM 708*) in all locations requiring regular mowing maintenance as per the *SHA Integrated Vegetation Management Manual for Maryland Highways*, and in areas where vegetation height must be controlled to maintain sight distance such as merge areas and roadside shoulder areas, in SWM management facilities, and elsewhere as specified in the Contract Documents.
- C. 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.
- D. Limit the use of shrub and perennial beds primarily to high-visibility locations and tighten plant spacing to minimize weed growth. Where space is available, masses of evergreens, flowering, and deciduous trees can provide substantial aesthetic benefits while requiring less annual maintenance than shrub or perennial beds. Shrub masses in areas that will be allowed to naturalize rather than receive frequent maintenance are to be mulched to discourage weed growth and aid plant establishment.

3.13.03.04 Invasive Species Management.

Successful landscape and mitigation plantings cannot be successfully established without

management of invasive species and woody and herbaceous weeds.

- A. Invasive species and prohibited weeds, as listed in *SSCM* Section 920.06.02 Prohibited Weeds, shall be treated and removed within the project limits in coordination with the OED-LOD.
- B. The Design-Builder shall develop an invasive species/prohibited weeds treatment plan and schedule detailing proposed methods for control and removal of invasive species/prohibited weeds for review and approval by the OED-LOD.
- C. The Design-Builder shall conduct invasive species management operations as appropriate for proposed final landscape treatments. For example, operations using herbicides will be scheduled with sufficient lead time prior to plant installation or seeding.

3.13.03.05 Landscape Architect and Other Personnel Requirements

This project requires the Design-Builder to have an experienced landscape architectural design team. This team shall address, in a collaborative, multi-disciplinary approach, the functional and aesthetic requirements of the Project, which includes the preparation and successful implementation of the design that responds to the requirements established for the project. The lead landscape architect shall be licensed with the State of Maryland, have 5 years of documented experience in the landscape design of highway environment and SWM facilities, and demonstrate the familiarity with SHA landscape design and stormwater management site development criteria. Design-Builder is to submit these qualifications to SHA for its review.

3.13.04 Planting Zones

The Design-Builder shall 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 all 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 apply to all plantings within the project limits.

The following Planting Zones are proposed within the limits of this Contract:

3.13.04.01 REFORESTATION AREAS ZONE

DESIGN INTENT

The design intent for areas identified as Reforestation Areas Zone is to reforest areas that are suitable for forest plantings within the project Limits of Disturbance (LOD) area. Contact SHA/OED/LAD to obtain an MDE approved tree planting detail to plant trees outside the LOD but within the Right-of-Way. The Design-Build Team shall submit a concept landscape reforestation plan, based upon the set of SHA supplied Forest Impact Plans, indicating the trees being removed and planting opportunities for this category prior to the development of the landscape plans. The Design-Build Team is to maximize planting whenever possible.

A. The Existing Forest Removal Calculations:

1. Existing Forest Stand

A forest stand has at least 100 stems per acre, half of which are greater than 2" DBH. Total all the aggregate areas of forest within the project limits even if they are less than an acre separately.

2. Existing individual trees not within a forest stand, but located within LOD area:

Show individual trees to be removed with an "X" on plans. Individual trees labeled ≥ 3 " DBH on plans shall be counted for 1/100th of an acre of "existing forest removal" per tree.

B. Reforestation Areas shall be designed as required by the Maryland Reforestation Law and according to the following:

1. Plantings shall consist of random arrangements of native trees. A mix of native evergreen and deciduous tree species of the Piedmont region of Maryland shall be specified as appropriate to site conditions. Use of cultivars of native species may be used. The Administration will reject unacceptable species.
2. In highly visible portions of Reforestation Areas (such as roadside edges or areas on cut or fill slopes facing the highway, exit ramps, or secondary roads, the Design-Builder shall use single-species groupings of trees and shrubs or masses of single-species groupings rather than random plantings of to increase aesthetic interest. Masses of trees selected to provide added aesthetic interest with flowers, fruit, fall color, bark texture or color are recommended in highly visible Reforestation and Revegetation areas.
3. Turfgrass Establishment or Turfgrass Sod Establishment shall not be used within Reforestation or Revegetation Planting areas without approval of OED-LAD.
4. Reforestation areas must meet the following size requirements for credit under the Maryland Reforestation Law:
 - a. Reforestation areas adjacent to existing forest to remain must be at least $\frac{1}{4}$ acre in size. Combined forest area width (existing and reforestation) must be at least 50' wide.
 - b. Reforestation areas not adjacent to existing forest must be at least one half ($\frac{1}{2}$) acre in size and at least 50' wide.

C. Reforestation plantings shall be provided at 1:1. Reforestation areas species diversity

and planting density shall be as follows:

1. Stock shall consist of a mix of at least 11 species of deciduous trees and 5 species of evergreens trees, and 7 species of shrubs, with no more than 10% the same tree.
2. The following ratios are recommended but variations of 5% or less are acceptable.
 - a. 150 stems per acre.
 - b. A ratio of 70% overstory large trees to 30% understory small trees
 - c. A ratio of 70% deciduous trees to 30% evergreen trees
 - d. Trees total shall be 2 in. cal. single leader deciduous trees or 6 ft. height evergreen or 6 ft. height multi stem trees

(Container classes for container grown stock are to be specified according to ANSI Z60-1.2004 or the latest edition)

PLANTING MATERIAL:

Roadside Reforestation Zone*

BOTANICAL NAME	COMMON NAME	SIZE*	COMMENTS
Overstory Deciduous Trees (Single Leader unless noted otherwise)			
<i>Acer rubrum</i>	Red Maple	Overstory	
<i>Acer saccharum</i>	Sugar Maple	Overstory	
<i>Betula nigra</i>	River Birch	Overstory	multistem
<i>Celtis occidentalis</i>	Hackberry	Overstory	
<i>Fagus grandiflora</i>	American Beech	Overstory	
<i>Liriodendron tulipifera</i>	Tuliptree	Overstory	
<i>Liquidambar styraciflua</i> 'Rotundiloba''	Rotundiloba Sweetgum	Overstory	
<i>Nyssa sylvatica</i>	Black Gum	Overstory	may be Container Grown
<i>Platanus occidentalis</i>	American Sycamore	Overstory	
<i>Quercus alba</i>	White Oak	Overstory	
<i>Quercus bicolor</i>	Swamp White Oak	Overstory	
<i>Quercus coccinea</i> var. <i>coccinea</i>	Scarlet Oak	Overstory	
<i>Quercus palustris</i>	Pin Oak	Overstory	
<i>Quercus phellos</i>	Willow Oak	Overstory	
<i>Quercus prinus</i>	Chestnut Oak	Overstory	
<i>Quercus rubra</i>	Red Oak	Overstory	
<i>Quercus velutina</i>	Black Oak	Overstory	
<i>Sassafras albidum</i>	Sassafras	Overstory	
<i>Tilia americana</i>	Basswood	Overstory	
Understory Deciduous/ Flowering Trees (single leader unless noted otherwise)			
<i>Amelanchier canadensis</i>	Eastern Serviceberry	Understory	single leader or multistem

<i>Amelanchier laevis</i>	Allegheny Serviceberry	Understory	single leader or multistem
<i>Carpinus betulus</i>	European Hornbeam	Understory	
<i>Cercis canadensis</i>	Eastern Redbud	Understory	single leader or multistem
<i>Chionanthus virginicus</i>	White Fringetree	Understory	multistem
<i>Crataegus viridis</i> 'Winter King'	Winter King Hawthorn	Understory	
<i>Diospyros virginica</i>	Persimmon	Understory	
<i>Hamamelis virginiana</i>	Witch Hazel	Understory	Multistem
<i>Ostrya virginica</i>	American Hophornbeam	Understory	
Note: * Refer to tree size specifications as listed in C3			
Evergreen Trees			
<i>Ilex opaca</i>	American Holly	Overstory	SHA Approved Varieties
<i>Ilex x 'Nellie R. Stevens'</i>	Nellie R. Stevens Holly	Understory	
<i>Magnolia virginiana</i>	Sweetbay Magnolia	Understory	multistem, semi-evergreen
<i>Pinus rigida</i>	Pitch Pine	Overstory	
<i>Pinus strobus</i>	Eastern White Pine	Overstory	
<i>Pinus taeda</i>	Loblolly Pine	Overstory	
<i>Pinus virginiana</i>	Virginia Pine	Overstory	

Note: * Refer to tree size specifications as listed in C3.

3.13.04.02 REVEGETATION AREAS ZONE

DESIGN INTENT

The intent for this zone is to re-vegetate areas that are suitable for forest type of 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 submit a site analysis plan indicating the planting opportunities for this category. The Design-Build Team is to maximize planting whenever possible.

A. Revegetation Areas shall be designed and constructed according to the design criteria for the Reforestation Plantings Zone with the exception of the minimum area requirements.

1. The minimum width and area for Revegetation Plantings shall be 15 feet and 1,500 square feet, respectively.

- B. Do not substitute Revegetation Plantings for Reforestation Plantings required under the MD Reforestation Law. Revegetation Plantings do not qualify for credit under the law.
- C. Clearly label and differentiate Revegetation and Reforestation Areas on the Landscape Plans.

PLANT MATERIAL

Refer to the Plant Material list for species and sizes recommended for in the Reforestation Areas Zone.

3.13.04.03 ROADSIDE STREET TREE PLANTINGS ZONE

DESIGN INTENT

The design intent for this zone is to provide street trees within the public right-of-way. The Design-Build Team shall evaluate locations for street tree placement based on the existing and proposed utility locations, proposed grading, drainage and SWM facilities, proposed roadway pavement limits, safety clear zones, sight lines, adjacent land uses, and other constraints. The Design-Build Team is to maximize opportunities for street tree planting following the Landscape Design Guide. OED-LAD will make the final determination as to whether trees installation is feasible in consultation with other SHA Offices.

- A. The planting shall, at a minimum, consist of a single row of trees, planted in long groups of the same species. Areas of separation between groups, such as cross streets, shall serve as the starting point for changing to a different plant genus.
- B. 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.
- C. Recommended plant species, minimum acceptable sizes, and maximum spacing are listed below. Requests for substitution of other species, selections, and cultivars, submitted in writing will be reviewed by OED-LAD and approved where appropriate.
- D. The Design-Build Landscape Architect shall be required to specify Street Trees a minimum of 3 inch (three inch) caliper or 2.5 inch (two and half inch) for minor understory trees to allow them to be limbed up 5 ½ feet to 6 feet minimum to accommodate pedestrian or vehicular circulation or sight lines.
- E. Specify appropriate heights and forms of trees according to available space and overhead and underground clearance.
 - 1. In general, use of Major Deciduous Trees is preferred where sufficient space if available for growth.

2. Major Columnar Deciduous Trees are to be used where sufficient height clearance is available but there is insufficient space for a broad canopy due to utilities, adjacent structures, setbacks to traffic or sight lines, or other constraints.
3. Minor Deciduous trees are to be used where site conditions preclude the use of Major Deciduous or Columnar Major Deciduous Trees. Use of upright or vase-shaped trees may be required by the Administration where broad-spreading branches will pose a maintenance problem. Multistemmed Minor Deciduous trees are to be used only in locations where there is sufficient width for their establishment and where they will not conflict with site distance and safety offset distances.

- F. Where other constraints, such as traffic control devices, sight lines, and utilities do not require larger offsets, maximum street tree spacing is to be as per the following:
1. Major Deciduous trees 30 ft OC
 2. Major Columnar Deciduous Trees 22 ft. OC
 3. Single Stem Minor Deciduous Trees 20 ft. OC
 4. Multistemmed Minor Deciduous Trees 20 ft. OC

PLANT MATERIAL:

Roadside Street Tree Plantings Zone

BOTANICAL NAME	COMMON NAME	COMMENTS
Major Deciduous Trees (3 inch cal. B&B, single leader) 30 ft. OC		
<i>Acer rubrum</i> 'Autumn Flame'	Autumn Flame Maple	seedless
<i>Acer rubrum</i> 'Brandywine'	Brandywine Maple	seedless
<i>Acer rubrum</i> 'Franksred'	Red Sunset Maple	
<i>Acer rubrum</i> 'October Glory'	October Glory Maple	
<i>Acer rubrum</i> 'Sun Valley'	Sun Valley Maple	seedless
<i>Celtis occidentalis</i>	Hackberry	
<i>Carpinus betulus</i> 'Fastigiata'	Upright European Hornbeam	
<i>Gleditsia triancanthos</i> var. <i>inermis</i>	Thornless Honeylocust	SHA-approved cultivars only
<i>Gymnocladus dioicus</i> 'Espresso'	Kentucky Coffeetree	seedless
<i>Liquidambar styraciflua</i> 'Happdell'	'Happidaze' Sweetgum	few seeds
<i>Liquidambar styraciflua</i> 'Rotundiloba'	Rotundiloba Sweetgum	seedless
<i>Nyssa sylvatica</i>	Blackgum	May be container grown
<i>Ostrya virginica</i>	American London Hornbeam	
<i>Platanus x acerifolia</i> 'Bloodgood'	Bloodgood London Planetree	
<i>Platanus x acerifolia</i> 'Columbia'	Columbia Planetree	
<i>Quercus coccinea</i>	Scarlet Oak	
<i>Quercus phellos</i>	Willow Oak	

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<i>Quercus rubra</i>	Red Oak	May be container grown
<i>Quercus shumardii</i>	Shumard Oak	
<i>Tilia Americana 'Redmond'</i>	Redmond Linden	
<i>Tilia cordata 'Greenspire'</i>	Greenspire Linden	
<i>Tilia tomentosa 'Sterling'</i>	Sterling Silver Linden	
<i>Zelkova serrata 'Green Vase'</i>	Green Vase Zelkova	
<i>Zelkova serrata 'Village Green'</i>	Village Green Zelkova	
<i>Ulmus americana 'Valley Forge'</i>	Valley Forge American Elm	
Major Columnar Deciduous Trees (3 inch cal. B&B, single leader) 22 ft. OC		
<i>Acer x fremanii 'Armstrong'</i>	Armstrong Maple	
<i>Acer rubrum 'Bowhall'</i>	Bowhall Maple	
<i>Acer rubrum 'New World'</i>	New World Maple	
<i>Acer rubrum 'Scarsen'</i>	Scarlet Sentinel Maple	
<i>Acer rubrum 'Karpick'</i>	Karpick Maple (male)	
<i>Acer saccharum 'Reba'</i>	Belle Tower Maple	
<i>Carpinus betulus 'Frans Fontaine'</i>	Frans Fontaine Hornbeam	
<i>Quercus x 'Crimschmidt'</i>	Crimson Spire Oak	
<i>Quercus x 'Long'</i>	'Regal Prince' Oak	
<i>Quercus palustris 'Pringreen'</i>	Green Pillar Pin Oak	
<i>Quercus robur 'fastigiata'</i>	Skyrocket Oak	
<i>Taxodium distichum 'Mickelson'</i>	'Shawnee Brave' Bald-Cypress	deciduous conifer, specify at 8' ht.
Single Stem Minor Deciduous Trees (2.5 inch cal. B&B)		
<i>Acer campestre 'Panacek'</i>	Hedge Maple	
<i>Acer ginnala 'Flame'</i>	Flame Amur Maple	
<i>Amelanchier arborea var. arborea</i>	Common Serviceberry	
<i>Amelanchier laevis 'Autumn Brilliance'</i>	Autumn Brilliance Serviceberry	
<i>Amelanchier laevis 'JFS-Arb'</i>	Spring Flurry Serviceberry	
<i>Amelanchier laevis 'Robin Hill'</i>	Robin Hill Serviceberry	
<i>Amelanchier laevis 'Snowcloud'</i>	Snowcloud Serviceberry	
<i>Cercis canadensis</i>	Redbud	
<i>Crataegus viridis 'Winter King'</i>	Winter King Hawthorn	
<i>Malus 'Adirondack'</i>	Adirondack Crabapple	
<i>Malus 'Donald Wyman'</i>	Donald Wyman Crabapple	
<i>Malus 'Prarifire'</i>	Prarifire Crabapple	
<i>Malus 'Snowdrift'</i>	Snowdrift Crabapple	
<i>Malus zumi 'Calocarpa'</i>	Redbud Crabapple	
<i>Prunus serrulata 'Kanzan'</i>	Kansan Cherry	(commonly known as Kwanzan cherry)
<i>Prunus serrulata 'Snow Goose'</i>	Snow Goose Cherry	

<i>Prunus virginiana</i> var. <i>virginiana</i> 'Schubert Select'	Canada Red Chokecherry	
<i>Prunus x yedoensis</i>	Yoshino Cherry	
<i>Prunus x yedoensis</i> 'Akebono'	Akebono Yoshino Cherry	
Multistemmed Minor Deciduous Trees (8 ft. ht. B&B, 3, 5 or 7 stems)		
<i>Acer ginnala</i> 'Flame'	Flame Amur Maple	
<i>Amelanchier canadensis</i>	Canadian Serviceberry	
<i>Amelanchier laevis</i> 'Autumn Brilliance'	Autumn Brilliance Serviceberry	
<i>Cornus kousa</i>	Kousa Dogwood	
<i>Lagerstroemia x 'Biloxi'</i>	Biloxi Crapemyrtle	
<i>Lagerstroemia x 'Choctaw'</i>	Choctaw Crapemyrtle	
<i>Lagerstroemia x 'Lipan'</i>	Lipan Crapemyrtle	
<i>Lagerstroemia x 'Muskogee'</i>	Muskogee Crapemyrtle	
<i>Lagerstroemia x 'Natchez'</i>	Natchez Crapemyrtle	
<i>Lagerstroemia x 'Sioux'</i>	Sioux Crapemyrtle	

Note: B&B indicates balled and burlapped. Cal. indicates caliper in inches. OC indicates On Center Spacing.

3.13.04.04 NATURALIZED ROADSIDE AREAS AND STEEP SLOPES ZONE

DESIGN INTENT

In locations where regular mowing maintenance is not required per the *SHA Landscape Design Guide 8.7.E* or feasible due to steep slopes or lack of access, the Design-Builder shall provide low-maintenance, naturalized landscaping. Also included in this zone are bridge abutments and other high visibility steep slopes where additional plantings will be provided for added aesthetic interest and erosion control. Specify and perform Upland Meadow Establishment (*SSCM 707*), Shrub Seeding (*SSCM 706*), and/or specify a seed mix of native herbaceous species as approved by OED in lieu of turfgrass establishment. Use of Type D Soil Stabilization Matting (Type D SSM) is recommended and may be required by OED in locations where necessary to stabilize slopes and other areas of potential erosion prior to establishment of vegetation. Naturalized massings of trees and shrubs are to be included for added aesthetic interest, soil stabilization, and environmental enhancement. Street Tree Planting Zones will be installed along roadside edges of Naturalized Roadside Areas and Steep Slope Planting Zones where feasible.

- A. Specify Meadow Establishment as per *SSCM* Section 707 or using a customized seed mix as approved by OED, in locations where mowing is necessary annually or every other year to control the growth of woody vegetation.

- B. Where mowing will not be required or will be infeasible, Shrub Seeding per *SSCM* Section 706 and installation of B&B or container-grown stock will be provided as per the following:
- a. Large naturalized masses composed of multiple single-species groupings of trees and shrubs are to be used in high visibility naturalized or steep slope areas.
 - b. Specify tree and shrub species that provide added aesthetic interest with flowers, fruit, fall color, bark texture or color where feasible.
 - c. Installation of container grown or B&B trees and shrubs or Shrub Seeding shall occur outside of clear zones or locations where woody plants are removed during vegetation management operations as per the *SHA Integrated Vegetation Management Manual for Maryland Highways*. Meadow Establishment will be used in locations where woody plants are not permitted and regular mowing will not be required or feasible.
 - d. Container grown and B&B plants will cover 25 percent of the total area where Shrub Seeding is performed. Coverage will be calculated using the following values:
 - i. 400 SF Major Deciduous Tree 1.75" cal. B&B
 - ii. 400 SF Major Evergreen Tree 6' ht. B&B
 - iii. 200 SF Minor Deciduous Tree 1.75" cal. B&B/#10 CG
 - iv. 200 SF Major Deciduous Tree 1.25" cal. B&B/# 10 CG
 - v. 200 SF Major Evergreen Tree 3' ht. B&B/#5 CG
 - vi. 200 SF Minor Deciduous Tree 1.25" cal. B&B/#10 CG
 - vii. 100 SF Minor Evergreen Tree 3' ht. B&B
 - viii. 50 SF Large Shrub 30 SF 3' ht. #3
 - ix. 25 SF Small Shrub 20 SF 2' ht. #2
 - x. Ornamental Grasses/Perennials #1 CG 10 SF
 - xi. Ornamental Grasses/Perennials #SP4 CG 5 SF
 - xii. Ornamental Grasses/Perennials Plugs 38 per tray, 2" diam. by 5" depth. 2 SF
 - e. Provide masses composed primarily of evergreens and more closely-spaced deciduous trees and shrubs where necessary to screen views from roadways into adjacent properties. Space plants a minimum of 75% closer than typical spacing. For example, a Major Deciduous tree usually spaces at 30' O.C. would be placed at 22.5' O.C.

PLANT MATERIAL

Naturalized Roadside Areas and Steep Slopes Zone

BOTANICAL NAME	COMMON NAME	MAX. SPACING	MINIMUM SIZE
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Trees			
<i>Betula nigra</i> 'BNMTF'	Dura Heat River Birch		8' Ht. B&B, 3-5 stems
<i>Crataegus viridis</i> 'Winter King'	Winter King Hawthorn	20' OC	2" CAL B&B
<i>Crataegus crus-galli</i> var. <i>inermis</i>	Cockspur Hawthorn	20' OC	1" Cal.B&B
Shrubs			
<i>Fothergilla gardenii</i>	Dwarf Fothergilla	3' OC	2.5'HT, #3 CG
<i>Ilex verticillata</i> 'Jim Dandy'	Male Winterberry Holly	5' OC	2.5'HT, #3 CG
<i>Ilex verticillata</i> 'Red Sprite'	Female Winterberry Holly	5' OC	3'HT, #3 CG
<i>Itea virginica</i>	Virginia Sweetspire	3' OC	2'HT, #3 CG
<i>Rhus aromatica</i> 'Low-Grow'	Low-Grow Sumac	3' OC	18" Spread, #3 CG
<i>Rhus glabra</i>	Smooth Sumac	5' OC	3'HT, #5 CG
<i>Clethra alnifolia</i>	Sweet Pepper Bush	3' OC	3'HT, #3 CG
<i>Viburnum acerifolium</i>	Mapleleaf Viburnum	3' OC	3'HT, #5 CG
<i>Viburnum dentatum</i>	Arrowwood Viburnum	3' OC	30" HT, #5 CG
<i>Taxus x media</i> 'Densiformis'	Dense YEW	5' OC	2.5'HT, #3 CG
Ornamental Grasses			
<i>Panicum virgatum</i> - SHA varieties	Switch Grass	3' OC	#1 CG
Perennials			
<i>Hemerocallis</i> 'Hyperion'	Hyperion Daylily	18' OC	#1 CG
<i>Upland Shrub Seed</i> (SSCM Sec.706)			
<i>Lowland Shrub Seed</i> (SSCM Sec.706)			

Note: CG indicates Container Grown. OC indicates On Center Spacing.

Evergreen Trees			
<i>Ilex opaca</i> (SHA approved varieties)	American Holly	20' OC	6' HT. B&B
<i>Ilex x</i> 'Nellie R. Stevens'	Nellie R. Stevens Holly	20' OC	6' HT. B&B
<i>Juniperus virginiana</i> 'Corcorcor' or 'Burkii'	Corcorcor or Burkii Red Cedar	8' to 10' OC	6' HT. B&B
<i>Pinus rigida</i>	Pitch Pine	30' OC	8' HT. B&B
<i>Pinus strobus</i>	Eastern White Pine	25' OC	8' HT. B&B
<i>Pinus virginiana</i>	Virginia Pine	25' OC	8' HT. B&B

3.13.04.05 MEDIAN PLANTING ZONE

DESIGN INTENT

The intent of this zone is to provide an aesthetic quality landscape creating pleasant driving conditions and minimizing headlight glare at night. The Design-Build Team shall evaluate locations for trees and turfgrass establishment based on the existing and proposed utility

locations, signage, proposed grading, drainage and SWM facilities, proposed roadway pavement limits, safety clear zones, sight lines and other constraints. Follow SHA Landscape Design Guide as to whether trees installation is feasible.

- A. 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.
- B. Recommended plant species, minimum acceptable sizes, and maximum spacing are listed below. Requests for substitution of other species, selections, and cultivars, submitted in writing will be reviewed by OED-LAD and approved where appropriate.
- C. Specify appropriate heights and forms of trees according to available space and overhead and underground clearance.
 - 1. In general, use of Major Deciduous Trees is preferred where sufficient space is available for growth.
 - 2. Major Columnar Deciduous Trees are to be used where sufficient height clearance is available but there is insufficient space for a broad canopy due to utilities, adjacent structures, setbacks to traffic or sight lines, or other constraints.
 - 3. Minor Deciduous trees are to be used where there site conditions preclude the use of Major Deciduous or Columnar Major Deciduous Trees. Use of upright or vase-shaped trees may be required by the Administration where broad-spreading branches will pose a maintenance problem. Multistemmed Minor Deciduous trees are to be used only in locations where there is sufficient width for their establishment and where they will not obscure sight distance.
 - 4. Where other constraints, such as traffic control devices, sight lines, and utilities do not require larger offsets, maximum street tree spacing is to be as per the following:
 - i. Major Deciduous trees 30 ft OC
 - ii. Major Columnar Deciduous Trees 25 ft. OC
 - iii. Single Stem Minor Deciduous Trees 22 ft. OC Maximum, 8' OC Min.
 - iv. Multistemmed Minor Deciduous Trees 22 ft. OC Maximum, 8' OC Minimum

PLANT MATERIALS

Median Plantings Zone

BOTANICAL NAME	COMMON NAME	COMMENTS
Major Deciduous Trees (2.5 inch cal. B&B, single leader) 30 ft. OC		
<i>Celtis occidentalis</i>	Hackberry	
<i>Carpinus betulus 'Fastigiata'</i>	Upright European Hornbeam	

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<i>Gleditsia triancanthos var. inermis</i>	Thornless Honeylocust	SHA-approved cultivars only
<i>Gymnocladus dioicus</i> 'Espresso'	Kentucky Coffeetree	seedless
<i>Liquidambar styraciflua</i> 'Happdell'	'Happidaze' Sweetgum	few seeds
<i>Liquidambar styraciflua</i> 'Rotundiloba'	Rotundiloba Sweetgum	seedless
<i>Nyssa sylvatica</i>	Blackgum	May be container grown
<i>Ostrya virginica</i>	American London Hornbeam	
<i>Platanus hybrid</i> 'Bloodgood'	Bloodgood London Planetree	
<i>Platanus hybrid</i> 'Columbia'	Columbia Planetree	
<i>Quercus coccinea</i>	Scarlet Oak	
<i>Quercus phellos</i>	Willow Oak	
<i>Quercus macrocarpa</i>	Burr Oak	
<i>Quercus rubra</i>	Red Oak	May be container grown
<i>Quercus shumardii</i>	Shumard Oak	
<i>Tilia Americana</i> 'Redmond'	Redmond Linden	
<i>Tilia cordata</i> 'Greenspire'	Greenspire Linden	
<i>Tilia tomentosa</i> 'Sterling'	Sterling Silver Linden	
<i>Zelkova serrata</i> 'Green Vase'	Green Vase Zelkova	
<i>Zelkova serrata</i> 'Village Green'	Village Green Zelkova	
<i>Ulmus americana</i> 'Valley Forge'	Valley Forge American Elm	
Major Columnar Deciduous Trees (2.5 inch cal. B&B, single leader, unless noted otherwise)		
<i>Carpinus betulus</i> 'Frans Fontaine'	Frans Fontaine Hornbeam	
<i>Quercus x</i> 'Crimschmidt'	Crimson Spire Oak	
<i>Quercus x</i> 'Long'	'Regal Prince' Oak	
<i>Quercus palustris</i> 'Pringreen'	Pringeen Pin Oak	
Single Stem Minor Deciduous Trees (2.5 inch cal. B&B, unless otherwise noted)		
<i>Acer compestre</i> 'Panacek'	Hedge Maple	
<i>Acer ginnala</i> 'Flame'	Flame Amur Maple	
<i>Amelanchier arborea var. arborea</i>	Common Serviceberry	
<i>Amelanchier laevis</i> 'Autumn Brilliance'	Autumn Brilliance Serviceberry	
<i>Amelanchier laevis</i> 'JFS-Arb'	Spring Flurry Serviceberry	
<i>Amelanchier laevis</i> 'Robin Hill'	Robin Hill Serviceberry	
<i>Amelanchier laevis</i> 'Snowcloud'	Snowcloud Serviceberry	
<i>Cercis canadensis</i>	Redbud	
<i>Crataegus viridis</i> 'Winter King'	Winter King Hawthorn	
<i>Malus</i> 'Adirondack'	Adirondack Crabapple	
<i>Malus</i> 'Donald Wyman'	Donald Wyman Crabapple	
<i>Malus</i> 'Prarifire'	Prarifire Crabapple	
<i>Malus</i> 'Snowdrift'	Snowdrift Crabapple	
<i>Malus zumi</i> 'Calocarpa'	Redbud Crabapple	

<i>Prunus serrulata</i> 'Kanzan'	Kansan Cherry	(commonly known as Kwanzan cherry)
<i>Prunus serrulata</i> 'Snow Goose'	Snow Goose Cherry	
<i>Prunus virginiana</i> var. <i>virginiana</i> 'Schubert Select'	Canada Red Chokecherry	
<i>Prunus x yedoensis</i>	Yoshino Cherry	
<i>Prunus x yedoensis</i> 'Akebono'	Akebono Yoshino Cherry	
Multistemmed Minor Deciduous Trees (8 ft. ht. B&B, 3, 5 or 7 stems)		
<i>Acer ginnala</i> 'Flame'	Flame Amur Maple	
<i>Amelanchier canadensis</i>	Canadian Serviceberry	
<i>Amelanchier laevis</i> 'Autumn Brilliance'	Autumn Brilliance Serviceberry	
<i>Cornus kousa</i>	Kousa Dogwood	
<i>Lagerstroemia x 'Biloxi'</i>	Biloxi Crapemyrtle	
<i>Lagerstroemia x 'Choctaw'</i>	Choctaw Crapemyrtle	
<i>Lagerstroemia x 'Lipan'</i>	Lipan Crapemyrtle	
<i>Lagerstroemia x 'Muskogee'</i>	Muskogee Crapemyrtle	
<i>Lagerstroemia x 'Natchez'</i>	Natchez Crapemyrtle	
<i>Lagerstroemia x 'Sioux'</i>	Sioux Crapemyrtle	

Note: Other Lagerstroemia can be used – See SHA/OED/LAD Preferred Plant List.

B&B indicates balled and burlapped. Cal. indicates caliper in inches. OC indicates On Center Spacing.

3.13.04.06 ACCENT PLANTINGS (AT INTERSECTIONS) ZONE

DESIGN INTENT

The Design-Build Team shall prepare landscape plans for the Intersections, Islands, and other areas in this zone. The planting shall be integrated with the landscape theme chosen for the roadway corridor. The planting concept will be turfgrass sod establishment, flowering trees and low shrubs. Provide trees and shrubs where possible while meeting the Landscape Design Guide. There will be no large trees or large plant materials in the areas. Sight lines must be maintained at all times. A minimum of 3 feet wide of turf grass strip shall be located between curb and sidewalk and a minimum of 6 feet wide for vegetated islands and other areas in this zone.

PLANT MATERIALS:

Accent Plantings Zone

BOTANICAL NAME	COMMON NAME
Single Stem Minor Deciduous Trees (2.5 inch cal. B&B, unless otherwise noted)	

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<i>Acer compestre 'Panacek'</i>	<i>Acer compestre 'Panacek'</i>
<i>Acer ginnala 'Flame'</i>	<i>Acer ginnala 'Flame'</i>
<i>Amelanchier arborea var. arborea</i>	<i>Amelanchier arborea var. arborea</i>
<i>Amelanchier laevis 'Autumn Brilliance'</i>	<i>Amelanchier laevis 'Autumn Brilliance'</i>
<i>Amelanchier laevis 'JFS-Arb'</i>	<i>Amelanchier laevis 'JFS-Arb'</i>
<i>Amelanchier laevis 'Robin Hill'</i>	<i>Amelanchier laevis 'Robin Hill'</i>
<i>Amelanchier laevis 'Snowcloud'</i>	<i>Amelanchier laevis 'Snowcloud'</i>
<i>Cercis canadensis</i>	<i>Cercis canadensis</i>
<i>Crataegus viridis 'Winter King'</i>	<i>Crataegus viridis 'Winter King'</i>
<i>Malus 'Adirondack'</i>	<i>Malus 'Adirondack'</i>
<i>Malus 'Donald Wyman'</i>	<i>Malus 'Donald Wyman'</i>
<i>Malus 'Prarifire'</i>	<i>Malus 'Prarifire'</i>
<i>Malus 'Snowdrift'</i>	<i>Malus 'Snowdrift'</i>
<i>Malus zumi 'Calocarpa'</i>	<i>Malus zumi 'Calocarpa'</i>
<i>Prunus serrulata 'Kanzan'</i>	<i>Prunus serrulata 'Kanzan'</i>
<i>Prunus serrulata 'Snow Goose'</i>	<i>Prunus serrulata 'Snow Goose'</i>
<i>Prunus virginiana var. virginiana 'Schubert Select'</i>	<i>Prunus virginiana var. virginiana 'Schubert Select'</i>
<i>Prunus x yedoensis</i>	<i>Prunus x yedoensis</i>
<i>Prunus x yedoensis 'Akebono'</i>	<i>Prunus x yedoensis 'Akebono'</i>
Multistemmed Minor Deciduous Trees (8 ft. ht. B&B, 3, 5 or 7 stems)	
<i>Acer ginnala 'Flame'</i>	<i>Acer ginnala 'Flame'</i>
<i>Amelanchier canadensis</i>	<i>Amelanchier canadensis</i>
<i>Amelanchier laevis 'Autumn Brilliance'</i>	<i>Amelanchier laevis 'Autumn Brilliance'</i>
<i>Cornus kousa</i>	<i>Cornus kousa</i>
<i>Lagerstroemia x 'Biloxi'</i>	<i>Lagerstroemia x 'Biloxi'</i>
<i>Lagerstroemia x 'Choctaw'</i>	<i>Lagerstroemia x 'Choctaw'</i>
<i>Lagerstroemia x 'Lipan'</i>	<i>Lagerstroemia x 'Lipan'</i>
<i>Lagerstroemia x 'Muskogee'</i>	<i>Lagerstroemia x 'Muskogee'</i>
<i>Lagerstroemia x 'Natchez'</i>	<i>Lagerstroemia x 'Natchez'</i>
<i>Lagerstroemia x 'Sioux'</i>	<i>Lagerstroemia x 'Sioux'</i>
Single Stem Minor Deciduous Trees (2.5 inch cal. B&B)	
<i>Acer compestre 'Panacek'</i>	<i>Acer compestre 'Panacek'</i>
<i>Acer ginnala 'Flame'</i>	<i>Acer ginnala 'Flame'</i>
<i>Amelanchier arborea var. arborea</i>	<i>Amelanchier arborea var. arborea</i>
<i>Amelanchier laevis 'Autumn Brilliance'</i>	<i>Amelanchier laevis 'Autumn Brilliance'</i>
<i>Amelanchier laevis 'JFS-Arb'</i>	<i>Amelanchier laevis 'JFS-Arb'</i>
<i>Amelanchier laevis 'Robin Hill'</i>	<i>Amelanchier laevis 'Robin Hill'</i>

<i>Amelanchier laevis 'Snowcloud'</i>	<i>Amelanchier laevis 'Snowcloud'</i>		
Deciduous Shrubs		Max. Spacing	Min. Size
<i>Rosa 'Meidiland Scarlet'</i>	Meidiland Scarlet Carefree Shrub Rose	5' OC	#3 CG
<i>Itea virginica "Henry's Garnet"</i>	Henry's Garnet Sweetspire	5' OC	2' Height #3CG
Evergreen Shrub			
<i>Juniperus sp. (OED approved sp.)</i>	Juniper	4' OC	2' Spread B&B
<i>Ilex verticillata 'Jim Dandy'</i>	Jim Dandy Winteberry	3' OC	2' Height #3CG
<i>Ilex verticillata 'Red Sprite'</i>	Red Sprite Winterberry	3' OC	2' Height #3CG

Note: CG indicates Container Grown. OC indicates On Center Spacing.

3.13.04.07 TURFGRASS AND TURFGRASS SOD ESTABLISHMENTS ZONE

DESIGN INTENT

The design intent for this zone is to provide Turfgrass Establishment (SSCM 705) or Turfgrass Sod Establishment (SSCM 708) for areas requiring frequent maintenance to ensure safety of the user. Turfgrass establishment shall be provided for disturbed areas or deforest areas without proposed reforestation/revegetation, bio swale, water quality swale, and other disturbed areas within the project right-of-way. Provide turfgrass sod establishment within 5' of sidewalk, between sidewalk and curb, and along curbs. Provide turfgrass sod establishment in vegetative islands and medians.

PLANTING MATERIAL

See SHA 2008 Standard Specifications Section 920.06.06 (a)-SHA Turfgrass Seed Mix and SHA Special Purpose Seed Mix.

3.13.04.08 SHRUB MIX ESTABLISHMENT ZONE

DESIGN INTENT

1. For areas with slopes greater than 3:1 that do not require frequent mowing/maintenance, the Design-Build Team shall apply the shrub mix establishment. The Design-Build Team shall coordinate with engineers to comply the establishment with appropriate Soil Stabilization Matting as defined in the Category 700 Landscaping Cost Estimating Manual. Regular and frequent mowing is defined as once a week mowing during the turf growing season. Non Frequent or non- regular mowing is defined as 2 or 3 mowing per year.

PLANTING MATERIAL

See SHA 2008 Standard Specifications Section 706-SHRUB SEEDING with OED-LAD approvals.

3.13.04.09 SWM-ESD FACILITY PLANTINGS ZONE

PLANTING & LANDSCAPE REQUIREMENTS

The landscape planting plan shall be developed to incorporate the use of SHA’s preferred plants and Landscape Design Guide to revegetate disturbed areas within the Project to the fullest extent possible. Large masses or groupings of trees and shrubs shall be created whenever possible to create naturalistic plantings*. Plantings shall be designed to provide multi-season aesthetic interest to the fullest extent possible. The Design-Builder shall be responsible for coordinating the Planting Plan with all other elements of work including but not limited to final grading, highway clear zones and sight distances, storm drain, utilities, signing, and lighting. Depending on the roadway section, trees shall be offset from the edge of travel lanes conforming to the AASHTO Roadside Design Guide. The Design-Builder shall furnish all specified seed for turf establishment according to the SHA Standard Specifications for Construction and Materials 2008, Section 920.06.05 – 920.06.06a.

*Naturalistic plantings are defined as not uniform, static patterns such as grids or lines. Instead, the planting configurations shall mimic natural colonization in natural plant communities. A relaxed sense of order shall be provided while avoiding the appearance of plants randomly dotted about the terrain. The arrangement of species in planting zones that require uniform cover of plant material (e.g., emergent, floating aquatic or shallow marsh areas) shall be arranged in homogenous groupings that intermingle with groupings of other species.

SWM-ESD AREA INTENT

The Design-Build Team shall prepare landscape plans for the SWM-ESD area. These areas are required as part of the stormwater management plans. Planting in this zone should meet the requirements of MDE SWM ESD Guidelines and SHA SWM Visual and Environmental Quality and Safety Criteria, as set forth in “*SHA Stormwater Site Development Criteria*”, latest edition.



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PLANTING MATERIALS

SWM –ESD AREA

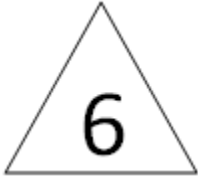
BOTANICAL NAME	COMMON NAME	SPACING	MINIMUM SIZE
Major Deciduous Trees			
<i>Acer rubrum</i> ‘Autumn Flame’	Autumn Flame Maple	30’ OC	2’’ Cal. B&B
<i>Acer rubrum</i> ‘Brandywine’	Brandywine Maple	30’ OC	2’’ Cal. B&B
<i>Betula nigra</i>	River Birch	20’ OC	8’ Ht. Multi-stem, 3-5 stems
<i>Quercus Palustris</i>	Pin Oak	30’ OC	2.5’’ Cal. B&B
Minor Deciduous Trees			
<i>Amelanchier arborea</i> var. <i>arborea</i>	Common Serviceberry	15’ OC	6’ Ht. Multi- Stem, B&B
<i>Amelanchier laevis</i> ‘Autumn Brilliance’	Autumn Brilliance Serviceberry	15’ OC	6’ Ht. Multi- Stem, B&B
<i>Amelanchier laevis</i> ‘JFS-Arb’	Spring Flurry Serviceberry	15’ OC	6’ Ht. Multi- Stem, B&B
<i>Amelanchier laevis</i> ‘Robin Hill’	Robin Hill Serviceberry	15’ OC	6’ Ht. Multi- Stem, B&B
<i>Amelanchier laevis</i> ‘Snowcloud’	Snowcloud Serviceberry	15’ OC	6’ Ht. Multi- Stem, B&B
<i>Carpinus caroliniana</i>	American Hornbeam	20’ OC	1.5’’ Cal. B&B
<i>Cercis canadensis</i>	Eastern Redbud	20’ OC	2’’ Cal. B&B
<i>Crataegus viridis</i> ‘Winter King’	Winter King Green Hawthorn	15’ OC	1.5’’ Cal. B&B



Evergreen Trees			
<i>Juniperus virginia</i>	Eastern Red Cedar	15' OC	6' Ht. CG/B&B
<i>Picea abies</i>	Norway spruce	20' OC	6' Ht. B&B
<i>Pinus strobus</i>	Eastern White Pine	25' OC	6' Ht. B&B
Shrubs			
<i>Clethra Alnifolia spp</i>	Sweet Pepperbush	4' OC	30'' Ht. CG
<i>Ilex verticillata</i> 'Southern Gentleman'	Southern Gentleman Winterberry	4' OC	24'' Ht. CG
<i>Ilex verticillata</i> 'Winter Red'	Winter Red Winterberry	4' OC	36'' Ht. CG
<i>Viburnum dentatum</i>	Arrowwood viburnum	5' OC	3' Ht. B&B
Herbaceous Species			
<i>Amsonia tabernaemontana</i>	Eastern Bluestar	18'' OC	Plug
<i>Andropogon virginicus</i>	Broomsedge	18'' OC	Plug
<i>Carex retrorsa</i>	Retrose Sedge	18'' OC	32 per tray
<i>Eragrostis pectinaces</i>	Purple Lovegrass	18'' OC	Plug
<i>Eupatorium dubium</i>	Joe-pye Weed	18'' OC	Plug
<i>Juncus effusus</i>	Soft Rush	12'' OC	Plug
<i>Rudbeckia hirta</i>	Black-eyed Susan	18'' OC	Plug
<i>Symphotrichum laeve var. laeve</i>	Smooth Blue Aster	18'' OC	Plug
<i>Thalictrum pubescens</i>	King Of The Meadow	18'' OC	Plug
<i>Vernonia noveboracensis</i>	New York Ironweed	18'' OC	Plug



Seeding/ Sod			
<i>Upland Meadow Establishment (SSCM Sec. 707)</i>			
<i>Lowland Meadow Establishment (SSCM Sec. 707)</i>			
<i>Wet Meadow Establishment (SSCM Sec. 707)</i>			
<i>Turfgrass Establishment (SSCM Sec. 707)</i>			
<i>Turfgrass Sod Establishment (SSCM Sec. 707)</i>			



SWM-POND AREA INTENT

The Design-Build Team shall prepare landscape plans for the SWM-Pond area. These areas are required as part of the stormwater management plans. Planting in this zone should meet the requirements of MDE SWM ESD Guidelines and SHA SWM Visual and Environmental Quality and Safety Criteria, as set forth in “SHA Stormwater Site Development Criteria”, latest edition.

QUANTITY OF PLANT MATERIAL

Each SWM facility is divided into two basic planting areas: pond plantings and surrounding plantings. Pond plantings include the area inside the 10 year flood level -see Pond Planting section below. The surrounding planting area is the region outside the pond planting area within the 20 feet of the 10 year flood level. After 20 feet, zonal planting applies.

To calculate surrounding area density, subtract square feet of areas where woody plant material cannot be planted due to AASHTO and SWM regulations from total surrounding

area square feet. For example, subtract lane access and offset of storm pipes, and setbacks from risers and roads from total surrounding planting area.

Density of plantings shall meet the following requirements: 1 overstory tree for each 800 square feet with maximum spacing 20 feet on center, 1 evergreen tree for each 1000 square feet with maximum spacing 15 feet on center, 1 understory tree for each 900 square feet with maximum spacing 15 feet on center, and 1 shrub for each 400 square feet with maximum spacing 5 feet on center, minimum of 5 shrubs per pond facility.

Follow the SHA Landscape Guide and arrange the plants for each specific site. Tighten spacing of plants to create space for pond access and no plant zones. Substitutions are as follows: 2 understory or 2 evergreen trees equal 1 overstory tree. 10 shrubs equal 1 overstory tree.

For the master plant list, one overstory tree species shall not constitute more than 10% of the overstory trees. One evergreen tree species shall not constitute more than 20% of the evergreen trees. One flowering tree species and/or tree species under utilities shall not constitute more than 10% for the flowering or under utility trees. One shrub species shall not constitute more than 7% for the shrub species. Also, limit using all the same genus for each group.

Overstory trees and evergreen trees shall not be planted within 30' of the C/L of overhead utilities. A random mix of only Understory trees and Shrubs shall be planted within 30' of the C/L of overhead utilities. Understory species shall be a mix of multi-stem and single stem form.

The surrounding planting approved plant species, minimum acceptable sizes, and minimum spacing are listed:

SURROUNDING PLANT MATERIAL

Botanical Name	Common Name	Maximum Spacing	Minimum Size
Overstory Trees (Major Deciduous Trees):			
<i>Acer saccharum</i> 'Legacy'	Legacy Sugar Maple	20' OC	1.5" Cal. B&B
<i>Carya ovata</i>	Shagbark Hickory	20' OC	1.5" Cal. B&B
<i>Celtis occidentalis</i>	Common Hackberry	20' OC	1.5" Cal. B&B
<i>Diospyrus virginiana</i>	Common Persimmon	20' OC	1.5" Cal. B&B or CG
<i>Fagus grandifolia</i>	American Beech	20' OC	1.5" Cal. B&B
<i>Gymnocladus dioicus</i>	Kentucky Coffeetree	20' OC	1.5" Cal. B&B or CG
<i>Juglans nigra</i>	Black Walnut	20' OC	1.5" Cal. CG
<i>Liquidambar styraciflua</i> 'Rotundiloba'	Rotundiloba Sweetgum	20' OC	1.5" Cal. CG
<i>Nyssa sylvatica</i>	Blackgum	20' OC	1.5" Cal. CG
<i>Platanus occidentalis</i>	American Planetree	20' OC	2.0" Cal. B&B
<i>Platanus x acerifolia</i> 'Yarwood'	Yarwood Planetree	20' OC	1.5" Cal. CG

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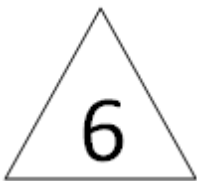
<i>Quercus alba</i>	White Oak	20' OC	1.5" Cal. CG
<i>Quercus bicolor</i>	Swamp White Oak	20' OC	1.5" Cal. CG
<i>Quercus coccinea</i>	Scarlet Oak	20' OC	1.5" Cal. CG
<i>Quercus imbricaria</i>	Shingle Oak	20' OC	1.5" Cal. CG
<i>Quercus macrocarpa</i>	Burr Oak	20' OC	1.5" Cal. CG
<i>Quercus muehlenbergii</i>	Chinkapin Oak	20' OC	1.5" Cal. CG
<i>Quercus shumardii</i>	Shumard Oak	20' OC	1.5" Cal. CG
<i>Taxodium distichum</i>	Bald Cypress	20' OC	1.5" Cal. B&B
<i>Tilia americana</i>	American Linden	20' OC	1.5" Cal. B&B
<i>Ulmus americana</i>	American Elm Cultivars	20' OC	1.5" Cal. B&B

'Valley Forge', 'Princeton', 'Patriot' – Use all three cultivars.

Evergreen Tree Species:

<i>Ilex x 'Nellie R. Stevens'</i>	Nellie R. Stevens Holly	15' OC	3' Height CG
<i>Ilex opaca</i>	American Holly	15' OC	6' Height B&B
(For both Hollies: SHA Approved varieties, Provide 10% male plants)			
<i>Juniperus virginiana</i>	Eastern Redcedar	15' OC	5' Height CG
<i>Picea abies</i>	Norway Spruce	15' OC	5' Height CG
<i>Pinus rigida</i>	Pitch Pine	15' OC	5' Height CG
<i>Pinus strobus</i>	Eastern White Pine	15' OC	5' Height B&B
<i>Pinus taeda</i>	Loblolly Pine	15' OC	5' Height CG
<i>Pinus virginiana</i>	Virginia Pine	15' OC	5' Height CG
<i>Thuja occidentalis 'Nigra'</i>	Dark Green Arborvitae	15' OC	5' Height CG

(Plant arborvitae in non deer areas)



Understory Trees (Flowering/Small Deciduous Trees):

<i>Amelanchier arborea</i>	Downy Serviceberry	15' OC	1" Cal. CG
<i>Amelanchier laevis</i>	Allegheny Serviceberry	15' OC	1" Cal. CG
<i>Amelanchier canadensis</i>	Shadblow Serviceberry	15' OC	1" Cal. CG
<i>Carpinus caroliniana</i>	American Hornbeam	15' OC	1" Cal. CG
<i>Cercis canadensis</i>	Eastern Redbud	15' OC	1" Cal. CG
'Forest Pansy'			
<i>Chionanthus virginicus</i>	White Fringetree	15' OC	1" Cal. B&B
<i>Cornus x 'KN30-8' Venus</i>	Venus Dogwood	15' OC	1" Cal. B&B
<i>Cotinus x 'Grace'</i>	Grace Smoketree	15' OC	1" Cal. CG
<i>Crataegus crusgalli</i>	Thornless Cockspur	15' OC	1" Cal. CG
var. 'inermis'			
<i>Halesia tetraptera</i>	Carolina Silverbell	15' OC	1" Cal. CG
<i>Lagerstroemia x 'Natchez'</i>	Natchez Crape myrtle	15' OC	1" Cal. CG
<i>Lagerstroemia x 'Dynamite'</i>	Dynamite Red Crape myrtle	15' OC	1" Cal. CG
<i>Magnolia x 'Galaxy'</i>	Galaxy Magnolia	15' OC	1" Cal. CG
<i>Magnolia x loebneri 'Merrill'</i>	Dr. Merrill Magnolia	15' OC	1" Cal. CG
<i>Magnolia virginiana</i>	Sweetbay Magnolia	15' OC	1" Cal. CG

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<i>Malus 'Prairie Fire'</i>	Prairie Fire Crabapple	15' OC	1" Cal. CG
<i>Malus 'Sugar Tyme'</i>	Sugar Tyme Crabapple	15' OC	1" Cal. CG
<i>Ostrya virginiana</i>	American Hophornbeam	15' OC	1" Cal. CG
<i>Oxydendrum arboretum</i>	Sourwood	15' OC	1" Cal. CG
<i>Prunus serrulata 'Kwanzan'</i>	Kanzan Flowering Cherry	15' OC	1" Cal. CG
<i>Prunus x yedoensis</i>	Yoshino Cherry	15' OC	1" Cal. CG
<i>Quercus palustris 'Green Pillar'</i>	Green Pillar Pin Oak	15' OC	1.5" Cal. B&B
<i>Sassafras albidum</i>	Sassafras	15' OC	1" Cal. CG
<i>Syringa reticulata</i>	Japanese Tree Lilac	15' OC	1" Cal. CG

Understory Shrub Species:

<i>Aesculus parviflora</i>	Bottlebrush Buckeye	5' OC	3' Height CG
<i>Aronia arbutifolia</i>	'Brilliantissima' Chokeberry	5' OC	3' Height CG
	'Brilliantissima'		
<i>Cephalanthus occidentalis</i>	Buttonbush	5' OC	3' Height CG
<i>Clethra alnifolia</i>	Summersweet	5' OC	3' Height CG
<i>Clethra alnifolia</i>	Summersweet	5' OC	3' Height CG
	'Ruby Spice'		
<i>Cornus amomum</i>	Silky Dogwood	5' OC	3' Height CG
<i>Cornus racemosa</i>	Gray Dogwood	5' OC	3' Height CG
<i>Cornus sericea</i>	Redosier Dogwood	5' OC	3' Height CG
	Or 'Baileyi'		
<i>Forsythia x intermedia</i>	Lynwood Border Forsythia	5' OC	3' Height CG
	'Lynwood Gold'		
<i>Fothergilla major</i>	Large Fothergilla	5' OC	3' Height CG
<i>Hamamelis vernalis</i>	Vernal Witchhazel	5' OC	3' Height CG
<i>Hamamelis virginiana</i>	Common Witchhazel	5' OC	3' Height CG
<i>Hydrangea arborescens</i>	'Annabelle' Hydrangea	5' OC	3' Height CG
	'Annabelle'		
<i>Hydrangea quercifolia</i>	'Alice' Oakleaf Hydrangea	5' OC	3' Height CG
	'Alice'		
	'Harmony'		
<i>Ilex glabra 'Densa'</i>	Densa Inkberry	5' OC	3' Height CG
<i>Ilex verticillata</i>	'Red Sprite' Winterberry	5' OC	3' Height CG
<i>Ilex verticillata</i>	'Sparkleberry' Winterberry	5' OC	3' Height CG
<i>Ilex verticillata</i>	'Winter Red' Winterberry	5' OC	3' Height CG
(For Hollies: Provide 10% male plants of OED approved compatible varieties)			
<i>Itea virginica</i>	Virginia Sweetspire	5' OC	3' Height CG
<i>Lindera benzoin</i>	Spicebush	5' OC	3' Height CG
<i>Lonicera fragrantissima</i>	Winter Honeysuckle	5' OC	3' Height CG
<i>Myrica pensylvanica</i>	Northern Bayberry	5' OC	3' Height CG
<i>Physocarpus opulifolius</i>	Common Ninebark	5' OC	3' Height CG
<i>Rhododendron arborescens</i>	Sweet Azalea	5' OC	3' Height CG
<i>Rhododendron calendulaceum</i>	Flame Azalea	5' OC	3' Height CG
<i>Rhododendron viscosum</i>	Swamp Azalea	5' OC	3' Height CG

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<i>Rhus aromatica</i>	Fragrant Sumac	5' OC	3' Height CG
<i>Rhus glabra</i>	Smooth Sumac	5' OC	3' Height CG
<i>Rhus typhina</i>	Staghorn Sumac	5' OC	3' Height CG
<i>Sambucus nigra</i>	American black elderberry	5' OC	3' Height CG
<i>Viburnum acerifolium</i>	Mapleleaf Viburnum	5' OC	3' Height CG
<i>Viburnum x pragense</i>	Prague Viburnum	5' OC	3' Height B&B
<i>Viburnum prunifolium</i>	Blackhaw Viburnum	5' OC	3' Height B&B
<i>Viburnum trilobum</i>	American Cranberrybush	5' OC	3' Height B&B

Or 'Wentworth'

Deciduous Trees Species Acceptable for Planting Next to/ Under Overhead Utilities

<i>Acer buergerianum</i>	Trident Maple	15' OC	1.5" Cal. B&B or CG
<i>Acer negundo 'Flamingo'</i>	Flamingo Box Elder	15' OC	1.5" Cal. B&B or CG
<i>Carpinus caroliniana</i>	American Hornbeam	15' OC	1.5" Cal. B&B or CG
<i>Cornus kousa</i>	Milky Way Select Dogwood	15' OC	1.5" Cal. B&B or CG
	'Milky Way Select'		
<i>Cornus x Rutdan</i>	Celestial Dogwood	15' OC	1.5" Cal. B&B or CG
<i>Cornus x Stellar Pink</i>	Stellar Pink Dogwood	15' OC	1.5" Cal. B&B or CG
<i>Cotinus coggygria 'Grace'</i>	Grace Smoke Tree	15' OC	1.5" Cal. B&B or CG
<i>Crataegus crus-galli inermis</i>	Thornless Cockspur Hawthorn	15' OC	1.5" Cal. B&B or CG
<i>Franklinia alatomaha</i>	Franklin Tree	15' OC	1.5" Cal. B&B or CG
<i>Halesia tetraptera</i>	Wedding Bells Silverbell	15' OC	1.5" Cal. B&B or CG
	'UConn Wedding Bells'		
<i>Lagerstroemia x Muskogee</i>	Muskogee Crape Myrtle	15' OC	1.5" Cal. B&B or CG
<i>Lagerstroemia x Natchez</i>	Natchez Crape Myrtle	15' OC	1.5" Cal. B&B or CG
<i>Lagerstroemia x Red Rocket</i>	Red Rocket Crape Myrtle	15' OC	1.5" Cal. B&B or CG
<i>Maackia amurensis</i>	Amur Maackia	15' OC	1.5" Cal. B&B or CG
<i>Malus x Adirondack</i>	Adirondack Crabapple	15' OC	1.5" Cal. B&B or CG
<i>Malus x Prairifire</i>	Prairifire Crabapple	15' OC	1.5" Cal. B&B or CG
<i>Malus x Royal Raindrops</i>	Royal Raindrops Crabapple	15' OC	1.5" Cal. B&B or CG
<i>Malus x Sugartyme</i>	Sugartyme Crabapple	15' OC	1.5" Cal. B&B or CG
<i>Malus Zumi Calocarpa</i>	Zumi Calocarpa Crabapple	15' OC	1.5" Cal. B&B or CG
<i>Prunus 'Frankthrees'</i>	Mt. St. Helens Plum	15' OC	1.5" Cal. B&B or CG
<i>Prunus 'Snow Goose'</i>	Snow Goose Cherry	15' OC	1.5" Cal. B&B or CG
<i>Prunus cerasifera</i>	Thundercloud Plum	15' OC	1.5" Cal. B&B or CG
	'Thundercloud'		
<i>Sorbus Americana</i>	Red Cascade Mountain Ash	15' OC	1.5" Cal. B&B or CG
	'Dwarfscrown'		
<i>Stewartia koreana</i>	Korean Stewartia	15' OC	1.5" Cal. B&B or CG
<i>Syringa reticulata</i>	Japanese Tree Lilac	15' OC	1.5" Cal. B&B or CG
	'Summer Snow'		
	'Ivory Silk'		

Note: B&B indicates Balled and Burlapped. CG indicates Container Grown. OC indicates On Center Spacing.

Requests for substitution of other species, submitted in writing, may be approved by the State Highway Administration Office of Environmental Design.

POND PLANTINGS

Pond plantings include the area inside the 10 year flood level. Follow current standard of SHA Stormwater Site Development Criteria: Design and Review Guidelines – specifically see Section 9-Planting. Follow SHA Stormwater Site Development Criteria: Design and Review Guidelines except where noted below.

Plant selections for Stormwater Management Areas shall come from the following list. Native species are preferred but non-natives can be used if compelling reasons exist. The Design-Builder shall solicit approval from the SHA Landscape Architectural Division before using non-native plant material or material not on the following list.

Submerged Aquatic Planting Zone

No planting required for Submerged Aquatic Zone

Emergent & Floating Aquatic Planting Zone

Minimum 6 species shall be provided with no one species being greater than 25%, Minimum 5%. Broadleaf plants shall be between 30% and 70% for the Emergents. 100% of the area to be seeded and 50% of the area to be plugged.

Botanical Name	Common Name
<u>Emergents</u>	
Acorus calamus	Sweet Flag (broadleaf)
Equisetum hyemale	Equisetum/ Horsetail
Iris versicolor	Blue Flag (broadleaf)
Juncus canadensis	Canada Rush
Juncus effusus	Soft Rush
Nuphar luteum	Spatterdock (broadleaf)
Osmunda regalis	Royal Fern (broadleaf)
Peltandra virginica	Arrow Arum (broadleaf)
Pontederia cordata	Pickerelweed (broadleaf)
Sagittaria latifolia	Duck Potato (broadleaf)
Scirpus cyperinus	Woolgrass
Scirpus pungens	Common Three-square

Floating Aquatics

No planting required for Floating Aquatic Zone

Frequently Fluctuating Zone

No Live Fascines or Wattles required.

Plugs

Minimum 6 species \leq 20 SF or 11 species \geq 20 SF shall be provided with no one species being greater than 15%, Minimum 3%. Inclusion on this list does not guarantee availability in plug form.

Asclepias incarnata	Swamp Milkweed
Asclepias tuberosa	Butterfly Weed
Amsonia hubrichtii	Thread-Leaf Blue Star
Althaea officinalis	Marshmallow
Aster novae-angliae	New England Aster
Carex lurida	Lurid Sedge
Carex stricta	Tussock Sedge
Carex vulpinoidea	Fox Sedge
Chelone glabra	White Turtlehead
Dennstaedtia punctilobula	Hay-Scented Fern
Eupatorium dubium	Joe-Pye Weed
Eupatorium perfoliatum	Common Boneset
Helianthus angustifolius	Swamp Sunflower
Hibiscus moscheutos	Marsh Hibiscus
Iris versicolor	Harequin Blueflag
Lobelia cardinalis	Cardinal Flower
Lobelia siphilitica	Great Blue Lobelia
Oenothera fruitcosa	Narrow-leaved Sundrops
Osmunda cinnamomea	Cinnamon Fern
Osmunda regalis	Royal Fern
Pontederia cordata	Pickerelweed
Sisyrinchium angustifolium	Blue-eyed Grass
Solidago sempervirens	Seaside Goldenrod
Verbena hastata	Blue Vervain
Vernonia noveboracensis	New York Ironweed

Seed

Minimum 5 seed types, one being SHA Upland Meadow Mix.

Aster novae-angliae	New England Aster
Carex lurida	Lurid Sedge
Carex stricta	Tussock Sedge
Carex vulpinoidea	Fox Sedge
Eupatorium dubium	Joe-Pye Weed
Eupatorium perfoliatum	Common Boneset
Panicum virgatum	Switchgrass
Verbena hastata	Blue Vervain
Vernonia noveboracensis	New York Ironweed
SHA Upland Meadow Seed Mix.	

TREES AND SHRUBS PLANTING INSIDE THE 10 YEAR STORM LINE

Use same plant list within this Landscape Special Provision as included for tree and shrub planting outside the 10 year storm line.

Density of planting for Pond Planting Area shall be adjusted to the following:

Deciduous Overstory Trees

3 trees if area is \leq 4,000 SF (measured at 10 YR water surface contour line)

5 trees if between 4,000 SF and 8000 SF

11 trees if between 8,001 SF and 12,000 SF

Add 1 Overstory Tree above 12,000 SF and for each additional 1000 SF.

SF not to include area of liner if liner is present. No woody plants may be planted within the limits of the liner.

Evergreen Trees

3 trees if area is \leq 4,000 SF, add 1 additional evergreen tree for each additional 1500 SF.

Understory Trees

3 trees if area is \leq 4,000 SF, add 1 additional understory tree for each additional 1000 SF.

Woody Shrubs

5 for every understory tree required.

TC 3.14 GEOTECHNICAL PERFORMANCE SPECIFICATION FOR EMBANKMENT AND CUT SLOPES

3.14.01 General

The Design-Builder shall conduct supplemental subsurface explorations, analyses, design and construction for embankment and cut slopes of the project in accordance with all applicable criteria and standards cited herein and in accordance with this Geotechnical Performance Specification for embankment and cut slopes (referred as “Geotechnical Performance Specification” herein).

3.14.02 GUIDELINES AND REFERENCES

3.14.02.01 Guidelines

Design and construction of -embankment and cut slopes shall be in accordance with this Geotechnical Performance Specification and the relevant requirements of the following Guidelines and references unless otherwise stipulated in this specification. Should the requirements in any guideline conflict with those in another, the guideline listed with highest priority in Table 1 shall govern unless otherwise stipulated in this specification. Listed under references are reports and resources that the Design-Builder may use to address the geotechnical requirements as the Design-Builder sees fit. It is the Design-Builder’s responsibility to obtain clarification for any unresolved ambiguity prior to proceeding with any design and construction. Geotechnical Reports and Submissions will be reviewed based upon FHWA Geotechnical Checklist and Guidelines (FHWA-ED-88-053) and the guidelines listed below.

Use the most current version of each listed guideline as of the initial publication date of this RFP unless revised by addendum or contract modification.

TABLE 1		
GUIDELINES FOR GEOTECHNICAL DESIGN AND CONSTRUCTION		
PRIORITY	AUTHOR OR AGENCY	TITLE
1	SHA	Office of Structures, Policy and Procedure Manual
2	SHA	Standard Specifications for Construction and Materials (Part III Technical Requirements)
3	SHA	Standard Specifications for Subsurface Explorations
4	SHA	Book of Standards for Highways, Incidental Structures and Traffic Control Applications for items identified as Standard in Appendix B of Part 3-Design Requirements
5	SHA	Manual for the Inspection of Highway Right of Way in Karst Areas
6	AASHTO	AASHTO LRFD Bridge Design Specification, 5 th Edition
7	AASHTO	Manual on Subsurface Investigations
9	AASHTO	Guide Specifications for Structural Design of Sound Barriers
10	AASHTO	Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals, 4th Edition
11	AASHTO	Standard Specifications for Transportation Materials and Methods of Sampling and Testing – Parts I and II
12	ASTM	Annual Books of Standards
13	MDE	Applicable Maryland Storm Water Design Manual
14	FHWA	Mechanically Stabilized Earth Walls and Reinforced Soil slopes, Design and Construction Guidelines

3.14.02.02 References

Use the references listed in Table 2 as supplementary references for the design and exploration of the geotechnical subsurface. These publications have no established order of precedence.

TABLE 2	
REFERENCES FOR GEOTECHNICAL DESIGN AND CONSTRUCTION	
AUTHOR OR AGENCY	TITLE
FHWA	Corrosion/Degradation of Soil Reinforcements for Mechanically Stabilized Earth Walls and Reinforced Slopes
FHWA	Design and Construction of Driven Pile Foundations
FHWA	Drilled Shafts: Construction Procedures and Design Methods
FHWA	Geosynthetic Design and Construction Guidelines
FHWA	Geotechnical Aspects of pavements
FHWA	Continuous Flight Augur Pile foundations
FHWA	Ground Improvement Technical Summaries Volumes I & II
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	Durability of Geosynthetics for Highway Applications
FHWA	Micropile Design and Construction Guidelines
FHWA	The Osterberg Load Cell for Load Testing Drilled Shafts and Driven Piles
Dunnicliff	Geotechnical Instrumentation for Monitoring Field Performance, Dunnicliff, 1986
FHWA	Subsurface Investigations (Geotechnical Site Characterization)
FHWA	Geotechnical Instrumentation

3.14.03 REQUIREMENTS

3.14.03.01 Geotechnical Subsurface Exploration

3.14.03.01.01 Preliminary Subsurface Data

The Administration has completed a preliminary geotechnical subsurface investigation. The preliminary geotechnical subsurface investigation data are included in ProjectWise.

The 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 conduct additional subsurface investigation using various exploration techniques such as test borings, test pits, and geophysical surveys for the design and construction of the project in accordance with the project scope and the requirements described below.

3.14.03.01.02 Design Builder's Subsurface Exploration

The Design-Builder shall form its own interpretation of the existing geotechnical and/or geophysical data and 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. The Design-Builder shall undertake its own assessment of the suitability of the preliminary geotechnical subsurface investigation data.

The preliminary geotechnical subsurface studies were performed by the Administration at a limited number of locations along the site and additional information is required for detailed design and construction.

The Design-Builder shall prepare and implement a subsurface exploration and testing program with all field, and laboratory testing and geophysical study necessary to establish the subsurface geotechnical conditions and to perform all geotechnical and foundation design and analyses. The program, herein designated as the Design-Builder's subsurface exploration program, shall be developed and implemented to supplement the data provided by the Administration and to obtain the data as required to meet the requirements of AASHTO and the Design-Builder's design approach and construction methods. The locations, number, depths and types of boreholes, laboratory and field-testing and sampling shall conform to Table 3, Table 4, and the standards of practice of the Administration, AASHTO and the FHWA. The details of the Design-Builder's field, and laboratory and geophysical testing programs for design shall be submitted to the Administration as part of the Geotechnical Planning Reports (See Section 3.14.05.01 "Geotechnical Planning Reports") for review and comment at least 30 days prior to the actual field exploration activities. The rationale for development of the exploration programs, data

interpretation, and parameter selection, together with descriptions of the methods of analyses, shall be clearly presented in the Geotechnical Planning Reports.

In addition to the techniques described in the AASHTO Manual on Subsurface Investigations, the Design-Builder's Geotechnical Engineer may include in situ testing such as the Ko blade, Prebored Pressuremeter Testing (ASTM D-4719), Electronic Friction Cone and Piezocone Penetration Testing (ASTM D-5778), Mechanical Cone Penetrometer Penetration Tests (ASTM D-3441), and Flat Plate Dilatometer Test Probes (ASTM D-6635) in the subsurface investigations to aid in the development of in-situ soil parameters for the design of this Project. Ko testing shall be in accordance with the manufacturers recommended procedures. The raw data obtained from in-situ testing shall be correlated by a professional geotechnical engineer based upon the soil conditions. Parameters obtained from in-situ testing, without correlation with soil index and validation by a qualified geotechnical engineer will not be allowed for design purposes. The design should not be solely based on the in situ testing. The soil parameters developed from in situ testing should be verified with laboratory testing and SPT borings.

The Administration will review and provide written comments on the subsurface exploration program prior to its implementation. The Design-Builders shall perform its subsurface exploration program to establish all geotechnical parameters and subsurface conditions, including groundwater conditions, required for design and construction. In areas of erratic subsurface conditions and where stratification indicates possible deep stability or settlement problems, borings shall extend into rock or into a hard or dense soil stratum.

The Design-Builder shall provide the results of the studies to the Administration as described in "Interim Design Memoranda", as per section 3.14.05.02

Among the requirements for the subsurface investigation and laboratory testing to be performed for the Project are the following:

- A. Supervision and Inspection – All geophysical investigations shall be planned and performed under the direct supervision of a geophysicist with a minimum of 10 years of relevant professional experience. All boring and in-situ testing inspection shall be performed by field inspectors that have passed the NHI Subsurface Investigation Qualification Course (FHWA-NHI-132079), and; (a) be a degreed engineer or geologist; or, (b) have a minimum of two (2) years of field experience in the inspection and reporting of field sampling and testing of similar size and content. 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 experience in the performance and supervision of geotechnical engineering projects.
- B. Location and Ground Surface Elevation - The Design-Builder shall determine the coordinate location, station and offset from baselines as shown on the Plans, and ground surface elevation, for each boring and other test probes and show the information on the individual boring logs.

- C. Visual soil identification as reported on the boring logs shall be in accordance with ASTM D-2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). For description for soil samples with laboratory test results, the description shall also include the AASHTO and USCS soil classification.
- D. Final boring and rock core logs shall be prepared and presented using gINT software as supplied by gINT Software, Inc. The presentation of borings and rock core logs shall be consistent with the Maryland standard as included in the RFP. The Administration will provide the gINT electronic template for gINT.
- E. 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 the designated location upon completion.
- F. The Design-Builder shall determine groundwater table depth/elevation and seepage conditions at the project site.
- G. Boreholes shall be covered with bags of sand or metal plates and topped with orange cones for 24 hours and until obtaining the 24 hour water reading. After reading is taken, all borings should be sealed as per MDSHA's Standard Specification for Subsurface Investigation under TS -10. Spoils shall be evenly distributed to surrounding areas.
- H. All drilling equipment shall be calibrated and the Design-Builder shall provide the efficiency of all hammers and sampling assembly to be used for the project. The Administration reserves the right to reject or accept the efficiency of the Design-builder's hammer and sampling assembly.
- I. The Design-Builder shall use all information obtained from testing program to prepare a subsurface profile in order to determine the adequacy of the site investigation program.
- J. Refer to the Environmental Performance Specification for specifics regarding stream crossing, wetland, and buffer zones. See the Maintenance of Traffic Performance Specification for the specifics regarding maintenance of traffic requirements that will be required during any subsurface exploration activities.

TABLE 3
MINIMUM REQUIREMENTS FOR BORING DEPTH

AREAS OF INVESTIGATION	BORING DEPTH
Cuts	Borings shall extend a minimum of 1.5 times the depth of the cut below the anticipated depth of the cut at the ditch line
Embankments	See AASHTO Manual on Subsurface Investigations, Section 7.4.4.2. Borings shall extend a minimum of 1.5 times the height of the embankment

TABLE 4
MINIMUM REQUIREMENTS FOR BORING LAYOUT*

GEOTECHNICAL FEATURES	BORING LAYOUT
Roadway Embankments and Cuts	See AASHTO Manual on Subsurface Investigations, Section 7.4.3.2. For most critical section, three borings (at toe of the slope, crest of the slope and top) shall be performed to establish the cross-slope soil profile for slope stability analysis

3.14.03.01.03 Laboratory Testing

After collecting soil and rock samples, laboratory tests will be performed to quantify material properties and verify design assumptions. The type and number of tests required are primarily a function of the variability of the site, the purpose of the study, and the amount of risk and potential consequences of failure. Sufficient laboratory testing shall be performed so that the Design-Builder’s Geotechnical Engineer and the Administration’s Geotechnical Engineer are satisfied that the test results are representative of in-situ conditions. All standard soil and rock sample laboratory testing shall be performed in accordance with the appropriate AASHTO test designation. All laboratory testing shall be performed by laboratories with AASHTO Materials Reference Laboratory (AMRL) certification for each specific test performed. Laboratory testing conducted on undisturbed samples shall be performed no more than 7 calendar days after sample retrieval.

Laboratory consolidated undrained (CU) and unconsolidated undrained (UU) testing shall be used to determine the undrained shear strength, S_u . As indicated in Section 3.14.03.01.02, the Design-Builder may supplement the subsurface investigation with in-situ testing. For Determination of the undrained shear strength using in situ testing such as CPT, DMT, and PMT, the undrained shear strength shall be calibrated with the appropriate level of triaxial testing. For relatively thick deposits of cohesive soil layers, profiles of the undrained shear strength S_u as function of depth shall be obtained so that the deposit stress history and properties can be

ascertained. Strength measurements from hand torvanes, pocket penetrometers, or unconfined compression tests shall not be used to determine undrained shear strength.

Long-term effective stress strength parameters, c' and Φ' , of cohesive soils shall be evaluated by consolidated drained (CD) triaxial tests, or consolidated undrained (CU) triaxial tests with pore pressure measurements. Long-term effective stress strength parameters, c' and Φ' , of cohesive soils shall not be evaluated by direct shear 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.

3.14.03.02 GEOTECHNICAL DESIGN

3.14.03.02.01 Selection of Design Properties

Engineering properties of soils and rocks are vital in the geotechnical analysis and design. The Design-Builder shall validate the properties of each soil or rock stratum with the field and laboratory testing program.

The Design-Builder shall refer to AASHTO LRFD Specification, Section 10.4.6 for the selection of soil and rock design properties.

Correlations for undrained shear strength (S_u) based on in-situ test measurements shall not be used for final design unless they have been calibrated to the specific soil profile under consideration. Correlations for S_u based on SPT tests will not be allowed.

The selection of peak, fully softened, or residual strength of long-term effective stress strength parameters, c' and ϕ' , for design analyses shall be based on a review of the expected or tolerable displacements of the soil mass. The use of a nonzero cohesion intercept (c') for long-term analyses in natural materials will not be allowed.

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. Parameters obtained from in-situ testing, without correlation with soil index and validation by a qualified engineer will not be allowed for design purposes.

3.14.03.02.04 Design of Fill Embankments

3.14.03.02.04.01 Slope Stability

The analyses, design and construction of soil and rock embankment side slopes including embankment for storm water management ponds shall accommodate the effects of deterioration and loss of soil resistance due to local climatic and construction conditions. 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.

Embankments in excess of 20 feet in height shall include a bench at least 10-feet in width at the mid height of the slope, and shall include a minimum 12-ft long geotextile inclusion (Class SD Type II Nonwoven) placed every three feet (vertical spacing) along the edge of fill embankments for compaction aid and surficial stability. In the absence of required right-of-way, the Design-Builder shall engineer the slope to maintain the stability. Subsurface drainage shall be provided for all fill slopes greater than 10-feet in height that do not have graded drainage at the top of the slope. Subsurface drainage may also be required on all other slopes depending upon the analysis of the slope design.

Slope stability analyses shall be conducted using limit equilibrium methodologies using a computer program such as PCSTABL, ReSSA, or StedWIN/GSTABL. Circular, sliding, compound and wedge type failures shall be analyzed for potential occurrence for each embankment configuration and slope. The Modified Bishop, simplified Janbu, Spencer, or other widely accepted slope stability methods shall be used for rotational and irregular surface failure mechanisms. Soil parameters based upon valid testing requirements shall be used. At a minimum, three shear strength laboratory test results shall be required to confirm the soil parameters. Shear strength testing shall be performed by an AMRL certified laboratory. The testing program shall be approved by the Administration. The evaluation of global slope stability (long term and short term). 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. The global stability analyses shall account for the use of buttressing, placement of select material, or improvements to the foundation material of the embankment, especially at the toe of slope near ponds, wetlands, streams and other locations of poor materials. For all slope stability analyses, linear Mohr-Coulomb model shall be used for soil strength model unless it is approved by the Administration. If the fill material consists of silts or is unknown at the time of analysis, cohesion (c) shall be equal to zero (0). A minimum safety factor of safety of 1.3 shall be provided under static loads for fill permanent embankment slopes for both global stability and surficial stability analyses. In addition to global and surficial stability analyses, the Design-Builder shall provide stability analyses for the rapid drawdown condition with a minimum factor of safety of 1.1. If the toe of the slope is adjacent to pond or water, the toe of the slope shall be protected by riprap.

All requirements of the Planting and Landscape Architectural Performance Specification shall be coordinated and accounted for in the Design-Builder's slope analysis. The Design-Builder shall coordinate landscape features to account for landscaping, re-vegetation and/or reforestation operations to address potential adverse impacts and reductions in the factor of safety for fill embankment slopes for the as-built condition. At these locations, the Design-Builder's Geotechnical Engineer shall perform site-specific global stability studies for the landscaping condition, which may require pre-emptive measures such as localized areas of reinforcement and/or localized areas with buttressing at the toe of slope to maintain the required factors of safety. In areas where water features (such as storm water management ponds) intercept the toe of slope, the toe of slope shall be buttressed.

3.14.03.02.04.02 Settlement

Analyses shall be conducted to estimate the soil settlement induced by the embankment loads. Immediate settlement in granular soils and both immediate and consolidation settlements in cohesive soils shall be accommodated. Embankments shall be designed to keep estimated total long-term settlements limited to 0.5-inches during a period of 50 years after completion of the pavement construction. Differential settlements within fill sections and across fill/structure interfaces shall be limited to 1/300. For soft ground situations, see “Design of Ground Improvement” below.

3.14.03.02.05 Design of Ground Improvement

The use of soil improvement techniques to increase soil shear strength and reduce compressibility in order to increase the safety factors for external and internal stability and reduce settlements to the allowable range will be allowed in the design. The Design-Builder shall demonstrate their suitability for local conditions and installation methods. 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 included in the design in order to increase strength and/or expedite consolidation of the subsoils, where it is required to increase bearing capacity or reduce post-construction settlements.

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 and post-production field testing program developed to demonstrate that the proposed methods and design will provide the ground improvement level required to satisfy the performance requirements specified herein. Long term performance of the soil improvement systems shall be demonstrated. The Administration may require instrumentation or sampling to verify the strength gained using the Design-Builder’s ground improvement techniques.

3.14.03.02.06 Alternative Embankment 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. Recycle materials such as tire shreds, recycled glass and wood chips/products will not be considered for use on the Project. By-products from steel and coal production, such as slags and fly ashes, will not be allowed for embankment construction.

The Contractor shall submit the following for recycled materials proposed for use and approval on the project:

- 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,
- F. Certification and test data demonstrating compliance with all MDE and EPA requirements for use of recycled materials, and
- G. Material Safety Data Sheets from the material supplier.

3.14.03.02.07 Design of Reinforced Steepened Slopes (RSS)

Where reinforced slopes are approved for reducing impacts to wetlands and/or other natural resources, the design procedures and considerations shall conform to the requirements of the following design requirements and FHWA Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Design and Construction Guidelines and requirements herein. Performance requirements are presented in the following table:

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.

Adequate drainage provisions, slope protection and erosion control provisions shall be incorporated into the RSS designs in accordance with requirements of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Design and Construction Guidelines.

Material requirements such as gradation, partial reduction factors of safety (creep, installation damage, durability, etc) for reinforcement fill, geosynthetic materials: geogrid, geotextile, etc., shall be submitted for review. The geosynthetic reinforcement material for RSS shall be a geogrid or high tenacity polyester geotextile. Geosynthetic reinforcement shall be manufactured from high strength polypropylene (PP), or high density polyethylene (HDPE), or high tenacity

polyester (PET) material. This reinforcement material shall have a high resistance to damage during construction, to ultraviolet (UV) degradation, and to all forms of chemical and biological degradation in the soil being reinforced.

Allowable Tensile Strength. Allowable tensile strength (Ta) of the geosynthetic shall be determined using a “partial factors of safety” approach. Partial factors of safety shall be developed from the test results provided with the geosynthetic material certifications.

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 geosynthetic tensile strength, (plf) for use in stability analyses;
- T_{ult} = Ultimate geosynthetic tensile strength, (plf)
- FS_{CR} = Partial factor of 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, used in environments where biological degradation potential may exist, (dimensionless);
- FS_{JNT} = partial factor of safety for joints (Seams and connection), (dimensionless).

Default Partial Factor of Safety Values: If test documentation is not provided, or the Engineer determines that the test documentation is not adequate, the following partial factor of safety values shall be used for the computation of allowable tensile strength. In absence of valid test results, the Administration will reject the use of the materials or use the following values to determine the allowable tensile strength of Geosynthetic material:

FS _{ID}	FS _{CR}	FS _{CD}	FS _{BD}	FS _{JNT}
3.0	5.0	2.0	1.3	2.0

Default Coefficient of Interfering Friction Values: Laboratory interface friction tests shall be conducted on all interfaces using ASTM D5321 – Standard test Method for Determining the Coefficient of Soil and Geosynthetics or Geosynthetic and Geosynthetic Friction by Direct Shear Method. Testing shall be accomplished by a GRI accredited laboratory that is specifically accredited for this test method and the results provided prior to construction.

If geotextile is used as the reinforcement material, $0.67 \tan \phi$ or the results of the documented laboratory test results, whichever is less, shall be used as the coefficient of interface friction value for interface between geotextile and soil, where ϕ is the friction angle of the soil.

Geosynthetic Coverage: Horizontal coverage of less than 100 percent shall not be permitted unless specifically recommended in the Interim Design Memorandum. If coverage of less than 100 percent is specifically recommended in the Interim Design Memorandum, then minimum horizontal coverage shall be 75 percent, with horizontal spacing between reinforcement no greater than 36 inches.

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.

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.

3.14.03.02.08 Design of Permanent Cut Slopes

Geotechnical analyses of soil cut slopes shall be performed to assess soil slope stability along new and existing roadway cuts. Potential circular and wedge type failure modes shall be analyzed for each soil cut and each slope and orientation. Slope stability analyses shall be

conducted using limit equilibrium methodologies performed using a computer program such as PCSTABL, ReSSA or StedWIN. The Modified Bishop, simplified Janbu, Spencer, or other widely accepted slope stability methods shall be used for rotational and irregular surface failure mechanisms. Soil parameters based upon valid testing requirements shall be used. At a minimum, three shear strength laboratory test results shall be required to confirm the soil parameters. Shear strength testing shall be performed by an AMRL certified laboratory. The testing program shall be acceptable to the Administration. Permanent soil cut slopes shall be no steeper than 2H: 1V with a minimum factor of safety of 1.5 for global stability and surficial stability. In the absence of required right-of-way, the cut slope shall be engineered through the use of a toe wall, soil nail wall or other engineering technique.

Cut slopes (2H:1V) in excess of 20 feet in height shall include a bench at least 10-feet in width at middle height of the slope. 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.

3.14.04 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.

3.14.04.01 Temporary Support of Excavation

Temporary support of excavation 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.

3.14.04.02 Reinforced Steepened Slopes (RSS) Construction

3.14.04.03.01 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 an open graded aggregate wrapped in a geotextile filter and be a minimum of 2/3 of the height of the slope.

Geotextile wrapped facing or wired meshed facing system are required for all RSS.

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 Contractor 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.

The RSS shall be vegetated immediately after construction to prevent or minimize erosion due to rainfall and surface runoff. Erosion control matting shall be used on the slope to provide veneer reinforcement. The matting shall be anchored at the top of the slope and at each 7 ft intervals (with minimum of 5 feet of anchorage) along the face of the slope. The anchor trench at the top of the slope shall not be less than 3 feet.

3.14.04.03.02 Geosynthetic Placement

The geosynthetic reinforcement shall be installed in conformance with the manufacturer's recommendations. The geosynthetic shall be placed within the layers of the compacted soil.

During construction, the surface of the fill shall be approximately horizontal. Geosynthetic shall be placed directly on the compacted horizontal fill surface. Geosynthetic shall be placed within three inches of the design elevations. The geosynthetic shall be placed in continuous longitudinal strips in the direction of the primary reinforcement.

When using geogrids, joints may be made in the primary reinforcement direction. Only one joint per length of geogrid shall be permitted. This joint shall be constructed for the full width of the strip by using a similar material with similar strength. Joints in geogrid reinforcements shall be pulled and held taut during fill placement. Geogrid reinforcement may be joined with mechanical connections as approved by the Engineer. Joints shall not be placed within 6 feet below top of slope, nor horizontally nor vertically adjacent to another joint. Joints in the primary reinforcement direction shall not be permitted when geotextile is used.

Adjacent strips of geosynthetic need not be overlapped. The minimum horizontal coverage shall be 50 percent, with horizontal spacing between reinforcement no greater than 40 inches. Horizontal coverage of less than 100 percent shall not be permitted unless called for in the working drawings.

Geosynthetic reinforcement shall be laid 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.

Only the amount of geosynthetic reinforcement required for immediately pending work shall be placed. After a layer of geosynthetic reinforcement has been placed, the next succeeding layer of soil shall be placed and compacted. 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.

3.14.04.03 Reinforced Fill Material Placement

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 Reinforced Earth Slope. An earth berm may be used to direct runoff away from the face of the Reinforced Earth Slope. This grading shall be maintained until vegetative growth is established.

Unless a facing system is used with the slope, the RSS shall be built 1 ft beyond the limit of the geosynthetic to achieve proper compaction of the reinforced fill material at the face of the slope. Before vegetating the slope, the extra foot of the slope shall be trimmed. The trimming shall not expose the geosynthetic material.

Tracked construction equipment shall not be operated directly upon the geosynthetic reinforcement. Geogrid shall be installed on the top of the flat service and be tension 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.

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.

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.

3.14.04.04 Fill Embankment Construction

The Design-Builder shall submit the source and material properties of all fills proposed for use, including the results of gradation tests, plasticity tests and shear strength testing. All laboratory tests shall be performed in accordance with the appropriate ASTM/AASHTO test methods. The bearing capacity of the embankment foundation shall be validated by the requirements of Section 204 of Maryland SHA's Standard Specifications for Construction and Materials and documented by the Design-Builder's Geotechnical Engineer prior to initiating construction. Sheet flow across the slope face will not be permitted during construction or for the permanent condition until vegetation is established on the face of the slopes.

3.14.04.04.01 Settlement of Embankments

Prior to releasing any fills and/or surcharges and proceeding with subsequent construction activities, the Design-Builder shall compile, and submit as per TC-3.14.04.06 " Geotechnical

Instrumentation”, any settlement data, including proof that all settlements necessary have occurred.

3.14.04.04.02 Embankment Construction Near Existing Structures

Where embankments or walls are to be constructed in the vicinity of existing structures, the Design-Builder shall develop and implement a program for performing preconstruction surveys and monitoring movement of structures that shall include the following:

- A) Estimate the settlement influence zone from embankment and construction loads that includes settlements in excess of 1/2-inch;
- B) Site reconnaissance to determine the sensitivities of adjacent structures to settlement;
- C) Identification of site-specific facilities that may be adversely affected by settlement;
- D) Procedures to mitigate and to compensate property owners affected by settlement/movement resulting from construction activities.

3.14.04.06 Geotechnical Instrumentation

3.14.04.06.01 Geotechnical Instrumentation

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.

- A) 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;
- B) The type and distribution of instrumentation shall demonstrate an understanding of the need, purpose and advantages of using each proposed instrument;
- C) The plan shall include consideration of environmental effects such as temperature, rain, sun, wind, corrodibility, and electromagnetic wave interference;
- D) Responsibilities for the instrumentation plan, procurement, installation, recording, maintenance and protection shall be the Design-Builders;
- E) The instrumentation plan will provide construction-related control information and accommodate the collection of long-term performance data;

- F) Test installations may be performed to demonstrate the compliance and acceptability of instrumentation in relation to the Contract requirements;
- G) 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;
- H) Monitoring shall be initiated a minimum of 15 days prior to construction of the features being monitored to establish baseline readings; and,
- I) The results of the vibration measurements shall be used to develop attenuation curves for predicting vibrations at varying distances from the source.
- J) Qualifications of instrumentation personnel should be listed.
- K) The Design-Builder shall provide calibration of all data acquisition equipment used to collect the required instrumentation data.
- L) A set of full size plans and cross sections of the area covered by the report,
- M) Copies of any reports or references referred in the report.

3.14.04.06.02 Monitoring Facilities for Effects of Construction Activities

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.

3.14.04.06.03 Instrumentation for Monitoring Field Performance of Construction Elements

The Design-Builder shall prepare instrumentation plans, where appropriate, to monitor field performance of specific construction elements such as settlement, lateral earth movement, rotation of structural elements and changes in groundwater. The instrumentation and monitoring program shall include appropriate types and quantities of monitoring instruments capable of measuring horizontal and vertical movements, tilt/rotation of structural elements, soil pore pressures and vibrations, as applicable.

Instrumentation that may be used in monitoring programs to control and assist design and construction include, but are not limited to:

- A) Piezometers and observation wells;
- B) Inclinometers;
- C) Survey stations on structures and at ground level locations;
- D) Tiltmeters;
- E) Deep and shallow settlement points and extensometers;
- F) Strain and load-measuring devices; and
- G) Seismographs;
- H) Optical survey.
- I) Time Domain Reflectometer (TDR)

The Design-Builder shall not release monitored elements for subsequent construction until completed monitoring reports have been submitted.

3.14.05 SUBMITTALS

All submittals shall be subject to review and approval as per TC Section 3.06.20.1.

The Design - Builder shall submit the following geotechnical design reports and documents at various stages of the project for individual project elements or groups of elements for approval by the Administration. Copies of these submittals shall also be sent to the Project Engineer and the Office of Materials Technology (OMT). Office of Materials Technology is located at

Office of Materials Technology
7450 Traffic Drive
Hanover, MD 21076
Phone: 1-866.926.8501 (Toll free)

Software and spreadsheets used for geotechnical analysis and design of foundations shall be consistent with AASHTO, FHWA and MDSHA guidelines and specifications. The Design-Build team shall provide background information about the software, assumption made and their limitations. The Administration reserves the right to accept or reject the use of a particular software or spreadsheet. If spread sheets are used for geotechnical analysis and design, the spreadsheet should include the calculation procedure, references, definition of parameters, units, equations used, input values and output values.

3.14.05.01 Geotechnical Planning Reports

The Design-Builder shall prepare Geotechnical Planning Reports for individual Project elements or groups of Project elements based upon the design/construction priority and/or sequence of construction. 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 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.

The Geotechnical Planning Reports shall be prepared, signed and sealed by a Professional Engineer licensed in the State of Maryland. This Geotechnical Planning Report shall be submitted to the Administration 30 days prior to mobilization. Prior to mobilization, the Design-Builder and the Administration shall meet to discuss the contents of the Geotechnical Planning Reports and present the Administration’s review written comments.

3.14.05.02 Interim Design Memoranda

The Design-Builder shall prepare Interim Design Memoranda for individual Project elements or groups of Project elements consistent with the Geotechnical Planning Reports. The Interim Design Memoranda shall be submitted in accordance with “Submittals” in the Structures Performance Specification and shall include the following, at a minimum:

- a) Description of the Project elements included in the Memorandum;
- b) Locations of borings, rock coring, 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) A 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 pertinent geotechnical analyses and designs;
- k) Conclusions and recommendations for the specific project elements;
- l) Construction considerations such as blasting and vibration monitoring;
- m) Level of construction control for deep foundations;
- n) Instrumentation and monitoring requirements;
- o) A set of full size plans and cross sections of the area covered by the report,
- p) Copies of any reports or references referred in the report.

3.14.05.02 Final Geotechnical Reports

The Design-Builder shall prepare Final Geotechnical Reports for individual Project elements or groups of Project elements consistent with the Geotechnical Planning Reports and the Interim Design Memoranda 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 Interim Design Memorandum;
- C. Locations 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. A description 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 results checked and initialed by a Professional Engineer licensed in the State of Maryland;
- K. Conclusions and recommendations for foundation types for structures, embankments, cut slopes, retaining walls, ground improvement, requirements for backfill materials;
- L. Groundwater problems encountered, means of dewatering and/or other solutions;

- M. Designs for support of excavation;
- N. Results of instrumentation and monitoring and post-construction monitoring summaries;
- O. Potential settlement problems; and
- P. Potential stability problems and analysis results;
- 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.

For each of the following Project elements, the Design-Builder shall submit the following items with the Final Geotechnical Reports.

S. Embankments

- 1) The results of the slope stability analyses, including external loading from live and seismic loading, the recommended side-slopes of all embankments and the search limits and the most critical failure surface should be highlighted; input and output files should be included.
- 2) The results of settlement analyses, including predictions of the magnitude and duration of primary, secondary, and post-construction settlements;
- 3) The results of the liquefaction analyses and the proposed methods of mitigation for any location deemed necessary to protect the integrity of bridges and adjacent walls;
- 4) The proposed method(s) of protecting and abandoning utilities.

T. Cut Slopes

- 1) The results of the slope stability analyses, including external loading from live and seismic loading, and the recommended side-slopes of all cuts;
- 2) Evaluation of rock cut slopes shall clearly describe the rock bedding characteristics, including strike and dip and a detailed description of the analysis completed to assure stability. Software and references used shall be from industry accepted sources, preferably Government Agencies such as the FHWA or the Army Corps of Engineers.

V. Instrumentation:

- 1) All items included in TC 3.14.04.06 "Geotechnical Instrumentation" above.

**TC 3.15 UTILITY DESIGN AND RELOCATION PERFORMANCE
 SPECIFICATIONS**

3.15.01 Utility Statement

3.15.01.01 General

The Design-Build Team's attention is called to the requirements of Section GP-5.05, GP-7.13 and GP-7.17.

3.15.01.02 Utilities Within Project Limits

The Design-Build Team (DBT) is alerted to the presence of overhead and underground utilities including but not limited to water, sanitary sewer, gas, electric, communications, utility conduit, 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 these utilities on the overall project design, schedule and construction. As it is impossible to determine how a DBT will perform certain operations or 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.

SPECIAL PROVISIONS
SCOPE OF WORK FOR DESIGN-BUILD

CONTRACT NO. PG7585184
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Contact Information:

Mr. Brad Zellmer
Potomac Electric Power Company
8300 Old Marlboro Pike
Upper Marlboro, MD 20772
Distribution Engineering, Maryland Division
Phone (301) 967-5354

Mr. Jeffrey Hicks
Washington Gas
6801 Industrial Road
Springfield, VA 22151
Phone (703) 750-5972

Mr. Nasr Widatalla
Washington Suburban Sanitary Commission
14501 Sweitzer Lane
Laurel, MD 20707
Phone (301) 206-8371

Mr. Brad Leatherman
Zayo Group
13861 Sunrise Valley Dr., Suite 450
Herndon, VA 20171
Phone (703) 928-0649



Mr. Gabor Varsa
Verizon of Maryland
1301 Columbia Pike
FDC-I Floor 01
Silver Spring, MD 20904
Office: (301) 282-7031

Mr. Adam Rice
Verizon Business
12379 Sunrise Valley Drive, Suite A
Reston, VA 20191
Phone (703) 391-5767

Mr. Victor Grafton
SHA District Utility Engineer (DUE)
9300 Kenilworth Avenue
Greenbelt, MD
Phone 301-513-7350

Mr. Brandon Freeman-Johnson
Comcast Cable
900 Michigan Avenue, NE
Washington, DC 20017
Phone (202) 635-5653

3.15.01.03 Utilities Coordinator

The DBT shall provide a Utility Coordinator with experience in coordinating the relocation of utilities on major SHA roadway projects. Responsibilities for this position will include but are not limited to: continuous coordination with all utility companies, establishment of a schedule for the relocation of utilities, updating schedule for the relocation of utilities, facilitating the handling of issues and conflicts as they arise, conducting and facilitating monthly utility coordination meetings, and preparation and distribution of utility coordination meeting minutes.

3.15.01.04 Preconstruction Utility Conference

The DBT shall conduct and facilitate a utility coordination meeting as soon as possible after notification as the successful Proposer and prior to issuance of the Notice to Proceed. 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 3 Utility 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

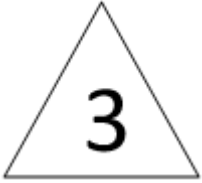
- Status of utility relocations
- Establishment of a schedule of utility relocations
- DBT planned design and construction schedule
- How utility relocation schedule will be facilitated within the DBT's planned design and construction schedule
- Plan for how issues and conflicts will be handled as they occur
- Setup monthly utility coordination meetings

The DBT shall prepare all meeting minutes and distribute them to attendees for review and comments.

3.15.01.05 Utility Coordination

The DBT shall incorporate and make provisions in the design for all existing and proposed utilities including relocations. The DBT shall establish and maintain ongoing coordination with utility owners after initial contact has been made by SHA to fulfill the following requirements:

- a. Obtain plans from the utility companies.



- b. Assure adequate protection of their utilities.
- c. Maintain utility service at all times during construction of the project.
- d. Identify all potential conflict areas both overhead and underground and perform test pits to verify conflicts.
- e. Incorporate and accommodate utility relocations in the schedule and sequence of construction.
- f. Conduct alternative studies to avoid utility relocation.

3.15.01.06 Non-Impacted Utilities

N/A

3.15.01.07 Utility Relocations By Others

Verizon Maryland, PEPCO, Zayo Group, Washington Gas and Comcast maintain facilities located within the limits of this project that may be in conflict with SHA's conceptual design. Any impacts will be relocated by the owner concurrent to this project. The Design-Builder shall perform all clearing and grubbing within the approved Limits of Disturbance prior to any required utility relocations by others.

The Design-Builder shall complete its design and construction with the intention of avoiding or reducing impacts to utility facilities. The Design-Builder will be responsible for completing alternative designs or studies to avoid utility relocations. When all reasonable efforts have been taken to avoid a utility impact and it is determined that a utility impact may be avoided through an exception to the requirements of the RFP, the Administration may consider an exception for approval on a case-by-case basis. When a utility impact cannot be avoided, the Design-Builder shall coordinate concurrent relocations with its schedule and sequence of construction so that there are no delays to the utility relocations or SHA's project.

The cost for utility relocations by others will not be the responsibility of the Design-Builder. If a utility relocation has been completed by others concurrent with the Design-Builder's design and construction and must be relocated a second time due to modifications or errors by the Design-Builder, all costs for the redesign and relocation will be the responsibility of the Design-Builder.



3.15.01.08 Utility Relocations by DBT

3.15.01.08.03 Washington Suburban Sanitary Commission (WSSC)

WSSC maintains water and sanitary sewer facilities located within the limits of this project that may be in conflict with SHA's conceptual design.

The DBT will be responsible for identifying all impacts to these water and sewer facilities within the limits of this project, perform test pits to verify conflicts, perform design alternative studies to remove or minimize these conflicts, design water and sewer relocation plans and coordinate and receive approvals from SHA and WSSC for relocation plans and construct water and sewer relocations. This includes scheduling meetings with WSSC and SHA and maintaining ongoing coordination during the entirety of this contract.

The DBT shall provide relocation design to WSSC for review and approval.

The DBT shall incorporate and accommodate utility relocations in the schedule and sequence of construction.

Care must be taken when working in the immediate vicinity of any existing WSSC facilities. Any damage to existing WSSC facilities created as a result of the Design-Builder's construction activities will be repaired at the expense of the Design-Builder. The integrity of the 30" water main pipe that runs along southbound MD 4 should be maintained at all times during the construction of this project.

3.15.01.08.05 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.

Monthly energy use charges and the final connection fees will be the responsibility of the Administration.

The DBT shall review all existing and proposed traffic signal structures and related equipment to ensure clearance distances from all existing and proposed utility line 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 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.

3.15.01.09 Permitting

The DBT shall obtain all required utility permits from SHA and the County and all other necessary Governmental Approvals with regard to utility work to be done by the DBT including service connections. SHA will require utility relocation plans that have been approved by the utility owner with the permit package. 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 Design-Builder shall notify SHA immediately after discovery.

3.15.01.10 Existing Utility Services

Existing utility service connections are not shown on the plans, therefore, 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. The cost of this work will be incidental to the cost of respective LS Item impacting the service. Utility services must be maintained at all times during construction, unless written permission is obtained from the Utility Owner and/or SHA.

3.15.01.11 Existing Utility Locations

The DBT is responsible to follow 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. The cost for this coordination and time consumption is considered incidental to all work performed.

Utility facilities owned by SHA

The State Highway Administration (SHA) is part of MISS UTILITY, Please note our notification procedures. To file electronically, visit – <http://www.missutility.net/itic/>. This site has instructions for MISS UTILITY requests, including Registration and Processing a Locate Request. When processing on line, you shall complete the LOCATE REQUEST FORM. On this form, toward the bottom is Section – EXCAVATION INFORMATION. Under this Section, in the blank space to the right of “Work Being Done For” type – SHA-3- PG7585184. This is so MISS UTILITY knows what highway agency and District number (3) you are working for. Similarly, when notifying MISS UTILITY, via 1-800-257-7777, you must state, “SHA-3- PG7585184.” The contractor must provide the contract number when contacting Miss Utility for locates. This provision is required whether the contractor contacts Miss Utility via the internet or by

phone. Failure of the contractor to comply with this requirement may result in a locate fee by SHA for which the contractor will not be allowed to recover.

The SHA facilities contacts are as follows:

SHA Street and Sign Lighting
Mr. Rick Divelbiss
District 3
9300 Kenilworth Avenue
Greenbelt, MD 20770
Phone (301) 513-7300

SHA Fiber Optic and Communication Cables
Statewide Operations Center (SOC)
(800) 543-2515

SHA Traffic Signals
Hanover Complex Signal Shop
Phone (410) 787-7652

SHA Intelligent Transportation (ITS)
Communications Division (410) 747-8590
ITS Operations Section (410) 787-7662

3.15.01.12 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, gas valves and gas meters. The DBT must coordinate with the utility owner on the specifications and schedule. This work is incidental to the respective LS item.

3.15.01.13 Utilities: Guidelines and Technical Requirements

All utilities within the Project area, designed and/or constructed by the Design-Build Team, shall be placed in accordance with applicable Governmental Rules, including the Administration's utility regulations and policies, Utility Policy Manual and Utility Procedure Manual, the applicable Utility Standards, Maryland Tariff, and other requirements specified in the Contract Documents.

3.15.04 Relocation of WSSC Water and Sewer

3.15.04.01 Description

This work will be specified by WSSC and will consist of designing, furnishing and installing all relocations, replacements and/or new installations of existing or proposed water mains, sewer mains and appurtenances owned by WSSC within the project limits. The DBT shall submit to WSSC for review all locations within the project limits within close proximity of any WSSC facilities.

3.15.04.02 Coordination with Other Work

The DBT shall coordinate the work on and location of the WSSC's facilities to avoid conflicts with work by others, including the DBT roadway and drainage design.

3.15.04.03 Adherence to WSSC Manuals

The latest edition of the WSSC General Conditions and Standard Specifications and all special provisions and special conditions shall be adhered to with the exclusion of:

- The following General Condition Articles:
 - 3-5, 7-13, 15-18, 22-24, 26, 28-30, 32, 33, 38, 39
- All "Measurement and Payment" sections
- Section 01570 – Temporary Erosion and Sediment Control
- Section 02070 – Geosynthetics
- Section 02230 – Site Clearing
- Section 02370 – Slope and Watercourse Protection
- Section 02820 – Fences and Gates
- Section 02920 – Lawn and Grasses
- Section 02930 Exterior Plants
- Section 02950 – Pavement Restoration

The latest edition of the WSSC Pipeline Design Manual and the latest edition of the WSSC Standard Details for Construction shall be adhered to. Upon conflicting requirements between any WSSC Manual and SHA's Standards Specifications for Construction and Materials, the higher standard will be implemented and the conflict will be remanded to SHA and WSSC for resolution. WSSC's manuals including the Pipeline Design Manual, Standard Details for Construction, and General Conditions and Standard Specifications may be viewed on the WSSC website at www.wsscwater.com.

3.15.04.04 Design

3.15.04.04.01 Preliminary Design

As a first order of business involving facilities owned by WSSC, the DBT shall:

1. Consult with WSSC to understand WSSC's requirements for the Project and review available data.
2. Obtain such additional geotechnical, corrosion and related information that it deems necessary for performance of the work.

3. On the basis of WSSC's requirements for the Project, prepare Preliminary Design Phase documents consisting of final design criteria, preliminary plans, and written descriptions of the Project.
4. Furnish the Preliminary Design Phase Documents for review by WSSC. The DBT shall submit the latest version of all applicable roadway, drainage, stormwater management, etc. plans to WSSC with the Preliminary Design Phase Documents.

Plan submissions to WSSC should be sent to the following:

Mr. Nasr Widatalla
Washington Suburban Sanitary Commission
14501 Sweitzer Lane
Laurel, MD 20707
Phone (301) 206-8753

Reference **14RMS7903A** in all correspondence with WSSC.

WSSC is anticipated to respond within 30 calendar days of their receipt of the submission by providing written acceptance or rejection of the Preliminary Design Phase Documents. Review time for submissions to WSSC in excess of 30 calendar days shall not be the basis of a claim or time extensions against the Administration. If the Preliminary Design Documents are rejected, WSSC will provide a reason for rejection and the DBT shall address the problems and resubmit the Preliminary Phase Documents to WSSC. Every resubmission of the Preliminary Phase Documents to WSSC will constitute the beginning of a new review period for WSSC with an anticipated response time of 30 calendar days from receipt of the submission.

A copy of all submissions to WSSC shall be delivered to the Administration concurrently.

3.15.04.04.02 Final Design

After written acceptance by WSSC of the Preliminary Phase Documents, the DBT shall:

1. On the basis of the accepted Preliminary Design Phase Documents, prepare Final Plans showing the scope, extent, and character of the Construction to be performed and furnished by the DBT.
2. On the basis of the Final Plans, prepare an item-by-item cost estimate breakdown of the lump sum price for the proposed work. The item-by-item breakdown will be used to determine cost responsibilities between SHA and WSSC.

3. Furnish the Final Plans and the item-by-item cost estimate breakdown for review by WSSC. The DBT shall submit the latest version of the applicable roadway, drainage, stormwater management, etc. plans to WSSC with the Preliminary Design Phase Documents.

Plan submissions to WSSC should be sent to the following:

Mr. Nasr Widatalla
Washington Suburban Sanitary Commission
14501 Sweitzer Lane
Laurel, MD 20707
Phone (301) 206-8753

Reference **14RMS7903A** in all correspondence with WSSC.

WSSC is anticipated to respond within 30 calendar days of their receipt of the submission by providing written acceptance or rejection of the Final Plans. Review time for submissions to WSSC in excess of 30 calendar days shall not be the basis of a claim or time extensions against the Administration. If the Final Plans are rejected WSSC will provide reason for rejection and the DBT shall address the problems and resubmit the Final Plans to WSSC. Every resubmission of the Final Plans to WSSC will constitute the beginning of a new review period for WSSC with an anticipated response time of 30 calendar days from receipt of the submission.

A copy of all submissions to WSSC shall be delivered to the Administration concurrently.

3.15.04.05 Materials

The DBT shall furnish all material. The DBT will procure materials referred to in WSSC Manuals as “to be furnished by the Commission” from the latest WSSC Approved Manufacturers and Material List or equals approved by WSSC.

3.15.04.06 Construction

After written acceptance by WSSC of the Final Plans, the DBT shall supervise and direct the Construction, competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to provide the Construction in accordance with the requirements of WSSC. **The construction contractor must have performed satisfactory work on WSSC facilities, as related to the scope of work on this contract within the last five**

years. The construction contractor must have in possession and on the job site a copy of the latest edition of the WSSC General Conditions and Standard Specifications and WSSC Standard Details. Prior to the start of construction, the construction contractor shall arrange a meeting with the WSSC representative to walk the project to determine which manhole frames and covers and water valve boxes are damaged and are to be replaced. The DBT shall be responsible to see that the completed Construction complies accurately with the Contract Documents and shall keep WSSC advised to the quality and progress of Construction.

3.15.04.06.01 Insurance

WSSC shall be listed as an additional named insured on the policy acquired to fulfill the requirements in SHA's Standard Specifications for Construction and Materials section TC-5.01 (Insurance). Evidence of insurance shall be provided to WSSC, prior to performing any work related to WSSC facilities, by the same means as specified in SHA's Standard Specifications for Construction and Materials section TC-5.01 (Insurance) for providing evidence of insurance to SHA. The DBT shall provide a waiver of subrogation applicable to WSSC and its employees while such employees are performing work for or on behalf of WSSC.

3.15.04.06.02 Customer Relations

The DBT shall have an onsite representative to act as liaison between WSSC and the community. This representative shall be responsible for all Customer Notifications, Customer Complaints, and any coordinating efforts that may arise throughout the duration of the contract. This person must correspond with the designated WSSC Contract Manager, in a timely manner, on all WSSC related issues.

3.15.04.06.03 Inspection

The DBT shall notify WSSC at least 1 week prior to beginning construction of WSSC facilities. An inspector, provided by WSSC, will inspect all construction of WSSC facilities. The Design-Build Team shall pay all costs for such inspection to insure compliance with the standards and details of WSSC.

3.15.04.06.04 Testing

The DBT shall be responsible for all testing required by WSSC. Concurrent with acceptance of the Final Plans, WSSC will be provided to the DBT forms and instructions for the use of the forms to be utilized in reporting the testing data to WSSC. The DBT shall have a Geotechnical Engineer, licensed to practice in the State of Maryland, perform compaction tests. The location and depth of the tests are to be as designated in the WSSC General Conditions and Specifications. The DBT shall provide WSSC with copies of all test performed. WSSC reserves the right to require additional compaction tests as it may deem necessary.

3.15.04.06.05 Reports

Documentation of the construction of WSSC facilities shall be computer generated WSSC supplied forms and submitted on a weekly basis by email and in CD format. Documents to be included with the reports shall include, but not limited to photographs, compaction reports, correspondence (emails or letters), field orders, and change orders. The reports must be approved by the WSSC Engineer. Reports that are rejected must be resubmitted with corrections made.

3.15.04.06.07 Final Inspection

Within seven calendar days of receiving written notice from the DBT that the entire Construction of WSSC facilities or an agreed upon portion thereof is complete, WSSC will make a final inspection with the DBT. The DBT shall provide the necessary manpower to assist with the Final Inspection to include but not limited to traffic control, ventilation of confined spaces, and any other safety requirements. Within 30 calendar days of the final inspection WSSC will notify the DBT in writing of all particulars in which this inspection reveals that the Construction is incomplete or defective. The DBT shall immediately take such measures as necessary to complete such Construction or remedy such deficiencies.

3.15.04.06.08 As-Built Drawings

The DBT shall provide WSSC with 3 sets of as-built drawings prior to the Acceptance of Work by WSSC. The as-built drawings will be used to determine final quantities for payment purposes. The as-built drawings will be reviewed by WSSC for approval. If the as-builts are rejected, the DBT will make the necessary corrections and resubmit prior to final payment.

3.15.04.06.09 Acceptance of Work

After the DBT has completed all corrections required by the Final Inspection to the satisfaction of WSSC and has delivered all required submittals to WSSC, the DBT shall inform WSSC in writing that the work is complete. If WSSC is satisfied that the work has been completed and the DBT's other obligations have been fulfilled, WSSC will inform SHA that the Work is acceptable and issue the Certificate of Substantial Completion. Otherwise, WSSC will indicate in writing to the DBT the reason for refusing acceptance of the work.

3.15.04.06.10 Quality Control

If WSSC objects to the performance of any part of the DBT, WSSC will communicate this SHA and the obligation will be addressed by SHA.

3.15.04.07 Measurement and Payment

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The payment for all costs accrued in designing, finishing the material and performing the work, complete and to the satisfaction of WSSC and SHA, shall be included as a separate lump sum price for WSSC work as defined in TC 7. The DBT shall provide an item-by-item breakdown estimate of the DBT's final design. In addition, the DBT shall complete the OOC36 Form (item-by-item cost breakdown of WSSC items that were constructed) for each WSSC relocation and submit the form to WSSC and SHA within 30 calendar days of WSSC's acceptance of the work. These quantities must be in agreement with the as-built drawings.

TC 3.16 MAINTENANCE OF TRAFFIC (MOT) PERFORMANCE SPECIFICATION

3.16.01 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 adapt 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 will lay out transportation management strategies and how these strategies will be implemented to manage work zone impacts.

3.16.02 Guidelines and References

The Design-Builder shall design and implement maintenance of traffic set-ups in accordance with the relevant requirements of the standards listed by priority in Table 1 unless otherwise stipulated in this specification. Standards specifically cited in the body of this specification establish requirements that shall have precedence over all others. Should the requirements in any standard below conflict with those in another, the standard listed with the higher priority shall govern. It shall be the Design-Builder’s responsibility to obtain clarification for any unresolved or perceived ambiguity prior to proceeding with design or construction.

**Table 1
Guidelines for Maintenance of Traffic**

Priority	Author or Agency	Title
1	SHA	Temporary Traffic Barrier Policy
2	SHA	Guidelines for Late Lane Merge Concept
3	SHA	Flagger Policy at Signalized Intersections
4	SHA	Functional Guidelines for Portable Changeable Message Signs (PCMS)
5	SHA	Maryland State Police Criteria for Use in Work Zones and Interagency Agreement between SHA and Maryland State Police
6	SHA	High Visibility Apparel Policy

Table 1
Guidelines for Maintenance of Traffic

Priority	Author or Agency	Title
7	SHA	Work Zone Safety Policy
8	SHA	Office of Traffic and Safety Approved Product List for Temporary Traffic Control Devices and Miscellaneous Items
9	SHA	List of Qualified Removable Preformed Pavement Marking Material for Maintenance of Traffic
10	SHA	Maryland State Highway Standard Sign Book
11	SHA	Book of Standards for Highway and Incidental Structures for items identified as Standard in Appendix B of Part 3-Design Requirements
12	SHA	Standard Specifications for Construction and Materials Section for items identified as Standard in Appendix A of Part 3-Design Requirements
13	SHA	Work Zone Safety and Mobility Policy
14	SHA	Guidance on Maintenance of Traffic Alternatives Analysis
15	SHA	Transportation Management Plan Guidelines
16	SHA	Work Zone Lane Closure Analysis Guidelines
17	AASHTO	A Policy on Geometric Design of Highways and Streets, 2001
18	SHA	Maryland Manual on Uniform Traffic Control Devices (MD MUTCD) [Latest Adopted Edition]
19	FHWA	Manual on Uniform Traffic Control Devices (MUTCD)
20	SHA	Roadway Delineation Policy
21	AASHTO	Roadside Design Guide
22	SHA	NCHRP Report 350 Implementation Schedule
23	FHWA	National Cooperative Highway Research Program (NCHRP) Report 553 Crashworthy Work Zone Traffic Control Devices
24	FHWA	National Cooperative Highway Research Program (NCHRP) Report 350 Recommended Procedures for the Safety Performance Evaluation of Highway Features.
25	SHA	Work Zone Safety Tool Box
26	ATSSA	Quality Standards for Work Zone Traffic Control Devices
27	SHA	Accessibility Policy and Guidelines for Pedestrian Facilities Along State Highways
28	ADA	Americans with Disabilities Act Accessibility Guidelines
29	SHA	Bicycle Policy & Design Guidelines

3.16.03 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 setup, 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 the 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) flagging certification.

3.16.03.02 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 property by 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 including, but not limited to, the MD 4/Suitland Parkway Interchange Construction project; The SHA will be executing the MD 4/Suitland Parkway Interchange Construction Project (Contract No’s. PG6185170 and PG6185370) beginning in 2015. The MD 4/ Suitland Parkway Interchange Construction Project will have one or more contractors and utility companies performing work during the construction of the MD 4 from Forestville Road to MD 458 Community Safety and Enhancement Project. The Design Build Team will be required to coordinate maintenance of traffic and signing with all contractors and utility companies performing work on the MD 4/Suitland Parkway Interchange Construction Project. The following maintenance of traffic issues must be considered when coordinating with the MD 4/Suitland Parkway Interchange Construction Project:
 - i. Truck traffic is prohibited on Suitland Parkway.
 - ii. The proposed Maintenance of Traffic Plans for the MD 4/Suitland Parkway Interchange Construction Project may limit or prohibit the Design Build Team’s ability to use MD 4 for traffic diversions or other maintenance of traffic within the limits of the MD 4/Suitland Parkway Interchange Construction Project.
 - iii. A detour is proposed as part of the MD 4/Suitland Parkway Interchange Construction Project that utilizes MD 4 between MD 458 and Suitland Parkway. At the current level of design, it is anticipated that during one of the construction phases, the existing left-turn movement from eastbound Suitland Parkway to northbound MD 4 will be redirected via detour along northbound MD 458 and then along southbound MD 4 ending at the MD 4 interchange with I-95/I-495 (Capital Beltway).The detour and all related appurtenances including signage must be maintained for the duration of the detour.
- I) Provide Traffic Control Plans (TCPs) for each major phase of construction (see Section 3.16.06 of this performance specification); and



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- J) Provide for a Public Outreach campaign to be implemented in cooperation with the Administration. All public coordination should be conducted per TC 3.21 – Public Outreach Performance Specification.
- K) Develop an incident management plan for accidents occurring within the Project limits, including accident prevention strategies, emergency procedures, reporting requirements, and mitigation strategies.

requirements, and mitigation strategies.

DESIGN AND CONSTRUCTION CRITERIA

3.16.04.01 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) 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.
- C) Provide and use all safety equipment including (but not limited to) hard hats, safety vests and clothing required by State and Federal regulations and SHA policies and procedures.
- D) 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.
- E) Arrange and host a pre-traffic switch meeting with the Administration and all affected agencies at least two weeks prior to switching traffic.
- F) Identify desired full roadway closures (for any period of time) to the Administration for review and concurrence during the design review process.
- G) Correct all traffic control deficiencies immediately upon notification or observance of the deficiency.
- H) Design all geometric aspects of temporary roadways for the assigned posted speed.
- I) Design all active roadways to accommodate drainage such that there are no puddles or icing on the traveled roadway or shoulders.
- J) Ensure appropriate MOT and flagging procedures are employed during all phases of construction, including mobilization activities.

3.16.04.02 Public Information and Outreach

Actively assist the Administration in providing advance information to the public regarding construction phasing, detour routes, and expected travel impacts. Actively coordinate these activities through frequent meetings with the Community Outreach Manager. 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. All public coordination should be conducted per TC 3.21 – Public Outreach Performance Specification.

3.16.04.03 Public Access

Maintain access to all businesses, residences, local streets and private driveways at all times, including all temporary approaches and 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.

3.16.04.04 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. 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.

3.16.04.05 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.

3.16.04.06 Detour Routes

Design, place, and maintain all traffic detours required during construction. Wherever possible, use State routes for detour routes. Obtain all necessary permits from all agencies for temporary roadways, including construction and/or haul routes.

Detour routes shall be required when complete road or ramp closures are necessary. Proposed detour routes shall be included in the Traffic Control Plans and reviewed through the design review process (see Section 3.16.06 of this performance specification). Complete closures of roadways will not be permitted without the express written approval of the Administration as part of the design review process prior to 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.

Any road closures on Prince George's County roadways require written approval from the Director of the Prince George's County Department of Public Works and Transportation.

3.16.04.07 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 MD 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, MD 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.

3.16.04.08 Work Zone Intelligent Transportation Systems (ITS)

Utilize existing and future CHART and SHA variable message signs as part of the TMP. Coordinate the operation of these signs and the implementation of the appropriate messages with the Administration.

3.16.04.09 Construction Access and Haul Routes

Provide all construction roads required for delivery of fill, asphalt, concrete, and all other materials required for the Project. Obtain all necessary permits from all applicable agencies for construction, maintenance, and removal of temporary roadways, including construction and/or haul roads.

3.16.04.10 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 ROW. 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".

3.16.04.11 Emergency Response

The Design-Builder shall cooperate with the Maryland State Police, local law

enforcement, and other emergency response agencies 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 investigation 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.

3.16.04.12 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 the Administration for review.

3.16.04.13 MOT Restrictions

Refer to Special Provision – Section 104.01 – Traffic Control Plan for work restrictions and temporary lane closure and/or shoulder closure requirements.

Failure to restore full traffic capacity within the time specified will result in a deduction in Contract Price assessed on the next Periodic Payment. See below for the assessed MOT Deductions.

The Administration reserves the right to modify or expand the methods of traffic control or working hours as specified by the Design-Builder. The Administration reserves the right to modify the lane closure restriction hours based on area special events. Any request from the Design-Builder to modify the Temporary Lane and Shoulder Closure Schedule restrictions requires review and concurrence from the Administration at least 72 hours prior to implementing the change. The Design-Builder shall submit a copy of the original work restrictions with the request.

3.16.04.14 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	Minimum Advanced Notice	Maximum Advanced Notice
1	30 Days	45 Days
2	10 Days	21 Days
3	7 Days	14 Days
4	3 Days	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(s) closure that would have significant impact on traffic, such as temporarily stopping traffic completely (traffic drags), closing 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 excludes weekend 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 is 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 of work zone to end of 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.

3.16.04.15 NCHRP Report 350 Implementation Schedule

All items for the maintenance of traffic shall be crashworthy in conformance with the Administration's NCHRP Report 350 Implementation Schedule. 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 the 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) 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.

3.16.04.16 Work Zone Speed Limits

If the Design – Builder requires a work zone speed limit reduction in any area throughout the Project limits, the Design – Builder shall submit a request in writing to SHA for review, comment, and approval. For areas with work zone speed limit reductions, the Design – Builder shall provide work zone speed limit signs and any additional signing as necessary.

3.16.05 DEVELOPMENT AND REVIEW OF THE TRANSPORTATION MANAGEMENT PLAN

The Transportation Management Plan (TMP) shall include Traffic Control Plans (TCP), as well as transportation operations and public information and outreach 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 3.16.05.01 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 3.16.06 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.

3.16.05.01 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 Transportation Management Plan report shall be submitted to the Administration for review at the Definitive Design stage. 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.

3.16.05.02 TMP Report Format

- (A) All the pages within the report shall be numbered and dated.
- (B) 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.
- (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, 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 3.16.05.03 of

- this Performance Specification)
- 7) Work Zone Traffic Analysis (Refer to Section 3.16.05.04 of this Performance Specification)
 - 8) Work Zone Impact Management Strategies (Refer to Section 3.16.05.06 of this Performance Specification)
 - 9) Access and Mobility Plan (refer to Section 3.16.05.07 of this Performance specification)
 - 10) Contingency Plan (Refer to Section 3.16.05.08 of this Performance Specification)
 - 11) Incident Management Plan (Refer to Section 3.16.05.09 of this Performance Specification)
 - 12) Public Outreach Proposal (Refer to TC 3.21 – Public Outreach)
 - 13) Implementation and Monitoring Plan (Refer to Section 3.16.05.10 of this Performance Specification)
 - 14) Supporting Documentation (e.g., Traffic Control Plans)

3.16.05.03 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 ½ x 11, 11x17, or plan-sized (22x34) 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.

3.16.05.04 Work Zone Traffic Analysis

Using the date 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 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 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.)

3.16.05.05 Approved Analysis Techniques and Software

Design-Builder may utilize the following software packages for analysis of Maintenance of Traffic Plans.

- A) The Design-Builder may use QuickZone 2.0, MD QuickZone 2.0, Quewz 98, Lane Closure Analysis Program (LCAP), Highway Capacity Software (HCS+) (version 5.3 or higher), Synchro/SimTraffic (version 6.0 or higher), Critical Lane Volume technique, or approved equal (as appropriate) to determine the queuing, delay, and level of service impacts caused by the maintenance of traffic plans.

3.16.05.06 Additional Work Zone Impact Management Strategies

In addition to the impact management strategies and MOT requirements included in this Performance Specification, the DB Team 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.

3.16.05.07 Access and Mobility Plan

The Design-Builder shall develop an Access and Mobility Plan depicting haul routes and access points where applicable. 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.

3.16.05.08 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 contractors 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 exceed 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.

3.16.05.09 Incident 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:

The Design-Builder shall provide immediate response to emergencies by trained personnel from an incident response team per the requirement of TC 3.21 – Public Outreach. 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 of accidents and other incidents. At minimum, the Design-Builder shall provide documentation to the Administration with details on:

- A) Cause of disruption (i.e., whether it is construction oriented or not);
- B) Actions being taken to alleviate the problem;

- C) Responsible party for the actions; and
- D) Anticipated duration of the disruption.

The Design-Builder shall establish and manage an emergency response telephone tree per the requirements of TC 3.21 – 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.

3.16.05.10 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.

3.16.05.11 Review of and Revisions to TMP Report

The TMP shall be submitted to the Administration for review at the Definitive Design stage. No construction shall occur until the Administration's comments have been successfully addressed.

Any major changes to the TMP Report and associated analysis presented during Definitive Design shall be submitted along with the supporting analysis and documentation to the Administration for review and comment at least 45 days prior to implementing the proposed change. Changes to construction phasing/staging or other impact management strategies that will have a substantial impact on safety or mobility in the project area can be considered major changes. Minor changes (e.g., change to work zone speed limit) shall be submitted to the Administration at least 7 days prior to implementing the proposed change.

3.16.06 Traffic Control Plans

A MOT Phase Plan shall be developed for each major phase of construction. MOT Phase Plans shall be presented on paper no smaller than 22" by 34" with appropriate scale. The Design-Builder shall prepare and present each MOT Phase Plan for review and approval by the Administration. 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 Guidelines, MD MUTCD, or MUTCD. The following components shall be included in 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 a change is needed;
- D) Temporary roadways and striping Plans;
- E) Temporary drums 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, signals, and lighting plans;
- I) Specific sign messages with sign sizes, spacing or referenced distances, and MD MUTCD sign designations. The Design-Builder shall provide details for all proposed non-standard signs as defined by MD-MUTCD for SHA review and approval prior to installation;
- J) Proposed phased construction of permanent signing;
- K) Proposed phased construction of traffic signals;
- L) Pavement marking changes shall be specific and clearly shown on the Traffic Control Plan with respect to lane widths, pavement marking material, color, location, and widths. Dimensions are necessary to assure proper installation of the pavement markings;
- M) Flagging locations; and
- N) Emergency response information.

3.16.06.01 Review of and Revisions to Traffic Control Plans (TCP)

Major changes (e.g., changes in construction phasing or staging) to the Traffic Control Plans shall be submitted along with the supporting analysis and documentation to the Administration for review and comment at least 14 days prior to implementing the proposed change. Minor changes (e.g., slight changes in traffic shift location or taper lengths) shall be submitted to the Administration at least 3 days prior to implementing the proposed change.

The Administration understands that certain changes to traffic control setups may need to occur in a more timely manner during construction to address urgent safety or mobility problems. These changes should be discussed with the Administration before implementation; however, revisions to the TCP may be documented after their implementation in these circumstances. In these situations, TCP revisions should be documented within 10 days of their implementation. All TCP changes shall be reflected in revisions to the TMP Report when necessary, and these revisions shall be made within 21 days of their implementation.

TC 3.17 DRAINAGE, STORMWATER MANAGEMENT, AND EROSION & SEDIMENT CONTROL PERFORMANCE SPECIFICATION

3.17.01 GENERAL

Provide drainage systems, stormwater management, and erosion and sediment control required to serve the Project defined in these Contract Documents. This can necessitate the assessment and improvement of existing drainage and stormwater management as well as the construction of new facilities. Ensure that new or rehabilitated facilities cause no adverse impacts upstream and downstream of the project site.

3.17.02 GUIDELINES AND REFERENCES

3.17.02.01 Guidelines

Design and construct the drainage systems, stormwater management, and erosion and sediment control measures according to the relevant requirements of the Guidelines listed by priority in Table 1, unless otherwise stipulated. The Guidelines cited in this specification establish requirements that have precedence over all others. If the requirements in any guideline conflict with those in another; the guideline listed with the higher priority governs. Obtain clarification for any unresolved or perceived ambiguity prior to proceeding with design or construction.

Use the most current version of each listed guideline as of the publication date of this RFP.

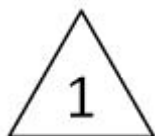
TABLE 1 GUIDELINES FOR DRAINAGE		
Priority	Author or Agency	Title
1	SHA	Maryland Department of Transportation, publications entitled "Highway Drainage Manual" dated December 1981 or as amended herein and any revisions thereof and "Highway Drainage Manual Design Guidelines".
2	MDE	Regulation COMAR 26.17.01, "Erosion and Sediment Control"
3	MDE	"Erosion and Sedimentation Guidelines for State and Federal Projects"
4	SHA	Field Guide for Erosion and Sediment Control

TABLE 1 GUIDELINES FOR DRAINAGE		
Priority	Author or Agency	Title
5	MDE	"2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control"
6	MDE	National Pollutant Discharge Elimination System General Permit for Construction Activity,
7	MDE	Regulations COMAR 26.17.02, "Stormwater Management"
8	MDE	"Stormwater Management Guidelines for State and Federal Projects"
9	MDE	"Maryland Stormwater Design Manual", Volumes I and II (October 2000, Revised May 2009, and any revisions thereof)
10	MDE	Regulations COMAR 26.17.04 "Construction on Nontidal Water and Floodplains."
11	MDE	"Guidelines for Construction on Nontidal Waters and Floodplains."
12	MDE	Regulation COMAR 26.08.02.10, "Water Quality Certification"
13	SHA	"Stormwater Management, Erosion and Sediment Control and Waterway Construction Permit Issues and Approaches"
14	NRCS	Pond Code MD-378
15	SHA	"SHA Stormwater Site Development Criteria - Review Guidelines"

3.17.02.02 References

Use the references listed in Table 2 as supplementary materials for the design and construction of the drainage system, stormwater management, and erosion and sediment control measures. These publications have no established order of precedence.

TABLE 2 REFERENCES FOR DRAINAGE	
Author or Agency	Title
MDE	"Surface Storage Volume Tables for Bioretention, Bioswales, Rain Gardens, and Landscape Infiltration", October 2012 draft.
SHA	"Guidelines for Preparing Stormwater Management Concept Reports", April 2003 draft.
SHA/MDE	"Stormwater Quality Management Banking Agreement" dated June 2, 1992, and amended March 1, 1994 and August 2003.
SHA	Grass Channel Credit Paper
SHA	SWM Concept Report
SHA/MDE	"Stormwater Management Process Agreements and Interpretations, April 2003"
FHWA	"Culvert Inspection Manual", July 1986



3.17.03 REQUIREMENTS**3.17.03.01 Surface Drainage Design**

Design all surface drainage conveyances including but not limited to open channels, inlets, closed storm drainage systems, cross culverts and entrance driveway pipes. Submit the drainage design, in report form as indicated herein, to the Administration for review and concurrence prior to construction.

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.

3.17.03.01.01 Surface Drainage Design - General Requirements

Drainage design shall be performed according to the following criteria and regulations:

- A. Design and construct the drainage system including the repair and/or replacement of unstable or deteriorating outfalls. Design also includes the regrading of existing outfalls and the replacement of adversely sloped and level (zero gradient) pipes to remove adverse slopes and provide positive drainage.
- B. Clean all existing and new pipes and drainage structures to be free of debris and sediment at conclusion of project.
- C. Inspect all existing pipes and drainage structures to be used in the Final Design and assess for structural integrity and hydraulic capacity. Compile inspection reports and submit for concurrence. Include photographs and a written report describing the structural integrity of the drainage structure. Repair or replace all existing pipes and drainage structures failing to meet structural integrity or hydraulic requirements.
- D. Remove all existing pipes and drainage structures which will not be used in the Final Design or abandon by filling with Flowable Backfill.
- E. Provide positive drainage flow in all open and closed systems. Complete designs and obtain Administration approval prior to construction of all temporary and permanent pipe systems.

SCOPE OF WORK FOR DESIGN-BUILD

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- F. Construct work so as not to trap water along any section. If during design or construction an area of the Project is identified as not having positive drainage in pre-construction conditions, provide adequate measures to ensure positive drainage after construction.
- G. 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).
- H. No adverse impacts to upstream or downstream properties, infrastructure, or environmental resources are allowed. This may require work to be performed beyond the accepted limits of the roadway improvements, based upon the approved contract limits.

3.17.03.01.02 Surface Drainage Design - Specific Criteria

This section contains criteria that are in addition to that contained under Drainage Design General Requirements. Where conflicts arise between these Specific Criteria and those contained in the General Requirements, these Specific Criteria have precedence.

3.17.03.01.02.01 Cross Culverts

Refer to Environmental Performance Specification, Section 3.20, 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 unless the drainage area exceeds 200 acres, for which GIS Hydro is added as an acceptable model. Use HEC-RAS for floodplain modeling.
- B. Ensure the 100-year headwater pool at new culverts remains within the right-of-way or easements. For existing, replacement, or extended culverts, ensure that the 100-year storm headwater elevation for the proposed conditions is at or below the existing 100-year headwater elevation.

3.17.03.01.02.02 Roadway Drainage Design

- A. The maximum allowable flow spread in a closed section for a 2-year storm event is 8 ft. and in no case cover more than one half of any travel lane.
- B. The maximum allowable 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. Where practicable, use the roadway inlets and drainage structures in the Administration's "Book of Standards for Highways and Incidental Structures" or approved equal(s). Submit for approval non-standard structures prior to construction. Within the travel or turning lanes, COG or COS inlets are preferred. If it is necessary to use grated inlets within the travel or turning lanes, place concrete aprons around the inlets unless specifically waived. Where grate inlets are used, bicycle friendly grates such as reticular (WR, WRM, NR, NRM) or curved vane (CV-S, CV-E) grates are required unless specifically exempted. Ensure that inlets in or immediately adjacent to crosswalks are compliant with the American with Disabilities Act (ADA). Inlets should be placed within 50 feet upstream of any handicap ramps. Elevations along the curb flow line should be detailed at all ramps to ensure positive drainage away from the ramps and towards the adjacent inlets.
- D. No breaks in curb, such as curb cuts, are allowed for drainage purposes. Curb depressions are permitted to provide maintenance access to the Micro-Bioretenion facilities. Spread computations should be performed to ensure the depth of flow meets SHA standards. Inlets should be placed upstream of curb depressions as needed.
- E. Design ditches to ensure positive drainage flow. Standing water is not acceptable, except for stormwater management. Design side ditch capacity to convey the 10-year storm with 9-inches of freeboard between the calculated normal flow depth and the edge of pavement.
- F. Design ditch linings using HEC-15 "Design of Roadside Channels with Flexible Linings ". Where practicable, the use of Soil Stabilization Matting (SSM) rather than riprap is preferred. 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 Dissipators for Culverts & Channels" Calculate outlet velocity and at a minimum, provide outfall protection for the same design storm as the culvert. Where conditions indicate that greater outfall velocity may occur at a lesser storm event, provide protection for that event

- i. Riprap outfalls may be used when the outlet Froude number (Fr) is less than or equal to 2.5. Consider stability of the surface at the termination of the apron.
 - ii. Design riprap aprons using Charts in Appendix B to the Culverts section of the Highway Drainage Manual Design Guidelines
 1. No. 405.8 “Design of Outlet Protection Minimum Tailwater Condition” is for use where:
 - o Tailwater is less than $\frac{1}{2}$ the culvert height and the culvert outlets onto flat areas with no defined channel.
 - o Tailwater is less than $\frac{1}{2}$ the culvert height and the receiving stream is wide enough to accept divergence of the flow.
 2. No 405.9 “Design of Outlet Protection Maximum Tailwater Condition” is for use where:
 - o Tailwater is greater than $\frac{1}{2}$ the culvert height.
 - o Culvert discharges into a confined channel
 - iii. Riprap lined preformed scour holes may also be used when the outlet Fr is less than or equal to 2.5.
- H. Concrete lined ditches and concrete slope or channel protection are not allowed 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. Obtain written approval prior to construction for conversion of existing drainage structures into junction boxes within the roadway. Inspection report data shall be provided for the Administration’s review and written comment.
- K. A 100 year service life is required for all added or replaced storm drain pipe under Interstates.
- L. Size all added or replaced storm drain so that the 100 year hydraulic grade line remains below the top of all added, replaced, and existing structures located on Interstates.

3.17.03.02 Floodplain and Waterway/Wetland Coordination

The Design-Builder is responsible for coordinating analysis of applicable drainage crossings with MDE, FEMA and the Administration. Floodplain crossing requirements can be found in Structures Performance Specifications.

Prior to construction, the Administration may be required to 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.

3.17.03.03 Stormwater Management (SWM)

The Concept SWM Report addresses management for the maximum project limits; however, if a revised roadway improvement scope is implemented, it is the Design-Build Team's responsibility to provide management acceptable to the SHA and MDE.

3.17.03.03.01 BMP Selection

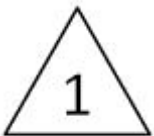
Submit the proposed SWM facility types for the Administration's consultation and written comment prior to advancing SWM design. The Administration will use the following criteria in evaluating proposed facilities:

- A. The best fit given the site context, the adjacent community, and the local ecology.
- B. Non-structural practices are considered first when feasible.
- C. Alternative surfaces and micro-scale practices are considered before larger structural Best Management Practices (BMPs).
- D. BMPs requiring lower maintenance are considered first. Potential maintenance needs are considered when designing SWM facilities. BMPs are prohibited in the grass median on MD 4.

3.17.03.03.02 Water Quality Bank

Provide Water Quality treatment of stormwater runoff according to the aforementioned regulations and guidelines. Account for new impervious area, impervious area removed, redevelopment, loss of existing water quality, and treatment provided. Determine the resulting treatment needs and credit for treatment provided according to the MDE/SHA Stormwater Quality Management Banking Agreement dated June 2, 1992, and amended March 1, 1994, with revisions as described below:

- 1. 100% credit for on-site (SHA) treatment of untreated impervious with any MDE approved BMP.
- 2. Off-site (non-SHA) treatment of untreated impervious areas may be eligible for



80% credit with MDE concurrence.

3. Non-structural BMPs qualify for only Project credit, not bank credit. Excess grass channel credit cannot be applied to the bank.
4. Pavement removal with soil amendments to promote infiltration will be considered as redevelopment and will receive 50% credit. If it is demonstrated that the pavement removal is solely for water quality treatment purposes, then 100% credit will be applied.
5. There will be a 20% surcharge for any debits to the bank.



A conceptual Water Quality Summary Sheet (WQSS) for this project is included in the concept SWM report provided on ProjectWise. The Design Build Team shall not exceed the net debit shown on that WQSS. The final WQSS, using the same format, shall be completed by the Design Build Team based on the Final Design. Upon approval and signature by MDE, provide to the Administration's Highway Hydraulics Division both a photocopy and electronic Excel spreadsheet that includes the XML conversion tool. Accompany those copies with a copy of the MDE SWM/ESC approval letter. Provide all of the above each time MDE issues a modification of the approval.

3.17.03.03.03 SWM Specific Engineering Criteria

- 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 Stormwater Site Development Criteria Review Guidelines, MDE Stormwater Design Manual Appendix A & Appendix B.3 for further information regarding landscaping design and SWM. The Bioretention Soil Mix (BSM) layer shall adhere to MD SHA BSM Specifications, Section 920.01.05.
- B. Locate structural BMPs 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. Non-structural BMPs (such as Micro-Bioretention facilities), may have 2-year water surface elevation rise into the COG inlets adjacent to the roadway, provided that a minimum freeboard of 0.5' is provided between the 2-year water surface elevation and the edge of roadway elevation.
- C. Riser structures and pipe outfall systems are to be designed and constructed according to MD 378. Concrete risers and outfall systems are preferred. No

other riser and pipe systems will be allowed unless specifically approved.

- D. Use pressure rated reinforced concrete pipe for stormwater management pond outfalls meeting the requirements of ASTM C-361.
- E. 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 2000 Maryland Stormwater Design Manual (and revisions thereof) for additional SWM specifications.
- F. 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.
- G. 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.
- H. Use slotted perforated pipes surrounded by aggregate for low flow and dewatering. Geotextile is not acceptable. Anchor pipes extending into ponds against flotation.
- I. 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.
- J. Use filter diaphragms for embankment seepage control. Anti-seep collars are not allowed unless specifically approved.
- K. Obtain a BMP number for each structural and non-structural BMP constructed on the Project.
- L. 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.

- M. 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 100 years.
- N. As-Built data for SWM facilities shall be certified by a qualified Maryland PE per the Maryland Stormwater Management Guidelines For State & Federal Projects (dated April 15, 2010) and provided as part of the design plan set. Per the guidelines, a SWM maintenance schedule for each type of facility should also be included with the plan set.

3.17.03.04 Erosion and Sediment Control (ESC)

Design, obtain approval from MDE and the Administration, and implement an E & S Plan and Sequence of Construction. Obtain all approvals prior to commencing earth disturbing activities.

3.17.03.04.01 ESC Specific Design Criteria

Ensure that Erosion and Sediment Control Designers have successfully completed the Administration's "Designers Erosion and Sediment Control Training"

Clearly delineate the Limit of Disturbance (LOD) on the ESC Plans by including a table of the break points with Station and Offset.

All BMP's cannot be constructed until all contributing drainage areas have been stabilized.

Prior to permanent seeding and mulching, cover slopes outside the roadway hinge point, flatter than and including 2:1 slopes, with 2 inches of topsoil. Cover slopes within the roadway hinge points, flatter than and including 2:1 slopes, with 4 inches of topsoil.

Evaluate slopes steeper than 2:1 for slope stability and prepare to promote vegetative growth according to Geotechnical Performance Specification and Planting and Landscape Architectural Performance Specification. Slopes within the SWM facilities shall not exceed the maximum slopes specified per the Maryland Stormwater Design Manual.

Ensure daily stabilization for land disturbance within any drainage areas adjacent to wetlands and streams in the design and implementation of the ESC plans.

Potential strategies to limit the potential for erosion may include, but are not limited to, the following:

- Use clear water diversions to the maximum extent feasible to limit the amount of area required to be controlled;
- Stage the construction to limit clearing, grubbing and area of disturbance to what is necessary to carry on a grading operation (EDA) to minimize the area and duration of soil exposure;
- Provide top of fill berms with pipe slope drains to convey discharge down steep slopes,
- Bench long cut or fill slopes to limit the risk of rilling on steep slopes and to lessen the slope of longitudinal ditches; and
- Other innovative techniques presented by the Design-Builder with prior written concurrence from the Administration and approval from MDE prior to construction.

Make every attempt to retain sediment generated by construction operations within the site. Some examples of these may include, but are not limited to, 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
- Other innovative techniques presented by the Design-Builder with concurrence from the Administration and approval from MDE prior to construction.

TC 3.19 CONSTRUCTION REQUIREMENTS PERFORMANCE SPECIFICATIONS

3.19.01 CONSTRUCTION STANDARDS

3.19.01.1 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."

3.19.01.2 Specifications for Construction and Materials

Shall comply with the Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, July 2008, including all Special Provision Inserts and these Special Provisions.

3.19.01.3 Industry Standards

Industry standards, such as ASTM and AASHTO, that are referenced in the Administration's or Utility and utility owners' specifications and standards shall also be met. 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.

3.19.01.4 Utility Details

All Utility work shall be done in accordance with the latest edition of the utility owners' details and specifications.

3.19.02 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 at all wetland areas and tree protection fencing at all Tree Preservation Areas.
 - e. Stakeout the Right-of-Way Line

3.19.03 Maintenance of Traffic

All maintenance of traffic work is to comply with the approved traffic control plans, the Manual on Uniform Traffic Control Devices (MUTCD), the Maryland Supplement to the MUTCD and special provisions. The Design-Build Team shall maintain vehicle, bike and pedestrian traffic at all times.

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 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 Open Excavation

Pursuant to the General Provisions, the Design-Build Team is responsible for protection of the work and safety of the public.

The use of decking or plates to close trenches, temporary wedge material to prevent pavement edge drop-off, and the installation of temporary channelizing devices and/or traffic barriers may be required as unforeseen conditions develop during construction operations.

3.19.04 Erosion and Sediment Control

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 Maryland Department of the Environment.

a. Plan Adjustments and Revisions

If approved by the MDE Sediment Control Inspector, minor field adjustments of the sediment control facilities may be made as required to accomplish the intended purpose.

Major revisions to the approved sediment control plan, as determined by the MDE Sediment Control Inspector, require the review and approval of the State of Maryland Department of the Environment. The Design-Build Team must provide for such review and obtain approval at no additional cost to the Administration.

Any changes to the approved sequence of construction shall be submitted for approval to MDE, Plan Approval Division, and the Administration, Highway Hydraulics Division.

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 MDE Sediment Control Inspector and the Administration's Environmental Monitor to address unforeseen site conditions and errors and omissions during design at no additional cost to the Administration.

Comply with all Federal, State and local laws, ordinances and regulations pertaining to environmental protection.

b. Protection of Existing Waterways and Highways

Do not dump debris or rubbish of any kind or allow it to fall into a river or on highways. This includes paint splatters and spillage during painting operations. Take care to prevent damage and injury to personnel, vessels, and vehicles using rivers, highways, or pedestrian ways. Provide devices and maintain as required to prevent such occurrences. Promptly remove any material or items falling in a river, on adjacent banks, or on highways and immediately report to the Engineer and the jurisdictional agency.

c. 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.

d. 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.

3.19.05 Topsoil, Turf Establishment, and Sodding

Topsoil shall be placed according to 3.17.03.04.01, ESC Specific Design Criteria.

Seeding shall be performed as per Section 705. The amount of limestone and starter fertilizer for SALVAGED topsoiled areas shall be found in the Nutrient Management Plan Special Provisions of this RFP OR WILL BE DEVELOPED PRIOR TO PERMANENT SEEDING AND SODDING. The Design-Build Team shall provide a minimum of 95 percent stand (coverage) of turf meeting 705 specifications for flat and slope areas. For slope areas 3:1 and steeper tracked with a bulldozer, the stand (coverage) of turf shall be a minimum of 50 percent.

Sodding shall be performed as per Section 708. Two inches of topsoil shall be placed UNDER the sod. The Design-Build Team shall provide a minimum of 99 percent stand (coverage) of turf with adequate soil moisture meeting Section 708 specifications.

TURF STANDS AND SODDING SHALL BE EVALUATED BY DIVIDING THE PROJECT INTO 10 EVENLY SPACED CROSS SECTIONS. EVALUATIONS SHALL BE CONDUCTED ALONG EACH CROSS SECTION, EVERY 25 SQUARE FEET.

The turf from seeding and sodding shall have a dark green color. Both the seeding and sodding requirements shall be met at the time of the semi-final and final inspections, as approved by the the Design-Build Team and a representative of the Landscape Operations Division.

Mowing shall be performed as per the Administration's INTEGRATED VEGETATION MANAGEMENT MANUAL FOR MARYLAND HIGHWAYS. Mowing shall be evaluated at the beginning of each month during the growing season.

3.19.06 Landscape and Reforestation Plantings

All materials shall conform to Section 920 of the Maryland Department of Transportation, State Highway Administration, *Standard Specifications for Construction and Materials*, July 2008.

All construction shall conform to Sections 701 through 715, inclusive, of the Maryland Department of Transportation, State Highway Administration, *Standard Specifications for Construction and Materials*, July 2008.

3.19.07 Protection of Existing Utilities

Attention of the Design-Build Team is directed to the presence of utility lines of various types in the existing and proposed streets or highways 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/IFP. 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 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. These repairs or replacements shall be at no additional expense to the Administration or the owner of the utility.

The Design-Build Team shall inform the respective utility companies at least fourteen days prior to working in any area. In addition, 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.

For a list of the known utility owners that have existing facilities within the limits of this contract see TC 3.15 – Utility Design and Relocation Performance Specifications, located 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.

The Design-Build Team shall be responsible for all frame and cover adjustments required by the project, either making the adjustment, or reimbursing the utility owner. The Design-Build Team 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 shall consist of a firm, ten foot minimum width, route to the equipment, drivable for an AASHTO SU 30 truck. This access shall also consist of a ten foot minimum width by twenty foot minimum length parking area immediately adjacent to the equipment. Both the route and the parking area shall be completely within in State right-of-way, shall have a four percent maximum cross slope, and shall have an eight percent maximum longitudinal slope. Shoulders may be part of these routes and parking areas, but travel lanes shall not be. 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.

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.

Working around or protecting the utilities, removal and disposal of materials from the utilities and cooperation with the owners of the utilities and with other contractors will not be measured but the cost will be included in the Contract Lump Sum price bid.

TC 3.20 ENVIRONMENTAL PERFORMANCE SPECIFICATION

3.20.01 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 the requirements of the necessary permits and approvals required by the Project.

3.20.01.01 General Environmental Philosophy

The MD 4 from Forestville Rd to MD 458 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 State Highway Administration (Administration) during the development of the Concept Plans was to incorporate environmental stewardship measures to avoid and minimize impacts to the natural and forest areas and wetlands/waterways 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.

3.20.02 Guidelines and References

The Design-Builder shall design and implement environmental requirements in accordance with the relevant requirements of the Guidelines listed by priority in Table 1 unless otherwise stipulated in this specification. Guidelines specifically cited in the body of this specification establish requirements that shall have precedence over all others. Should the requirements in any Guideline below conflict with those in another, the Guideline listed with the higher priority 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.

Appropriate professional standards and regulations shall be utilized for design and construction implementation of all commitments, considerations, permit conditions and approval requirements.

Guidelines shall include, but are not limited to the following:

TABLE 1
GUIDELINES FOR ENVIRONMENTAL

Priority	Author or Agency	Title
1		Section 106 of the National Historical Preservation Act (16 USC § 470f)
2		Section 4(f) of the US Department of Transportation Act (23 USC § 138)
3		Code of Federal Regulations (CFR)
4		Code of Maryland Regulations (COMAR)
5	MDE / USACE	Joint Federal / State MDSPGP-4 Permit Application and Authorization for the MD 4 from Forestville Rd to MD 458 Project
6		Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation (1983 and successors)
7		Standards and Guidelines for Archeological Investigations in Maryland (Shaffer and Cole 1994)
8		Standards and Guidelines for Architectural and Historical Investigations in Maryland (Maryland Historical Trust, 2000)
9		Recommended Approach for Consultation on Recovery of Significant Information from Archeological Sites, ACFIP 1999 (64 FR 27085-27087)
10		Secretary of the Interior's Standards for the Treatment of Historic Properties (36 CFR Part 68)
11	SHA	Standard Specifications for Construction and Materials
12	SHA	Book of Standards for Highways and Incidental Structures
13	DNR	State Forest Conservation Technical Manual, 3rd edition, 1997 by Maryland Department

3.20.03 Owner's Environmental Roles and Responsibilities

The Administration has conducted extensive coordination with various environmental and regulatory agencies and the public. The Administration may provide an Independent Environmental Monitor (IEM), on behalf of the United States Army Corps of Engineers (USACE) and Maryland Department of the Environment (MDE), if required by permit condition, who 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 plans as they are developed;
- B. Review the Design-Builder's environmental compliance implementation;
- C. Notify the Design-Builder of deficiencies in the compliance with the commitments, considerations, permits and approvals; and
- D. Coordinate and attend any meetings involving resource or regulatory agencies.

3.20.04 Design-Builder's Responsibilities

The Design-Builder shall be responsible for compliance with the permit conditions throughout the design and construction of the Project. The Design-Builder shall demonstrate compliance 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 US. The checklist and memorandum shall be submitted to the Administration within one week after the end of each quarter.

3.20.05 Permits and Approvals

The Administration will be relying on the Design-Builder to achieve and maintain commitments and permits through a strong Environmental Compliance Plan and partnering with the Administration. The Design-Builder is encouraged to consider environmental stewardship measures that exceed those in the standards and permits, while considering reasonable cost and practicality.

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

- 1) Nontidal Wetlands & Waterways Permit (from MDE and USACE)
- 2) Natural Resources Reforestation Permit (from DNR)

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

- 1) Erosion and Sediment Control Approval (from MDE)
- 2) Stormwater Management Permit (from MDE)
- 3) NPDES Construction Activity Permit (MDE)
- 4) 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.

3.20.06 Permit Modifications and Approvals

The Design-Builder shall obtain approvals from the Administration for any changes in design and/or construction activities that affect any permit conditions and would require a modification approval from the regulatory agencies.

All conditions in the permits shall be adhered to unless modifications are accepted and approved by the Administration and the regulatory agencies.

Delays due to permit modification approval for permits listed in TC Section-3.20.05A, requested by the Design-Builder, will not result in additional costs to the Administration nor will the Contract be extended.

The Design-Builder shall not alter the design in such a manner that increases or creates new impacts to forest, cultural resources, parkland, wetland, wetland buffer, waterway, or floodplain compared to those impacts which were authorized by the permits, illustrated in the Concept Plans and defined in the Joint Permit Application 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. Request for modification to the permits listed shall be accompanied by documentation provided by the Design-Builder to demonstrate that there is no practical alternative. Additional mitigation required with approval of modifications shall be the responsibility of the Design-Builder.

3.20.06.01 National Environmental Policy Act (NEPA) Reevaluation Process

Modifications and/or design changes proposed by the Design-Builder, which occur inside or outside of the Concept Plan limits of disturbance, such as shifts in access roads, staging areas, etc., shall be reviewed for impacts by the Design-Builder, including impacts to the natural, social and cultural environments. In addition, the 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 NEPA documentation
- 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 SHA prior to construction for any of the items identified above and prior to initiation of construction for the affected Design Unit. The SHA will prepare the NEPA documentation based on the information provided by the Design-Builder. The Administration will coordinate approvals with the regulatory agencies and FHWA as necessary. Delays due to reevaluation approval for design changes, requested by the Design-Builder, will not result in additional costs to the Administration nor will the Contract be extended. The step by step process for 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
 4. SHA Environmental Manager conditionally approves the change
 5. Design-Builder submits information such as narrative and figures to SHA
 6. SHA Project Engineer conditionally approves the change
 7. SHA Environmental Manager determines specific agency involvement
 8. SHA Environmental Manager prepares a Reevaluation and sends documentation/letters as required to regulatory agencies (such as MHT letter, permit modification, etc ...)
 - a. Permit modification (signed and mailed within 1 week of Design-Builder submission)
 - b. MHT concurrence (signed and mailed within 2-4 weeks of Design-Builder submission depending on the extent of the resource) (concurrence obtained within 30 days
 - c. Rare Threatened or Endangered (RTE) responses (typically takes 30 days to receive responses for DNR and FWS)
 9. Obtain all agency approvals, (1-2 months depending on the complexity of the change)
 10. SHA approves the Reevaluation

3.20.07 Natural Resources

3.20.07.01 Groundwater

The Design-Builder shall be responsible for design measures that maintain and discharge natural groundwater flows and seeps associated with waters of the US 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.

Within one year of the completion of the construction, an inspection will be conducted by the Administration and the regulatory agencies to determine whether any remnant wetlands or temporarily impacted wetlands have lost their hydrology. If it is determined that remnant or temporarily impacted wetlands are no longer functioning as a jurisdictional wetland, the Design-Builder shall be responsible for costs associated with the mitigation required. Mitigation ratios for the lost wetlands shall be in accordance with COMAR.

3.20.07.02 Surface Water

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. 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 and 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 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 Administration will request spot-check inspections at any time to verify compliance.

3.20.07.03 Aquatic Biota

The Design-Builder shall:

- A. Conduct all work so as 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. Conduct all in-stream work for culvert replacement in compliance with the Maryland mandated stream closure period for the Use I stream (March 1 through June 15, inclusive in any year). 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.

3.20.07.04 Wetlands and Waters of the US

Direct impacts to wetlands and waterways are anticipated to occur under the MD 4 from Forestville Rd to MD 458 Project. The impact plates and table in the Joint Permit Application present the total impacts permitted for the Project. All wetlands and waterways were identified, delineated and surveyed within the Project. Surveyed boundaries of waterways and wetlands are depicted on the Concept Plans. Prior to performing any work on the Project, the Design-Builder shall be responsible for installing temporary orange safety fence and prohibitive signage in English and Spanish adjacent to non-impacted areas of wetlands and their buffers, identified in the Joint Federal/State MDSPGP-4 Permit, along the limits of disturbance and/or right of way. The orange safety fence shall be installed at a maximum of 25 feet from the proposed toe of cut/fill adjacent to wetlands as depicted on the Concept Plans. The wetland (orange safety) 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.

3.20.07.04.01 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.

3.20.07.04.02 Avoidance and Minimization

The Administration proposed avoidance and minimization techniques during the planning and preliminary engineering phase that consisted of typical section adjustments and slope adjustments where practicable, to avoid impacts to whole or portions of wetlands and waterways.

In areas where existing streams are proposed to be filled, a ditch should be graded along the new toe of slope to reestablish the streams. These ditches are required to lessen mitigation requirements, and shall be included in the final design unless the design is altered in such a way that the existing streams will no longer be filled.

The Design-Builder shall focus its efforts to continue to minimize impacts to wetlands and waterways in all areas of the Project. Engineering designs shall continue to emphasize avoidance and minimization of impacts as the feasibility and effectiveness of using measures such as retaining walls, steeper fill slopes, increased headwall heights, reduced roadway sections and any other feasible minimization efforts are evaluated.

Side slopes shall be 2:1 or steeper wherever the fill material is adjacent to wetlands or waterways. Additional avoidance and minimization efforts such as retaining walls, MSE walls, and Reinforced Earth Slopes are encouraged, especially at wetlands. Refer to the Geotechnical Performance Specification.

3.20.07.05 Reforestation

Reforestation work shall include the performance of all required and applicable Maryland Roadside Tree Law, Reforestation Law and Maryland Forest Conservation Act work associated with the Project.

3.20.07.05.01 Forest Avoidance and Minimization

Direct impacts to forest are anticipated to occur under the Project. Surveyed boundaries of forests are depicted on the Concept 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 Concept Plans. 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).

Before reforestation is approved by the MD 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.

3.20.07.05.02 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.

Mitigation shall be the responsibility of the Design-Builder for additional impacts proposed beyond those originally approved by the MD 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.

3.20.07.06 Terrestrial Wildlife (TW)

3.20.07.06.01 Rare, Threatened and Endangered Species (RTE)

No federally listed rare, threatened, or endangered (RTE) species are anticipated to be directly impacted by construction of the Project.

3.20.07.07 Cultural Resources

It is not anticipated that cultural resources are present within the area identified in the Concept Plans based on coordination with the Maryland Historic Trust (MHT); however, should such 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 in the Concept Plans 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 resulting from design changes shall be solely borne by the Design-Builder.

3.20.07.07.01 Work Area Access During Design-Build Activities

The Design-Builder shall provide the Administration access to the work site to conduct cultural resources investigations as needed. The Design-Builder shall be responsible for coordinating an access plan that supports the timely completion of the required investigations. The Administration will make every effort to develop plans that avoid or minimize restriction of construction activities.

It is not anticipated that archeological resources are present within the area identified in the Concept Plans based on coordination with the MHT; however, should such resources be encountered during Design-Build activities, the following procedures will be followed:

3.20.07.07.02 Unanticipated Discoveries of Archeological Resources During Design-Build Activities

In the event that previously unidentified archeological resources 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, and in the surrounding area where further subsurface remains can be expected to occur. 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 Maryland's State Historic Preservation Officer (MD SHPO) 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, construction may resume in the area outside the archeological resource as defined by the Administration and MD SHPO.

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 either:

- The development and implementation of appropriate data recovery or other recommended mitigation measures, or
- The determination is made that the located remains are not eligible for inclusion on the National Register.

3.20.07.08 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.

3.20.07.08.01 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.

3.20.08 Submittals

The Design-Builder shall provide the following:

- A. Surveyed as-built 22x34 plans of post construction conditions in the same format as the Concept Plans and impact plates and tables that were included in the Joint State/Federal Nontidal Wetlands and Waterways Permit application.
- B. Forest Impact Plans.
- C. Close-out commitment/permit conditions reports for design, construction and post construction

TC 3.21 PUBLIC OUTREACH PERFORMANCE SPECIFICATION

3.21.01 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.

3.21.02 Guidelines and References

The Work shall be in accordance with this Public Outreach Specification.

3.21.03 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 including the MD 4 Community Task Force. 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, public meetings, and Task Force 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 coordinate with SHA, Prince George's County DPW&T, the Prince George's County Police Department, and other local groups to implement pedestrian education efforts in the community surrounding the project.

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.

3.21.03.01 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 including Pedestrian Education and 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 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.

3.21.03.02 Design-Builder Responsibilities and Requirements

3.21.03.02.01 Design-Builder's Response to Inquiries and Comments

- A. Questions or comments from residents, businesses, or other members 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 the Administration within 4 hours. The Design-Builder shall provide necessary information, staff support, and representation to assist in resolving the issue.
- C. 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.

3.21.03.02.02 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

3.21.03.02.03 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.

3.21.03.02.04 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.

3.21.03.02.05 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 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.

3.21.03.02.06 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.

3.21.03.02.07 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 should also work with the Administration to provide all graphics and printed materials for these forums.

3.21.03.02.08 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.

3.21.03.03 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

3.21.03.04 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.

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 engineer for review and approval. Following approval by the Design-Build Team's engineer, 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 Contractor 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 engineer 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 4
CONTROL OF WORK

TC-4.02 FAILURE TO MAINTAIN PROJECT

98 **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 \$500 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 FOR DESIGN-BUILD

TC-5.01 INSURANCE.

100 **DELETE**: All paragraphs under TC-5.01 in their entireties.

INSERT: The following.

.01 Commercial General Liability

The requirement of GP-7.14 (Liability Insurance) to submit Certificate of Insurance prior to starting work is modified for Administration Contracts to require the certificate of insurance to be submitted prior to the execution of the Contract.

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 which 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; or other liability insurance form deemed acceptable by the Administration. The State of Maryland shall be listed as an additional named 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. The policies shall be endorsed to provide 30 days notice of cancellation or non-renewal to:

Director, Office of Construction
State Highway Administration
707 North Calvert Street
Baltimore, Maryland 21202

Evidence of insurance shall be provided to the Administration prior to the award of the Contract by means of a Certificate of Insurance with copies of all endorsements attached or, in the event insurance is provided by a policy form other than a CGL form, by certified copy of the complete policy with all endorsements.

Any policy exclusions shall be shown on the face of the Certificate of Insurance.

The Certificate of Insurance shall be accompanied by a document (a copy of State License or letter from insurer) which indicates that the agent signing the certificate is an authorized agent of the insurer.

When specified in the Contract Documents, 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.

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-6.03.

.02 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.

.03 Additional Insurance Requirements

.03.1 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 Judicial Proceedings Article states Annotated Code of Maryland Section 5-108(b) shall apply.

.03.2 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.

.03.3 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.

.03.4 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.

.03.5 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.



SPECIAL PROVISIONS INSERT

TC 6.10 — RECYCLED OR REHANDLED MATERIAL

CONTRACT NO. PG7585184

1 of 1

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.

SPECIAL PROVISIONS

CONTRACT NO. PG7585184

TC 6.14 — RESTRICTIONS FOR PLACING AND USING EQUIPMENT ON
STRUCTURES, OR STORING MATERIALS ON/OR AGAINST STRUCTURES

1 of 1

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 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.

Except for landscaping items of work, after 15 percent project completion and upon request, Contractors with 'A' evaluations for the last two years may be reduced from 5 percent to zero 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'.

Except for landscaping items of work, 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, except for landscaping items.

Contractors with a 'D' evaluation for the last two years will begin at 5 percent, except for landscaping items. Project performance will be evaluated monthly with the retainage being raised to 10 percent, except for landscaping items, for continued 'D' performance.

New Bidders. 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 which 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, except for landscaping items of work.

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:

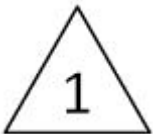
- a. Unit prices agreed upon in the order authorizing the work.
- b. An agreed upon lump sum amount.
- c. On a Force Account basis, if agreement cannot be reached and if directed by the Administration. Refer to TC-7.03

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 bids 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-7.05, paragraph (e))
- Design Engineering
- As-Built Drawings
- Engineer's Office
- Maintenance of Traffic
- Construction Stakeout
- Earthwork - Excavation & Embankment



Drainage
Erosion & Sediment Control
Structures, only retaining walls proposed by the design builder
Paving Items – hot mix asphalt, concrete pavement, and graded aggregate base
Concrete
Fencing
Seed & Mulch
Landscaping
Lighting & Electrical
Pavement Markings
Permanent Signing
Signals
W-beam and concrete barrier

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 twenty (20) working days after notification of Award. This is in addition to the requirements outlined in Section 112- 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 and 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
CY of Selected Backfill

Section 4000 (if applicable)

LS for Retaining Walls (if applicable)

Section 5000

SY of Graded Aggregate Base
Tons of HMA Surface
Tons of HMA Base
Tons of HMA Modified
SY of Grinding Existing Pavement
SY of Portland Cement Concrete Pavement (if applicable)
LF of Pavement Markings

Section 6000

LF of Curb & Gutter
SF of Sidewalk
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 Seeding
SY of Soil Stabilization Matting
LS for Tree, Shrub, Perennial Establishment
LS for Care & Replacement, Warranty of Plantings

Section 8000

CY of Concrete for Foundations
LS for Sign Structures
SF of Permanent Signing

EA of Lighting Structures
EA of Signal Structures
LF of Wire, Conduit for Lighting and Signals
Item-by-Item Breakdown of WSSC Utility Relocations per TC 3.15.04.07

The breakdown shall also contain the Design-Build Team unit prices for Hot Mix Asphalt, HMA 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-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:

$$\text{Percent Change} = [(E - B)/B] \times 100$$

$$\text{PA} = [E - (B \times D)] \times F \times Q$$

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

SECTION 101 — CLEARING AND GRUBBING

101.01 DESCRIPTION.

101.01.01 Definitions.

137 **DELETE:** (e) Grading Unit in its entirety.

INSERT: The following.

(e) **Grading Unit.** The maximum contiguous area allowed to be graded at a given time, not to exceed 20 acres.

101.03 CONSTRUCTION.

101.03.01 Erosion and Sediment Control.

138 **DELETE:** The third sentence of the second paragraph, “A grading unit need not be 20 contiguous acres”, in its entirety.

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 ft² and window area of at least 10 ft². 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 ft³ 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 1 desktop computers and 0 laptop computers, Printers and or multifunction printers and other equipment as specified herein.

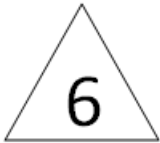
General Requirements.

- (a) IBM compatible with an Intel Core i5 processor.
- (b) Minimum hard drive storage of 500 GB (gigabyte).
- (c) One CD-RW drive (re-writable CD-ROM). 16X Minimum speed.
- (d) Operating System. Minimum Microsoft® Windows 7 Professional Edition. 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.
 - (6) For security reasons a printer with an internal hard drive installed is not allowed.
- (f) Software. Supply all manuals, license numbers, software key numbers, and/or software on original disks for retention in the Engineers Office or Administration facility for the duration of the Contract.

(1) Microsoft® Office 2007 Professional (32-Bit version only), for Windows™ or later. The computer system will not be acceptable unless all available Microsoft Office Professional critical updates and service packs are installed.



(2) Install and configure antivirus/antispymware software to perform an automatic virus signature update when the microcomputer system connects to the internet. No Freeware allowed (Antivirus/AntiSpyware software approved for Administration web email: *Norton, *McAfee, Sophos, or ETrust.)

(g) Internet Access. Provide unlimited internet service approved by the Engineer. Where available, provide internet high-speed service from cable. DSL service will be acceptable only if cable service is not available. Provide an external router device with cable or DSL internet service. Provide firewall software to protect the computer from security intrusions.

*Both Norton Internet Security and McAfee Internet Security include Antivirus and a Personal Firewall.

(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 (minimum size acceptable) USB flash drive storage devices.

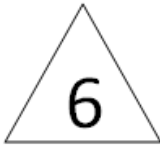
(7) Blank recordable CD-RW media as needed.

Desktop Specific Requirements.

- (a) IBM compatible with an Intel Core i5 processor.
- (b) Minimum processor speed of 3.0 GHz.
- (c) Minimum of 4 GB RAM.
- (d) Enhanced 101 key keyboard with wrist rest.
- (e) Super video graphics accelerator (SVGA).
- (f) Mouse and mouse pad.
- (g) Flat-panel LCD monitor (19 in. minimum) meeting Energy Star requirements.
- (h) Uninterruptible power supply (UPS).

Laptop Specific Requirements.

- (a) Must meet military standard of durability MIL-STD 810G.
- (b) Minimum processor speed of 3.2 GHz.
- (c) Minimum 4 GB SDRAM.
- (d) Minimum 15 in. 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 completely set up and ready for use on or before the day the Engineers office is to be occupied. When an Engineers office is not specified, have the computer system furnished complete and ready for use at least five days prior to beginning any work on the project.

The computer system is for the sole use of the Engineer. The engineer will have complete access to the system. After all specified software is satisfactorily installed by the contractor an SHA technician/ representative will ensure that no user accounts exist on the computer system except those used by the Engineer.

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.

Any remote access to the computer system by the contractor may be performed only with the permission and supervision of the Engineer.

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 ft² of floor area under one roof.

Type B Engineers Office – Standard office trailer with at least 400 ft² of floor area under one roof.

Type C Engineers Office – Standard office trailer with at least 700 ft² of floor area under one roof.

Type D Engineers Office – One-story structure containing at least 1300 ft² 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.

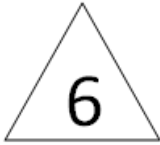
The Contractor shall be considered the owner of any profit and be responsible for all incurred costs.

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.



SPECIAL PROVISIONS

104.01 — TRAFFIC CONTROL PLAN

CONTRACT NO. PG7585184

1 of 4

**CATEGORY 100
PRELIMINARY**

SECTION 104 — MAINTENANCE OF TRAFFIC

104.01 TRAFFIC CONTROL PLAN (TCP)

104.01.01 DESCRIPTION.

149 **DELETE:** The fourth paragraph sentence “Refer to contract Documents for Work Restrictions.” in its entirety.

INSERT: The following.

Work Restrictions. The Engineer reserves the right to modify or expand the methods of traffic control or working hours as specified in the Contract Documents. Any request from the Contractor to modify the work restrictions shall require written approval from the Engineer at least 72 hours prior to implementing the change. The Contractor shall submit a copy of the original work restrictions with the written request.

Work is not permitted on Saturdays or Sundays.

Work is not permitted on the holidays, or work day preceding and following 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
- Veteran's Day, November 11
- Thanksgiving Day, the fourth Thursday in November
- Christmas Day, December 25

TEMPORARY LANE OR SHOULDER CLOSURE SCHEDULE			
ROADWAY	# LANE(S) / SHOULDER CAN BE CLOSED	DAY OF THE WEEK	CLOSURE PERIOD (TIME OF DAY)
MD 4 (Northbound & Southbound)	1/1 1/1	Mon. – Fri Sun. – Thurs	9:00 AM – 3:00 PM 9:00 PM – 5:00 AM (Next Day)

149 **ADD:** The following after the last paragraph, “Any monetary savings...and the Administration.”

When closing or opening a lane on freeways, expressways, and roadways with posted speed \geq 55 mph, a work vehicle shall be 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).

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, work shall begin within one hour after the lane is closed. Any delay greater than one hour with no work in progress shall require the Contractor to remove the lane/shoulder closure at no additional cost to the Administration. The Contractor's Traffic Manager shall attend Pre-Construction and Pre-Paving Meetings and shall discuss traffic control and the Traffic Control Plan including procedures to be implemented for lane closures.

SPECIAL PROVISIONS

104.01 — TRAFFIC CONTROL PLAN

CONTRACT NO. PG7585184

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All closures shall be in conformance with the approved TCP and under the direction of the Contractor's 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 work restrictions, unless otherwise noted below or as 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 actual time lane/shoulder closure or restriction is permitted. When temporary traffic control devices are being installed, all work vehicles involved in the installation shall 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 a lane open to traffic. Workers may be present on shoulders to prepare for lane closure setup no earlier than 30 minutes prior to actual time lane/shoulder closure or restriction is permitted. During preparation for the lane closure, all work vehicles present at the site and involved in the installation of the lane closure or restriction shall display flashing lights that provide 360-degree visibility of the vehicles. These lights shall remain on until the full implementation of the road closure or restriction is complete.

All temporary lane or shoulder closures shall be restored at the end of the closure period and no travel lane shall be reduced to less than 11 ft on expressways, freeways and 10 ft on other roadways. Prior to opening the closed lane or shoulder, the Contractor shall 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 being assessed on the next progress estimate in conformance with the following. This is in addition to the requirements specified in TC-4.02.

The designer shall identify the District (for freeways) or determine the Level of Service of the roadway (for other roads) and include the assessed deduction tables accordingly. All unnecessary tables should be deleted.

Level of Service may be determined by using the Congestion Assessment Maps obtained online at <http://shavmhisdwma/congestionassessmentintroduction/Default.aspx>

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.

ASSESSED DEDUCTIONS FOR OTHER ROADS	
ELAPSED TIME, (MINUTES)	DEDUCTION
<i>For 1 Lane Closures</i>	
1 – 10	\$ 150.00
Over 10	\$75.00 per minute (In addition to the original 10 minute deduction)
<i>For 2 or more Lane Closures</i>	
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
<i>For 1 Lane Closures</i>	
1 – 10	\$ 300.00
Over 10	\$150.00 per minute (In addition to the original 10 minute deduction)
<i>For 2 or more Lane Closures</i>	
1 – 10	\$ 600.00
Over 10	\$300.00 per minute (In addition to the original 10 minute deduction)



**CATEGORY 100
PRELIMINARY**

SECTION 104 — MAINTENANCE OF TRAFFIC

104.07 ARROW PANEL (AP).

104.07.01 DESCRIPTION.

159 **DELETE:** The second and third paragraphs “Furnish APs that are.....units unless otherwise specified” and “APs shall have bothdimmer device is operational.

104.07.03 CONSTRUCTION.

160 **ADD:** The following after the first paragraph.

Furnish APs that are self-contained, vehicle-mounted or portable, and approved. Use self-contained trailer units unless otherwise specified.

Provide APs that have both manual and automatic dimmer devices capable of reducing the light intensity by 50 percent. Periodically clean the photocells in order to prevent malfunctioning of the brightness control. Dimmer devices are mandatory during night operation. The devices shall include a fail-safe system that ensures maximum brightness during daytime operations and a reduction in brightness of up to 50 percent during periods of darkness, regardless of which dimmer device is operational.

The AP’s shall provide full illumination within at least a 24-degree cone perpendicular to the panel face.

Power Supply. The AP shall operate from a solar powered electrical system and consist of battery power and solar array panels, and be capable of providing power supply to the AP for 21 consecutive days without auxiliary charge.

ADD: The following after the Arrow Panel Lamp Options table.

Arrow Board Type	Minimum Size	Minimum Legibility Distance	Minimum Number of Elements
A	48x24 in.	½ mile	12
B	60x30 in.	¾ mile	13
C	96x48 in.	1 mile	15
D	None*	½ mile	12

* Length of arrow equals 48 in. width of arrowhead equals 24 in.



DELETE: (b) “Aim the AP at approaching.....that the display is level”.

INSERT: (b) “Aim the AP at approaching traffic in conformance with the minimum legibility distances specified above. Ensure that the display is level”.

SPECIAL PROVISIONS

104.11 — TEMPORARY PAVEMENT MARKINGS

**CATEGORY 100
PRELIMINARY**

SECTION 104 — MAINTENANCE OF TRAFFIC

166 **DELETE**: Section 104.11 TEMPORARY PAVEMENT MARKINGS. in its entirety.

INSERT: The following.

104.11 TEMPORARY PAVEMENT MARKINGS.

104.11.01 DESCRIPTION. Furnish, install, and remove temporary pavement markings as specified in the Contract Documents or as directed by the Engineer. These markings shall include lines, letters, numbers, arrows, and symbols.

104.11.02 MATERIALS.

Removable Preformed Pavement Marking Material	Refer to the Contract Documents
Nontoxic Lead Free Waterborne Pavement Markings	Refer to the Contract Documents
Black Out Tape	QPL

104.11.03 CONSTRUCTION.

104.11.03.01 Quality Assurance/Quality Control. Quality control testing shall be completed by the Contractor’s Administration certified technicians. The Engineer will complete the quality assurance checks in conformance with MSMT 729 by performing the Nighttime Visibility Evaluations.

104.11.03.02 Warranty Period. The Contractor shall maintain and be responsible for any defects in the pavement markings for a period of 180 days from the date of application. The Contractor shall replace the pavement markings as necessary within this period as directed by the Engineer at no additional cost to the Administration. Refer to GP-5.11.

104.11.03.02 Application and Removal. The pavement markings shall be applied in conformance with the manufacturer’s recommendations and the Contract Documents. Markings shall be applied in the same direction as the flow of traffic. The markings shall be located as specified in the Contract Documents or as directed by the Engineer.

Pavement markings may be applied to either new or existing paved surfaces. When applied to newly paved surfaces, the markings shall be placed before traffic is allowed on the pavement. Nontoxic lead free waterborne pavement markings shall be used for all temporary pavement markings except for the final surface. However, the Contractor may use removable preformed pavement markings at no additional cost to the Administration.

When at the “end of season”, the temperatures are too low to allow the placement of removable tape on the final surface, a written exception request may be submitted to the Engineer to allow the use of nontoxic lead free waterborne paint in lieu of removable tape until the following striping season.

When it is appropriate to shift lanes, all nonapplicable pavement markings within the travel way and adjacent to the travel way as directed by the Engineer shall be completely removed.

SPECIAL PROVISIONS

CONTRACT NO. PG7585184

104.11 — TEMPORARY PAVEMENT MARKINGS

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Surface Condition. Prior to application of pavement markings, the pavement surface shall be clean, dry, and free of all contaminants, including curing compound, dirt, and loose particles. Residual pavement markings shall be removed. Loose or poorly constructed markings shall also be removed.

Pavement Marking Removal. All removable preformed pavement markings shall be completely removed prior to application of the permanent markings. On stage construction or final surfaces of portland cement concrete pavements, any objectionable adhesive residue shall be removed by water blasting or other methods as may be approved by the Engineer. Open flame is prohibited to remove adhesive residue, or any pavement markings. The Contractor shall remove all nonapplicable pavement markings so that there is no damage to the existing or final surface.

Retroreflectance. The initial retroreflectance readings for temporary pavement markings shall be a minimum of 250 and 150 millicandellas/lux/square meter for white and yellow, respectively. The Engineer will monitor the pavement markings in conformance with MSMT 729 during the Contractor's 180 day period of responsibility.

104.11.04 MEASUREMENT AND PAYMENT. Payment for Removable Preformed Pavement Markings, Removal of Removable Preformed Pavement Markings, Nontoxic Lead Free Waterborne Pavement Marking Paint, and the Removal of Existing Pavement Markings will be measured and paid for using one or more of the items listed below and as specified in the Contract Documents.

The payment will be full compensation for furnishing, placing, complete removal of lines, letters, numbers, arrows, symbols, and the removal of all residue. In addition, payment will cover maintenance and replacement during the 180 day period, and for all material, labor, equipment, tools, and incidentals necessary to complete the work. Removal and replacement of temporary pavement markings required beyond the 180 day period will be measured and paid for at the Contract unit price for the pertinent temporary pavement marking item.

Temporary markings replaced during the 180 day period as a result of plowing (as determined by the Engineer) will be paid for at the Contract unit price for the pertinent temporary marking item.

- (a) Nontoxic Lead Free Waterborne Pavement Marking Paint-in width specified-per linear foot.
- (b) Removable Preformed Pavement Line Markings-in width specified-per linear foot.
- (c) Removable Preformed Letters, Symbols, Arrows, and Numbers per each.
- (d) Removal of Removable Preformed Pavement Markings-any width-per linear foot.
- (e) Removal of Removable Preformed Letters, Symbols, Arrows and Numbers per each.
- (f) Removal of Existing Pavement Line Markings-any width per linear foot.
- (g) Removal of Existing Letters, Symbols, Arrows, and Numbers per each.
- (h) Black Out Tape Lines-in width specified-per linear foot.
- (i) Removal of Black Out Tape Lines-any width-per linear foot.



CATEGORY 100
PRELIMINARY

SECTION 104 — MAINTENANCE OF TRAFFIC

104.12 DRUMS FOR MAINTENANCE OF TRAFFIC.

104.12.02 MATERIALS.

169 **ADD:** The following to the end of the first paragraph.

Drums may include recycled plastic content. The drum base may contain up to 100 percent recycled content.

104.12.03 CONSTRUCTION.

ADD: The following to the end of the third paragraph.

Damaged drums shall be recycled to the extent possible. The disposition of the damaged drums shall be provided prior to payment for any replacement drums.

104.12.04 MEASUREMENT AND PAYMENT.

ADD: The following to the end of the second paragraph.

A disposition as specified in 104.12.03 is required prior to payment.



**CATEGORY 100
PRELIMINARY**

SECTION 104 — MAINTENANCE OF TRAFFIC

104.14 CONES FOR MAINTENANCE OF TRAFFIC.

104.14.02 MATERIALS.

171 **DELETE:** First paragraph on this page “Cones shall be...an upright position”.

INSERT: The following.

All cones shall meet MdmUTCD and be new or like new condition. All cones shall be orange in color. Cones shall be at least 28 in. high, 10 in. diameter at the inside of the base, and reflectorized with two white retroreflective stripes. The top stripe shall be 6 in. wide and located 3 to 4 in. from the top of the cone. The second stripe shall be 4 in. wide and located 2 in. below the top band.

Tall-Weighted Cones. When specified, tall-weighted cones shall be at least 42 in. high and 7 in. diameter at the inside of the base. Tall-weighted cones shall be manufactured of low density polyethylene (LDPE) and have four high performance wide angle white and orange retroreflective stripes. The stripes shall be horizontal, circumferential and 6 in. wide. Alternate stripe colors with the top stripe being orange. Any nonretroreflective spaces between the orange and white stripes shall not exceed 1/2 in.

104.14.03 CONSTRUCTION.

ADD: The following after the first paragraph “The Contractor’s name...away from traffic”.

Equip all cones with approved weights or anchor collars, (15 lb maximum) as needed to maintain an upright position. Anchor collars shall fit to the base of the cone. For tall-weighted cones use anchor collars weighing 10 to 30 lb.



CATEGORY 100 — PRELIMINARY

104.19 PORTABLE VARIABLE MESSAGE SIGNS (PVMS)

104.19.03 CONSTRUCTION.

104.19.03.01 Equipment.

PVMS UNIT.

Sign Controller.

179 **DELETE:** (j) in its entirety.

INSERT: The following.

- (j) Contained in a secure weatherproof cabinet located on the controller housing and insulated to protect against excessive vibration, temperature or tampering.
- (1) Equipped with a lockable door latch and an interior cabinet dome light.
- (2) Provided with a keyboard storage location inside the cabinet.
- (3) Security locks shall include those installed by the manufacturer and an additional hardened hasp/lock combination with a user changeable combination. This hasp/lock setup shall be installed in a manner to maximize its effectiveness in stopping unauthorized access to the sign controls. For control box surfaces not compatible with the hasp/lock setup, other supplemental high security locking devices may be approved by the Engineer.

Security.

- (a) Lock all trailer control cabinets when not attended by Administration employee or Contractor, whether being stored, in transport, or deployed and activated.
- (b) Do not store or maintain any passwords on the PVMS.
- (c) Remove any password attached or inscribed on the PVMS trailer or equipment.
- (d) Change the password when it is no long secure or every six months.
- (e) Some older model PVMS may not have a changeable password, so extra measures shall be taken to hide the password.



SPECIAL PROVISIONS INSERT

CONTRACT NO. PG7585184

104.19 — PORTABLE VARIABLE MESSAGE SIGNS (PVMS)

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- (f) Do not leave Owner/Instruction manuals in the trailer control cabinets. Manuals should be copied and made available to the personnel responsible for deploying the PVMS Signs.
- (g) When equipped with a detachable keyboard remove it from the trailer and secure in the transport vehicle, field office or at the respective shop.
- (h) Failure to comply with these security standards or any subsequent PVMS tampering incidents will be cause for penalty under TC-4.02.
- (i) Construction and District Inspectors will ensure contractor compliance.

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 two. 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

SECTION 104 — MAINTENANCE OF TRAFFIC

104.23 PROTECTION VEHICLE.

104.23.01 DESCRIPTION.

182 **DELETE:** Fourth paragraph, “The rear facing.....Standard No. MD 104.01-18”.

INSERT: The following.

The rear facing surface of the TMA/TTMA shall have an inverted "V" chevron pattern formed by alternating 4 in. wide black and yellow stripes as shown in Standard No. MD 104.01-19C. The sides of the TMA/TTMA shall have a border of 4 in. red and white reflective tape as shown on Standard No. MD 104.01-18A.

CATEGORY 100
PRELIMINARY

SECTION 104 — MAINTENANCE OF TRAFFIC

104.25 DRONE RADAR

104.25.01 DESCRIPTION. Furnish, install, and relocate drone radar as specified in the Contract Documents or as directed by the Engineer. A drone radar consists of an electronic device that activates all types of on-board radar detectors without causing interference to normal police radar operations.

104.25.02 MATERIALS.

Drone Radar

As approved by the Office
of Traffic and Safety

General. The electronic device shall be capable of being securely mounted to a vertical or horizontal surface. The unit shall be of weatherproof and waterproof construction and operate efficiently from -20 to +160 F.

FCC Equipment Authorization. The device shall bear an FCC Equipment Authorization for unlicensed use by the general public under FCC Title 47, Part 15. All applicable FCC equipment regulations shall be met without any additional licensing required of the Administration or the Contractor.

Range. The drone radar shall have an effective linear range of at least 2600 ft.

Power Source. 12 volts DC or 120 volts AC compatible/convertible.

Current Consumption. 1/2 amp maximum.

Frequency. 24.150 ± 0.100 GHz.

104.25.03 CONSTRUCTION. The drone radar shall be furnished, positioned, repositioned, operated, maintained, and removed, as needed or as directed by the Engineer. The unit may be truck or trailer mounted, fixed to a special lighting unit, portable changeable message sign, arrow panel, traffic sign, or traffic barrier W beam, as directed by the Engineer.

104.25.04 MEASUREMENT AND PAYMENT. Drone Radar will be measured and paid for at the Contract unit price per day. A unit day shall consist of any approved usage within a 24 hour calendar day. If a unit is used for part of a day, it will be measured as a unit day.

The payment will be full compensation for drone radar unit, installation, power supply, wiring, supports, relocating as required by the Traffic Control Plan or as directed by the Engineer, removal, and for all material, labor, equipment, tools, and incidentals necessary to complete the work. Each Drone Radar device will be paid for only once per unit day, which will include any work necessary to maintain, re-align, or relocate the device; or replace damaged, missing or stolen devices.



SPECIAL PROVISIONS INSERT

CONTRACT NO. PG7585184

**104.31 — ACCESSIBLE PEDESTRIAN MAINTENANCE
OF TRAFFIC**

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**CATEGORY 100
PRELIMINARY**

SECTION 104 — MAINTENANCE OF TRAFFIC

104.31 ACCESSIBLE PEDESTRIAN MAINTENANCE OF TRAFFIC.

104.31.01 DESCRIPTION. Provide and maintain an accessible pedestrian route, to the “maximum extent feasible”, throughout the project’s limits. When an existing pedestrian access route within the public right of way is blocked by construction, alteration, or maintenance activity, an alternate accessible pedestrian route shall be provided.

The phrase to the “maximum extent feasible” applies in areas where the nature of an existing facility or site conditions makes it virtually impossible to comply fully with applicable accessibility standards through a planned alteration. In these circumstances, the alternate accessible pedestrian route shall provide the maximum physical accessibility that is feasible, or a design waiver must be approved by SHA’s Office of Highway Development.

104.31.02 MATERIALS. Not applicable.

104.31.03 CONSTRUCTION. The following considerations shall be taken into account when addressing accessible pedestrian maintenance of traffic:

- (a) All pedestrians, including persons with disabilities, shall be provided with a reasonably safe, convenient and accessible path that replicates as much as practicable the existing pedestrian facilities.
- (b) The width of the existing pedestrian facility should be maintained if practical. When it is not possible to maintain a minimum width of 60 in. throughout the entire length of the pedestrian route, a minimum width of 36 in. shall be provided with 60 x 60 in. passing zones at least every 200 ft, to allow individuals in wheelchairs to pass.
- (c) Traffic control devices and other construction materials and features shall not intrude into the usable width of the sidewalk, temporary pathway or other pedestrian facility.
- (d) Signs and other devices mounted lower than 7 ft above the temporary pedestrian pathway shall not project more than 4 in. into accessible pedestrian route.
- (e) A smooth, continuous hard surface shall be provided throughout the entire length and width of the pedestrian route throughout construction. There shall be no curbs or vertical elevation changes greater than 1/4 in. in grade or terrain that could cause tripping or be a barrier to wheelchair use. Vertical elevation differences between 1/4 in. and 1/2 in. shall be beveled at a maximum 2:1 slope.



SPECIAL PROVISIONS INSERT

CONTRACT NO. PG7585184

104.31 — ACCESSIBLE PEDESTRIAN MAINTENANCE
OF TRAFFIC

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- (f) When channelization is used to delineate a pedestrian pathway, a continuous detectable edging should be provided throughout the length of the facility such that pedestrians using a white cane can follow it. Edging should protrude at least 6 in. above the surface of the sidewalk or pathway with the bottom of the edging a maximum of 2.5 in. above the surface
- (g) Temporary ramps shall be provided when an alternate pedestrian route crosses a curb and no permanent ramps are in place. The width of the ramp shall be a minimum of 36 in. and the slope of the ramp shall not exceed 12:1. Temporary detectable warning mats must be installed at street crossings and signalized entrances.
- (h) When possible, an accessible pedestrian route shall be provided on the same side of the street as the disrupted route. When it is not feasible to provide a same-side accessible pedestrian route an accessible pedestrian detour route shall be provided.
- (i) Information regarding closed pedestrian routes, alternate crossings, and sign and signal information shall be communicated to pedestrians with visual disabilities by providing devices such as audible information devices, accessible pedestrian signals or barriers and channelizing devices that are detectable to the pedestrians traveling with the aid of a white cane or who have low vision.
- (j) It is desirable that pedestrians cross to the opposite side of the roadway at intersections rather than mid-block. Appropriate signing shall be placed at the intersections.
- (k) Access to transit stops shall be provided and maintained at all times.

104.31.04 MEASUREMENT AND PAYMENT. Unless otherwise specified, Accessible Pedestrian Maintenance of Traffic will not be measured but the cost will be incidental to the Lump Sum item for Maintenance of Traffic. The payment will be full compensation for all materials, labor, equipment, tools, and incidentals necessary to complete the work.

CATEGORY 100
PRELIMINARY

184 **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 100th 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.H.A.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

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 construction 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 or Incentive/Disincentive Date. 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 or change in an incentive/disincentive date 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 or incentive/disincentive date.

Only delays to activities that affect the Contract completion date or incentive/disincentive date will be considered for an extension of Contract time. The extension of the specified Contract completion date or incentive/disincentive date will be based upon the number of calendar days the Contract completion date or incentive/disincentive 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 100
PRELIMINARY**

209 **DELETE:** SECTION 111 — SAMPLING DEVICES AND TESTING EQUIPMENT in its entirety.

INSERT: The following.

SECTION 111 — SAMPLING DEVICES, TESTING AND SAFETY EQUIPMENT

DESCRIPTION. Furnish and maintain Sampling Devices and Testing and Safety Equipment with accessories that are required to sample and test materials used on the project. The sampling and testing and safety equipment will be used by Administration employees as directed by the Engineer. All equipment shall be as approved by the Office of Materials Technology. Furnish the sampling devices and testing equipment to the Engineer at least five days prior to commencement of work on the project. All equipment shall remain in the Engineers' possession until completion of all sampling and testing on the project. Unless otherwise specified, all testing equipment, accessories, and unused sampling devices and safety equipment will be returned to the Contractor at the completion of the project.

MATERIALS. Furnish all applicable sampling devices and containers required by the Administrations' Materials Manual, including all inserts, Sample Testing and Frequency Guide, and this Specification. Quantities will be designated by the Engineer at the preconstruction meeting.

CONSTRUCTION.

Testing Equipment Requirements. Maintain the equipment in good working condition and submit a written certification to the Administration stating when the testing equipment was last calibrated or inspected by an Administration approved testing agency. Ensure that the equipment is calibrated at the frequency required for that type of equipment as specified in the test method and AASHTO R18.

If any testing equipment or accessories are stolen, become defective, or for any other reason do not function as intended, replace with an equal or better unit at no additional cost to the Administration within eight hours after notification.

Sampling Devices and Testing Equipment with Accessories. The following is a general list for sampling devices and testing equipment to be furnished by the Contractor for the specified testing. Contact the Office of Materials Technology, Materials Management Division with any questions concerning the requirements for Sampling Devices, Testing Equipment, and Accessories. The devices, testing equipment, and accessories will be randomly inspected during Independent Assurance Audits.

(a) Sampling Devices from the Administration's Materials Manual.

(1) Soil bags (able to hold at least 35 lb).

(2) Screw top cans - 1 qt.



SPECIAL PROVISIONS INSERT

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- (3) Friction top cans - 1 qt and 1 gal.
- (4) Plastic jar - 1 gal.
- (5) Flow panels for joint sealer.
- (b) Testing Equipment and Accessories from the Administration's Materials Manual - Determination of Moisture Content of Aggregates (MSMT 251).
 - (1) Electric hot plate or a gas burner, including bottle and fuel.
 - (2) Scale or balance conforming to M 231, Class G2.
 - (3) Metal container, such as large frying pan or equivalent.
 - (4) Pointing trowel or large spoon.
- (c) Field Determination of the Amount of Stabilization Agent in Bases and Subbases (MSMT 254).
 - (1) Scale or balancing conforming to M 231, Class G 100 having a capacity of at least 100 lb/sample containers.
 - (2) Bench brush.
 - (3) Large spoon or scoop.
 - (4) Sampling mat consisting of a sheet of plywood or canvas with a surface of at least 1 yd².
 - (5) Tape measure.
- (d) Field Determination of Moisture Density Relations of Soils (MSMT 351). Refer to MSMT 350.
- (e) Hot Applied Joint Materials Sealer and Crack Filler (MSMT 404). Flow panels (brass panel may be used in lieu of a tin panel).
- (f) In-Place Density of Embankment, Subbase, Base, Surface and Shoulder Material (T 99, T 180, T 191, and MSMT 350).
 - (1) Cylindrical compaction molds, 1/30 and 1/13.33 ft³.
 - (2) Compaction rammers, 5.5 and 10 lb.
 - (3) 12 in. straightedge.
 - (4) Scale or balance conforming to M 231, Class G 100, having a capacity of at least 100 lb.
 - (5) Two 10 in. pie pans.



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- (6) 12 in. frying pan.
- (7) 12 in. rocker set complete with pan.
- (8) One each of the following sieves conforming to M 92:

SIZE (in.)	SHAPE	SIZE OPENINGS
12	Square	2 in.
12	Square	3/4 in.
12	Square	No. 4
12	Square	No. 10
*8	Round	No. 10

* For density sand.

- (9) Field density plate with recess to accommodate sand cone apparatus.
 - (10) Steel pan, 12 x 30 in.
 - (11) Electric plate or gas burner, including bottle and fuel.
 - (12) Soil density pick.
 - (13) Precalibrated sand cone density apparatus.
 - (14) Spatula, 3 in.
 - (15) Two water pails.
 - (16) Bag of density sand.
 - (17) Stencil brush, bench brush, sprinkling can, large spoon, and sample shovel.
- (g) Sampling Hot Mix Asphalt prior to Compaction (MSMT 457) - Performed by the paving contractor).
- (1) A 25 ft measuring tape.
 - (2) Random selection cards numbered from 0 to width of the paving lane in 1 ft increments
 - (3) Sample boxes
 - (4) Spatula.
 - (5) Spray paint or other suitable marking material.
 - (6) GPS equipment.



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- (7) Masonry nails or equivalent.
- (8) Thermometers (50 to 550°F).
- (9) Square end shovel, fire shovel, or grain shovel.
- (10) Scoop.
- (11) 24 ft of 18 gauge mechanical wire or equivalent to tie through each hole of the plate template.

(h) Concrete Tests.

TEST	METHOD
Sampling	T 141
Making and Curing Concrete Test Specimens	T 23
Slump	T 119
Air Content - Pressure Method	T 152
Air Content - Volumetric Method	T 196
Temperature	T 309

- (1) Air meter, pressure type for conventional concrete and volumetric air meter (Roll-a-Meter) for lightweight Concrete.
- (2) Air Bulb.
- (3) Air pump.
- (4) Rubber mallet.
- (5) Slump cone with rod.
- (6) Steel straight edge.
- (7) Large and small scoop.
- (8) Trowel.
- (9) 3/8 in. diameter tamping rod.
- (10) Unit weight bucket for light weight concrete.
- (11) Sprinkle can or bucket for water.
- (12) Postal scale (only for lightweight concrete).
- (13) Thermometer (0 to 220 F).
- (14) 4 x 8 in. cylinder molds (for compressive strength specimens).



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(15) 3 x 6 in. cylinder molds for latex concrete.

(16) 6 x 12 in. cylinder molds for density (unit wt) of lightweight concrete and when otherwise specified.

(17) Isopropyl alcohol for light weight concrete.

(18) Protective gloves.

(i) Other Measuring Devices.

(1) Hand held pile driving monitoring device (as approved by the Engineer).

111.03.02 Safety Equipment. Approved Safety Equipment.

(a) Fall Protection Devices for SHA Inspection Personnel.

(b) Life vests where applicable.

111.04 MEASUREMENT AND PAYMENT. Sampling devices, testing equipment, and safety equipment will not be measured but the cost will be incidental to items of work for which they are required.

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) 4.0 megapixel image resolution and 3X optical zoom
- (3) AC adapter, 2 sets of rechargeable batteries, and battery charger.
- (4) 2 GB SmartMedia 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 5000 pages/month.

113.03 CONSTRUCTION. Not applicable.

113.04 MEASUREMENT AND PAYMENT. The number of digital cameras required for this project is 1. 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 within 5 days after the Engineer notifies the Contractor.

Ownership of the cameras and printer will remain with the Contractor. The Administration assumes neither responsibility nor liability for the condition of the camera when returned.

**CATEGORY 100
PRELIMINARY**

SECTION 114 — TRUCK STAGING AREAS AND IDLING REQUIREMENTS

114.01 DESCRIPTION. Locate truck staging areas and avoid unnecessary idling of construction equipment in order to reduce engine emissions and to provide air quality benefits to those who live or work in or adjacent to the construction site.

114.02 MATERIALS. Not applicable.

114.03 CONSTRUCTION. Establish truck staging areas for all vehicles waiting to load or unload materials at the job site. Subject to review and approval by the Administration, locate staging areas where emissions will have the least impact on sensitive areas and the public.

Sensitive areas include, but are not limited to, hospitals, schools, residences, motels, hotels, daycare facilities, and elderly housing and convalescent facilities. All sources of emissions shall be located as far away as possible from fresh air intakes, air conditioners, and windows.

Idling of all mobile construction equipment, including delivery trucks, shall be limited to five minutes except under any of the following circumstances:

- (a) When forced to remain motionless because of traffic conditions or mechanical difficulties over which the operator has no control.
- (b) When necessary to operate defrosting, heating, or cooling equipment to ensure the safety or health of the driver or passenger.
- (c) When necessary to operate auxiliary equipment that is located in or on the mobile source to accomplish the intended use of the mobile source.
- (d) To attain the recommended operating temperature.
- (e) When the outdoor temperature is below 32 F.
- (f) When undergoing maintenance that requires operation for more than five consecutive minutes.

The above requirements do not prohibit the operation of an auxiliary power unit or generator set as an alternative to idle the main engine of a motor vehicle operating on diesel fuel.

114.04 MEASUREMENT AND PAYMENT. All methods and procedures required to comply with these requirements will not be measured for payment but will be incidental to the pertinent Contract items.

CATEGORY 200
GRADING

SECTION 203 — BORROW EXCAVATION

203.01.02 Notice to Contractor —Borrow Pits.

225 **ADD:** After the first paragraph.

This project is located in Prince George's 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. Marys (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

227 **ADD:** The following

(d) Test Rolling. All embankment foundation on this project shall be test rolled in conformance with Section 204.03.01(c) of the “2008 Standard Specification for Construction and Materials”. Unstable embankment areas shall be treated by undercutting and backfilling with Geosynthetic Stabilized Subgrade using Graded Aggregate Base; 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

STORMWATER MANAGEMENT (SWM) FACILITY AS-BUILT CERTIFICATION

DESCRIPTION. Inspect stormwater management facilities during specified stages of construction, and furnish a completed (SWM) Facility As-Built Certification Package to the Administration certifying that the SWM facilities have been constructed as specified in the Contract Documents,. Inspection of SWM facilities and completion of the SWM Facility 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 SWM design and construction.

To request approval, furnish a one-page resume for the AB Inspector at least two weeks prior to the start of construction of any SWM facility. 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.

SWM Facility. As-Built Certification Package. The Certification Package certifies that the SWM Facilities have been constructed as specified. The submitted package shall include, at a minimum, photographs during specified construction phases, written descriptions of each phase, completed tabulations and checklists, completed certification forms, material testing reports, turf/vegetation establishment report and green-line revision plans for each facility

CADD Work and Files. All work and files shall adhere to the CADD Standards established by the Administration.

The Administration will provide the approved SWM Report and MicroStation CADD files to facilitate the duties of the AB Inspector.

MATERIALS. Not applicable.

CONSTRUCTION. Inspect and complete the appropriate AB checklist for each facility. Ensure that the facility features are constructed as designed.

Stages for As-Built Inspections by the AB Inspector. Perform minimum inspections for SWM facilities as follows:

(a) Ponds.

- (1) Upon completion of excavation to sub-foundation and when required, installation of structural supports or reinforcement for structures, including, but not limited to:
 - (a) Core trenches for structural embankments.
 - (b) Inlet and outlet structures, anti-seep collars or diaphragms, and watertight connections on pipes.
 - (c) Trenches for enclosed storm drainage facilities.
- (2) During placement of structural fill, concrete, and installation of piping and catch basins.
 - (a) During backfill of foundations and trenches.
 - (b) During embankment construction.
 - (c) Upon completion of final grading and establishment of permanent stabilization.

(b) Wetlands. Refer to stages specified for pond construction. Additional inspections include:

- (1) During and after wetland area planting.
- (2) During the second growing season to verify a vegetation survival rate of no less than 50 percent.

(c) Infiltration Trenches.

- (1) During excavation to subgrade.
- (2) During placement and backfill of subdrain systems and observations wells.
- (3) During placement of geotextile and all filter media.
- (4) During construction of appurtenant conveyance systems such as diversion structures, pre-filters and filters, inlets, outlets, and flow distribution structures.
- (5) Upon completion of final grading and establishment of permanent stabilization.

(d) Infiltration Basins. Refer to stages specified for pond construction and add:

- (1) During placement and backfill of subdrain systems.

(e) Filtering Systems. Filtering systems include bioretention, micro- bioretention, sand filters, organic filters, bio-filters, and dry swales.

- (1) During excavation to subgrade.
 - (2) During placement and backfill of subdrain systems.
 - (3) During placement of geotextile and all filter media.
 - (4) During construction of appurtenant conveyance systems such as flow diversion structures, pre-filters and filters, inlets, outlets, orifices, and flow distribution structures.
 - (5) Upon completion of final grading and establishment of permanent stabilization.
- (f) Open Channel Systems.** Open channel systems include wet swales and grass channels.
- (1) During excavation to subgrade.
 - (2) During installation of diaphragms, check dams, or weirs.
 - (3) Upon completion of final grading and establishment of permanent stabilization.
- (g) Non-Structural Practices.** Upon completion of final grading and after the establishment of permanent stabilization.

Surveys, Computations, and Green-Line Revision Requirements. Upon completion of each SWM facility, survey each SWM facility and provide green-line revisions that include the following items:

- (a) Core trench location, dimensions, material and compaction.
- (b) **Contours.** Indicate the grading of the SWM facility using one foot contour intervals.
- (c) Inflow and outflow ditches.
- (d) **Riprap.** Indicate the locations dimensions of riprap within SWM facilities and immediately outside of SWM footprints.
- (e) **Emergency spillways.** Indicate locations of emergency spillways for SWM facilities.
- (f) **Outfall structures.** Indicate locations of outfall structures, such as risers and weirs, and include all relevant information such as elevations, dimensions at top, orifice elevations, weir lengths and elevations, and openings.
- (g) **Miscellaneous Features.** Include all other pertinent features in and around the SWM facility, such as freeboard, water surface elevations, and setbacks.

Tolerances. Tolerance limits for green-line 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, pipe inverts, orifices, and weirs.
- (c) **Freeboard.** Freeboard must be no less than specified in the Contract Documents.

When tolerances are exceeded, furnish computations for the storage volumes, discharge rates, detention times, and other applicable documentation to demonstrate that the SWM facilities meet all of the designed parameters.

Submission Requirements. Furnish two hard-copies and one digital copy in PDF format of the SWM Facility As-Built Certification Package to the Administration. Incomplete SWM Facility As-Built Certification Packages will not be accepted. The Administration will submit one copy to the Department of the Environment (MDE) for review and approval.

When SWM facilities do not meet the design parameters, reconstruct, re-inspect, resurvey and recalculate deficient aspects of the SWM facilities and furnish the revised information in the SWM Facility As-Built Certification Package.

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. The payment will be full compensation for inspection, photographs, documentation, surveys, computations, green-line revisions, completion and submission of the SWM Facility As-Built Certification Package, and for all material, labor, equipment, tools, and incidentals necessary to complete the work. Modifications to rejected SWM Facility 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:

SPECIAL PROVISIONS300 — STORMWATER MANAGEMENT (SWM) FACILITY
AS-BUILT CERTIFICATION

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STORMWATER MANAGEMENT (SWM) FACILITY AS-BUILT CERTIFICATION PAYMENT SCHEDULE		
REQUIREMENTS	PERCENT OF TOTAL CONTRACT PRICE	PAYMENT FOR COMPLETED WORK
Furnish completed SWM Facility As-Built Certification Package	50	At submission to the Administration
Receive approval from the Maryland Department of the Environment (MDE)	50	At project close-out

CATEGORY 300
DRAINAGE

PIPE LINING

DESCRIPTION. Install pipe lining through the length of existing pipes or culverts and eliminate any voids around the existing pipe or culvert as specified in the work order provided.

Installer Qualifications. Ensure that pipes and culverts are lined by a qualified installer. Qualifications are as follows:

- (a) **Minimum Successful Installation Experience.** The installer shall possess no less than 5 years of active installation experience and performed a minimum of 100,000 linear feet of successful pipe lining installation for pipes and culverts with at least 12 in. diameters.
- (b) **Manufacturer Installation Certification.** The installer shall be certified by the pipe lining manufacturer as an approved installer of the pipe liner.
- (c) **Certificates of Training.** All installation personnel shall possess certificates of training from the pipe lining manufacturer.
- (d) **Installer Field Supervisor Experience.** The installer field supervisor shall possess a minimum of 5 years of field supervisory experience for pipe lining.

Document qualifications to the satisfaction of the Administration.

Submit a procedure list for handling, storing, repairing, and installing the pipe liner from the pipe liner manufacturer.

MATERIALS.

Flowable Backfill

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Pipe Lining. The pipe lining material and method shall be approved by the Administration. The liner may be a high-density polyethylene resin conforming to the following:

SPECIAL PROVISIONS
PIPE LINING

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PROPERTY	SPECIFICATION LIMITS	TEST METHOD
Material Classification	III C 5 P34	D 1248
Cell Classification	345464C	D 3350 98A
Density, gm/cm ³	0.955	D 1505
Melt Index, gm/10 min	0.11	D 1238
Flex Modulus, psi	135000	D 790
Tensile Strength, psi	3200	D 638
ESCR, hrs in 100% igepal	> 5000	D 1693
PENT, hrs	> 100	F 1473
HDB @ 73 F, psi	1600	D 1693
UV Stabilizer, %C	2.5	D 1603

The pipe lining shall be seamless having smooth interior and exterior surfaces. All cast-in-place liners must be approved by the Administration.

The pipe lining shall be capable of being joined in continuous lengths. Joints shall not create an increase in the outside diameter or a reduction of the inside diameter. Joints shall utilize elastomeric sealing gaskets conforming to D 3212. Joints shall be water tight and free of gaps or openings.

All annular space shall be filled. Method shall be preapproved by the Administration.

Flowable Backfill. Fill the annular space between the existing pipe and the liner with flowable backfill. Use Flowable backfill to fill any large voids encountered outside of the existing pipe.

Chemical Grout. Seal joints and fill soil voids with hydrophobic polyurethane (foaming type) grout. The grout shall have a low viscosity of 500 centipoise. Maintain grout within a temperature range of 60 F to 80 F or as recommended by the manufacturer for effective soil stabilization and setting and as.

Latex Grout. Once chemical grout work is complete, finish joints or fill grout holes with polymer modified latex cement grout or an equivalent product. The latex grout shall be capable of withstanding prolonged submergence in flowing water and have a minimum unconfined compressive strength of 5000 psi.

CONSTRUCTION.

SPECIAL PROVISIONS
PIPE LINING

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Cleaning Existing Pipes or Culverts. Clean existing pipe according to F 1216. Remove obstructions and debris prior to installation of the pipe lining. Pipes should be free of all loose debris and obstructions.

Repairing Existing Pipes or Culverts. After cleaning the existing pipe or culvert, manually repair joint and pipe with diameters of 30 in. and greater. Repairs include but are not limited to sealing open concrete pipe joints, clearing mortar or debris at pipe connections or bends to restore full pipe flow, removing protruding lateral pipe connections, removing or bending metal pipe protrusions, and grouting perforated or deteriorated metal pipe inverts. For pipes with diameters less than 30 in., minimal manual joint and pipe repairs are possible. Grout soil voids at pipes or culverts to be lined prior to the installation of the pipe lining. All repair methods must be approved.

Spray-wet surfaces to be sealed immediately prior to any grout application.

Seal pipe joints and grout soil voids by injecting chemical grout under nominal pressure and at such pressures as necessary to fill soil voids around the existing pipe or culvert. Inject chemical grout into all the pipe joints through drilled holes for that purpose, or through groutable tubing. When drilled grout holes are appropriate, drill a minimum of six such holes through the pipe at each joint. Groutable tubing with steel dowels or a neoprene gasket anchored with stainless steel battens and anchors will be allowed for joints wider than 3 in. or as directed. Remove neoprene ring gaskets after the chemical grout hardens. Ensure that chemical grout penetrates the pipe joints and flows into the soil surrounding the existing pipe or culvert.

Inject chemical grout injection from the bottom to the top of each joint or as directed. Continue grouting through a hole or joint until strong back pressure is experienced or the grout comes out of another hole at higher elevation. Prevent chemical grout from escaping from the joint or in between the injection valves, while still ensuring that enough chemical grout has penetrated any soil voids around the existing pipe or culvert. Keep a log of gallons of chemical grout injected through each hole or joint. When a void requires more than 5 gallons of chemical grout, evidenced by the injection of 5 gallons of chemical grout into a single hole without an increase in back pressure or emergence of chemical grout from another hole, are encountered, cease the injection of chemical grout and fill the remainder of the void by injecting flowable backfill until a back pressure of 100 psi is obtained.

Fill holes drilled for the purpose of sealing existing pipe or culvert joints with latex grout. Prevent damage to the existing pipe or culvert when drilling holes.

Installation of Pipe Lining. Video inspect the existing and repaired pipe by closed circuit television using direct entry or using a mechanized camera in the presence of the Engineer. Upon satisfaction of pipe repair and with the approval, install the pipe liner. Install pipe lining during a 48 hour period of dry weather when no rainfall is predicted. Ensure the existing pipe or culvert is clean and clear of debris. A report prepared by professional engineer detailing the pre and post conditions shall be submitted and approved by the Administration prior to acceptance of

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work. This report shall detail assessment procedures, structural integrity concerns, and methods for repair.

Position the pipe liner in the existing pipe or culvert using a pull or push method as approved. A power winch may be utilized. Prevent damage to the existing pipe or culvert and the pipe lining. Use bridging runners along the pipe or culvert invert to the center of the pipe lining and/or a blocking technique along the inside crown of the pipe or culvert to prevent pipe lining floatation during flowable backfill injection.

Grouting Annular Space. Once the pipe lining is in place, fill the annular space between the liner and pipe or culvert. Injection of flowable backfill shall have a maximum pressure of 7.8 psi through a flowable backfill inlet pipe using an air outlet pipe. Ensure the annular space is free of water prior to injection. Apply an end seal which includes wrapping the liner end with okum soaked in chemical grout to hold the flowable backfill in place until it has cured. Inject flowable backfill in lifts with a 2 psi hammer. Attach certified and calibrated gages according to ANSI B40, Grade 2A to monitor flowable backfill pressure at each injection.

Ground Heave Survey. Monitor ground heave across any roadways above the existing pipe or culvert during the flowable backfill injection operation. Develop a monitoring procedure and submit it to the Engineer for approval. The setup for ground heave monitoring may not interfere with normal traffic on the roadway. No lanes may be closed. Ground heave shall not exceed 0.02 ft.

Installation and Maintenance of Erosion and Sediment Controls. Erosion and sediment controls will be strictly enforced. Contain waste material during the operation and promptly remove from the site to an approved disposal facility. Any discharge from cast-in-place liners systems is not permissible. Keep waste material, flowable backfill, grout, and any other debris out of waterways. Sand-bag the working area upstream and downstream and ensure maintenance of flow is in place.

Maintenance of Flow. Install maintenance of stream flow or maintenance of storm drain flow prior to the installation of the pipe lining as specified in the Contract Documents or directed. Maintain the maintenance of stream flow or maintenance of storm drain flow 24 hours a day until the pipe liner has been completely installed and the flowable backfill is cured. Any damages caused by failure to maintain the maintenance of stream flow or maintenance of storm drain flow as a result of Contractor negligence will be at no additional cost to the Administration.

MEASUREMENT AND PAYMENT. Pipe Lining will be measured and paid for at the Contract unit price per linear foot for Pipe Lining. The payment will be full compensation for all applicable dewatering, video inspection, pipe cleaning, pipe repair, void filling, flowable backfill, curing, grout, pumping equipment, ground heavy survey, maintenance of flow, sand bags, removal and disposal of debris and for all material, labor, equipment, tools, and incidentals necessary to complete the work. Measurement will include all pipes and culverts.



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DRAINAGE

SECTION 303 – PIPE CULVERTS

303.03 CONSTRUCTION.

303.03.04 Joints.

Reinforced Concrete Pipe.

240 **DELETE:** The second paragraph Reinforced Concrete Pipe in its entirety.

INSERT: The following.

Seal circular pipe joints using rubber gaskets meeting C 433. Seal elliptical pipe joints using preformed flexible joint sealants meeting C 990.

Plastic Pipe.

DELETE: In its entirety.

INSERT: The following.

Use integral bell and spigot joints with flexible elastomeric seals meeting D 3212.



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DRAINAGE

SECTION 305 – MISCELLANEOUS STRUCTURES

305.03.06 Precast Drainage Structures.

247 **DELETE:** The third paragraph “Do not ship.....untested precast unit” in its entirety.

INSERT: The following.

Do not ship any precast unit without complete documentation showing that all materials meet specifications per 305.02 or the Contract Documents; or without complete identification markings per Sections 440, 905 and 915.



**CATEGORY 300
DRAINAGE**

SECTION 308 — EROSION AND SEDIMENT CONTROL

308.01 DESCRIPTION.

308.01.02 Standards and Specifications.

253 **DELETE:** The last sentence, “Where details differ ... from the Field Guide.”

308.01.03 Quality Assurance Ratings.

INSERT: The following paragraph at the end of **Shutdowns**.

No Claims against the Administration will be considered due to a shutdown of the grading operations or the entire project for any non-compliance.

INSERT: The following paragraph at the end of the section.

Individual Sites. Where specified, sites within the project may be designated as individual sites for Quality Assurance Rating purposes. If an individual site is in non-compliance, shutdowns apply to only that site.

308.02 MATERIALS.

256 **ADD:** The following.

Compost 920.02.05, Type B

DELETE: The following paragraph. “Soil Stabilization Matting...for Soil Erosion and Sediment Control”, in its entirety.

ADD: The following paragraph.

Where woven geotextile is specified use woven geotextile Class E. Where nonwoven geotextile is specified use nonwoven geotextile Class E. Where woven slit film geotextile is specified use geotextile Class F.

318.03 CONSTRUCTION.

308.03.08 Stabilization Requirements.



259 **DELETE:** The first paragraph, “Permanently or temporarily...fourteen day time frame.” in its entirety.

INSERT: The following.

Following initial soil disturbance, complete permanent or temporary stabilization within:

- (a) Three calendar days as to 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 site not under active grading.

260 **DELETE:** The third paragraph, “Stabilization requirements may...ensure continued stabilization.”

INSERT: The following.

Sensitive areas may require less than three or seven day stabilization. Maintain as necessary to ensure continued stabilization.

308.03.11 Waste Areas.

DELETE: The last sentence, “All waste areas...stabilization requirement.”

INSERT: The following.

Protect all waste areas and stockpile areas with erosion and sediment control measures within the three or seven day stabilization requirement.

308.03.21 Riprap Inflow Protection.

262 **DELETE:** In its entirety.

308.03.23 Stone Check Dam.

DELETE: In its entirety.

308.03.24 Sediment Traps.

DELETE: The second sentence, “In areas of limited right-of-way...conditions will allow.”



308.03.29 Silt Fence.

DELETE: The last paragraph, “Remove and reset... the original placement.”

308.03.30 Inlet Protection.

263 **DELETE:** In its entirety.

308.03.31 Stabilized Construction Entrance.

ADD: The following.

Place wash racks as directed to prevent tracking of mud and sediment from the Limit of Disturbance.

308.03.32 Super Silt Fence.

DELETE: The last paragraph, “Remove and reset... the original placement.

308.03.37 Diversion Fence.

265 **DELETE:** In its entirety.

308.03.39 Dewatering Bag.

DELETE: In its entirety.

ADD: The following.

308.03.39 Filter Bag. Determine the bag dimensions necessary to provide the required storage volume. Determine pump and hose sizes.

308.03.40 Heavy Use Areas. Locate and size Heavy Use Areas used for activities such as staging and storage. Obtain any necessary permits or modifications for non-specified areas.

308.03.41 Stockpile Areas. Locate and size Stockpile Areas. Obtain any necessary permits or modifications for non-specified stockpile areas.

308.03.42 Rock Outlet Protection. Construct according to Section 312.

308.03.43 Plunge Pool. Construct according to Section 312.



308.03.44 Gabion Outlet Protection. Construct according to Section 313.

308.03.45 Filter Berms. Construct berms of wood chips and up to 50 percent Type B Compost.

308.03.46 Filter Log. Construct using Type B Compost for the filter media.

308.04 MEASUREMENT AND PAYMENT.

308.04.12.

266 **ADD:** The following after (e).

(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.

267 **DELETE:** In its entirety.

308.04.18 Remove and Reset Silt Fence.....per linear foot.

DELETE: In its entirety.

308.04.20 Stabilized Construction Entrances.....the Contract price.

INSERT: The following.

308.04.20 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.

Wash racks will be measured and paid for per each and includes racks, excavation, wash water and incidentals to complete the work

DELETE: In its entirety.

304.04.22 Remove and Reset Super Silt Fence.....per linear foot.



303.04.35.

268 **DELETE:** Dewatering Bags in its entirety.

INSERT: The following.

308.04.35 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.

269 **ADD:** The following after 308.04.35.

308.04.36 Heavy use areas will not be measured but will be incidental to the pertinent items.

308.04.37 Stockpile areas will not be measured but will be incidental to the pertinent items in the Contract.

308.04.38 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.

308.04.39 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.

308.04.40 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.

308.04.41 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.

308.04.42 Rock Outlet Protection will be measured and paid for at the Contract unit price per square yard of Riprap Slope and Channel Protection.

308.04.43 Plunge Pool will be measured and paid for at the Contract unit price per square yard of Riprap Slope and Channel Protection.

308.04.44 Silt Fence on Pavement will be measured and paid for at the Contract unit price per linear foot of Silt Fence.



308.04.45 Clearwater Pipes through Silt Fence or Super Silt Fence will not be measured but will be incidental to the pipe and silt fence items.

308.04.46 Filter Berms will be measured and paid for at the Contract unit price per linear foot.

308.04.47 Filter Logs will be measured and paid for at the Contract unit price per linear foot.

308.04.48 Sediment Basins will be measured and paid for at the Contract unit price for one or more of the items listed below:

- (a) Earthwork as specified in 201.04.
- (b) Pipe as specified in 303.04.
- (c) Stone as specified in 308.04.25.
- (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.
- (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.

308.04.49 Temporary Access Bridge will be measured and paid for at the Contract Lump Sum price.

308.04.50 Temporary Access Culvert will be measured and paid for at the Contract unit price per linear foot.

308.04.51 Onsite Concrete Washout Structures will not be measured but will be incidental to the various concrete mixes.

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DRAINAGE

SECTION 308 — EROSION AND
SEDIMENT CONTROL

308.01 DESCRIPTION.

256 **DELETE: 308.01.04 Incentive/Liquidated Damages Payments.** in its entirety.

INSERT: The following.

308.01.04 Incentive/Liquidated Damages Payments.

The total incentive awarded for this Contract will not exceed \$75,000.00. The rating quarter incentive payment for this contract is \$3,750.00. A final incentive payment for this contract is \$37,500.00 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 \$3,796.00 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 \$4,302.00 per day.



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DRAINAGE

SECTION 314 – FLOWABLE BACKFILL

314.02 MATERIALS.

276 **DELETE:** 314.02 Materials in its entirety.

INSERT: The following.

314.02 MATERIALS.

Controlled Low Strength Material

902.16



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FILTRATION FACILITIES

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CATEGORY 300
DRAINAGE

SECTION 316 — STORMWATER MANAGEMENT (SWM)
FILTRATION FACILITIES

316.01 DESCRIPTION. Construct stormwater management (SWM) filtration facilities as specified.

SWM Filtration Facilities Identification. SWM filtration facilities are identified by unique six-digit inventory numbers and include the following designations.

- (a) Bioretention.
- (b) Micro-Bioretention.
- (c) Organic Filters.
- (d) Surface Sand Filters.
- (e) Submerged Gravel Wetlands.
- (f) Landscape Infiltration.
- (g) Rain Gardens.
- (h) Infiltration Berms.
- (i) Bio-swales.

316.02 MATERIALS.

No. 57 Aggregate	901.01
No. 7 Aggregate	901.01
No. 2 Aggregate	M-43, No. 2
Concrete	902.10
Topsoil	920.01.01 and 920.01.02
Bioretention Soil Mix (BSM)	920.01.05
Coarse Sand	920.01.05(a) (1)
Fertilizer	920.03.01
Shredded Hardwood Bark (SHB) Mulch	920.04.03
Soil Stabilization Matting (SSM)	920.05
Seed and Turfgrass Sod	920.06



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Plant Materials	920.07
Water	920.09.01
Geotextile, Class PE, Type III	921.09
Securing Pins or Staples	921.09

Aggregate. Ensure aggregate has been adequately washed and is free of soil and fines.

Subdrain Pipe, Fittings and Geotextile Sock. Perforated and solid-wall polyvinyl chloride profile wall drain pipe (PPWP) meeting M-304 or corrugated polyethylene drainage pipe (CPP) meeting M-252, Type S and Type SP. Perforated pipe shall have two rows of slotted perforations with an opening area of 20 cm²/m to 21 cm²/m. When specified, use the geotextile sock recommended and supplied by the subdrain pipe manufacturer.

316.03 CONSTRUCTION.

316.03.01 Site Protection. Prior to constructing SWM filtration facilities, ensure that the SWM facility site areas are protected from vehicular traffic and is not used for erosion and sediment controls, stockpiles or equipment storage.

316.03.02 Site Preparation. Unless facilities are off-line and will receive no runoff, construct facilities only after all surrounding and adjacent areas are permanently stabilized. Divert flow from entering the SWM filtration facility areas unless same-day stabilization is specified for the SWM filtration facility location. Prevent trash, debris and sediment from entering SWM filtration facilities during construction.

316.03.03 Schedule. Perform SWM filtration facility activities during dry weather and when soil moisture conditions are suitable and unless the facility is off-line or flow diversions are in place. Only work with soil that is friable and not in a muddy or frozen condition. Cease operations when soil and overall conditions are otherwise unsuitable.

316.03.04 Excavation. Use methods of excavation that minimize compaction of the underlying soils. Where feasible, operate equipment from locations adjacent to SWM filtration facilities rather than within the facility area. Use only wide-track or marsh-track equipment, or light equipment with turf-type tires to excavate, grade, and place materials. Do not use equipment with narrow tracks or narrow tires, rubber tires with large lugs, or high-pressure tires.

310.03.05 Excavation Area Bottom Preparation. Only work with soil that is friable and not in a muddy or frozen condition. When present, remove any standing water from the excavation area. Prepare the bottom of the excavated area as follows.

Submerged Gravel Wetlands. Rake surface to loosen soil.

All Other SWM Filtration Facilities. Till to a minimum depth of 8 in. to loosen soil.



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316.04.06 Geotextile. Place tightly against the vertical sides of the excavation area, pulling tight to eliminate wrinkles and folds and pin securely. Eliminate any voids between the geotextile and the underlying soil and avoid wrinkling and folding the geotextile. Maintain a minimum 12 in. overlap at the geotextile joint ends or breaks. Pin longitudinal joints, overlaps and edges securely with pins spaced no greater than 10 ft on center. Do not place geotextile on the bottom of the excavated area.

316.03.05 Miscellaneous Structures. Furnish and install according to Section 305.

316.03.06 Aggregate. Place aggregate in layers as specified. Prevent soil, fines, and other debris from contaminating the aggregate. Remove contaminated aggregate and replace with clean aggregate.

316.03.07 Subdrain Pipe. Cap the ends of all subdrain pipe not terminating in a cleanout, vent, or drainage structure unless otherwise specified. Ensure perforations are placed on the bottom of the horizontal subdrain pipe runs.

- (a) **Cleanouts.** Install solid-wall pipe vertically and connect to horizontal subdrain with approved manufactured connections. Provide a counter-sunk screw cap on the exposed ends.
- (b) **Vents.** Install solid-wall pipe vertically and connect to the horizontal subdrain with approved manufactured connections. Provide a ventilated screw cap on the exposed ends. Ventilation holes or slots shall be no larger than 1/4 in. in diameter or width. The sum total area of the openings shall be no less than 1 in². Ensure that the ventilation openings are above the maximum specified water surface elevation.
- (c) **Observation Wells.** Use perforated and solid-wall pipe. Place the geotextile sock over the perforated pipe portion and secure at both ends. Provide a screw cap on the exposed end extending 2 in. above the surface. When a concrete collar is specified, ensure the top of the well is flush with the surface of the concrete collar.

316.03.08 Coarse Sand. Place coarse sand in horizontal layers not exceeding 12 in. After each lift, spread the coarse sand to provide a uniform surface then spray or sprinkle water to saturate the lift until water flows from the subdrain outlet. Use an appropriate sediment control device to capture any discharged sediment-laden water from the subdrain outlet. Place, spread, and water coarse sand to uniform surface true to depth, line, cross section and elevation to ensure the completed work is as specified after settlement. Prevent soil, fines and other debris from contaminating the coarse sand. Remove contaminated coarse sand and replace with clean coarse sand.



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316 – STORMWATER MANAGEMENT (SWM)
FILTRATION FACILITIES

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316.03.09 Bioretention Soil Mix (BSM). Place BSM in horizontal layers not exceeding 12 in. After each lift, spread the BSM to provide a uniform surface and spray or sprinkle water to saturate the entire area of BSM until water flows from the subdrain outlet. Use an approved sediment control device to capture any discharge sediment-laden water. Place, spread, and water BSM to uniform surface true to depth, line, cross section and elevation to ensure the completed work is as specified after settlement. Prevent soil, fines, and other debris from contaminating the BSM. Remove contaminated BSM and replace with uncontaminated BSM.

316.03.10 Topsoil. Place topsoil as specified. Do not blend topsoil into BSM when topsoil is placed on top of BSM.

316.03.11 Check Dams.

- (a) **Topsoil Check Dams.** Construct topsoil check dams to the dimensions, grades, and depths specified.
- (b) **Concrete Check Dams.** Furnish and install concrete check dams as specified and according to Section 305.

316.03.12 Soil Stabilization Matting (SSM). As specified in Section 709.

316.03.13 Vegetation Installation and Establishment. Unless facilities are off-line or flow diversions are in place, , install seed, sod, trees, shrubs, perennials, and annuals within SWM filtration facility areas immediately after final grading. In the event that vegetation cannot be installed and established due to time-of-year or weather restrictions, keep diversion controls in place until such time that permanent vegetation may be established. Do not use machinery other than hand held within the BSM footprint.

- (a) **Turfgrass Establishment.** As specified in Section 705.
- (b) **Meadow Establishment and Wildflower Seeding.** As specified in Section 707.
- (c) **Turfgrass Sod Establishment.** As specified in Section 708.
- (d) **Tree, Shrubs and Perennial Installation and Establishment.** As specified in Section 710.
- (e) **Annuals & Bulb Installation and Establishment.** As specified in Section 711.

316.03.14 Soil Amendments and Fertilizer. Apply according to Section 705, 706, 707, 708, 710, or as specified. Use the following for plant materials installed in BSM.



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- (a) **Non-Vegetated BSM.** Do not apply compost, other soil amendments, or fertilizer to non-vegetated BSM.
- (b) **Trees, Shrub, and Perennials in BSM.** Do not apply compost or other soil amendments to backfill soil or to planting beds.

Apply fertilizer to each planting pit per 710.03.04 when trees, shrubs, perennials, perennial plugs, or other plant materials are installed in BSM per Section 710.

- (c) **Seeded or Sodded BSM.** Do not apply compost or other soil amendments.

Uniformly apply either of the fertilizers in Table 1 at the rate specified over the installed surface of the BSM when BSM will be permanently vegetated with Turfgrass Establishment, Shrub Seeding Establishment, Meadow Establishment, Turfgrass Sod Establishment, or other seeded or sodded vegetation establishment as specified.

BIORETENTION SOIL MIX		
TABLE 1 - FERTILIZER APPLICATION RATES		
FERTILIZER	LB PER SY	LB PER ACRE
20-16-12 (83% UF with MAP and SOP)	0.052	200
14-14-14 polymer coated or granular	0.062	275

- (d) **Nutrient Management Reporting.** Record the fertilizer analysis, the square yards covered, and the pounds of fertilizer applied on the Nutrient Management Reporting Form. Submit the Form within 24 hours after applying fertilizer.
- (e) **Fertilizer.** Refer to (b). Rake fertilizer that is broadcast over the surface of the BSM for seeding or sodding to a depth of 1/8 to 1/2 in. Raking may be performed as part of seeding or sodding operations. Complete raking before soil stabilization matting or sod is installed.

316.03.15 Shredded Hardwood Bark (SHB) Mulch. As specified in 710.03.13.

316.03.16 Inspection and SWM Facility As-Built Certification. Inspect and document each step of construction of SWM filtration facilities and complete the applicable checklists and furnish the SWM facility as-built certification as specified.

316.04 MEASUREMENT AND PAYMENT. Payment will be full compensation for all control of discharge from subdrain pipe, geotextile, watering, sheeting, shoring, dewatering, hauling, storing, re-handling of material, removal and disposal of excess and unsuitable material, tilling, grading and slope adjustments and for all material, labor, equipment, tools, and incidentals necessary to complete the work.



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Excavation. Excavation will be measured and paid for as specified in Section 201.

Miscellaneous Structures. Miscellaneous Structures will be measured and paid for per cubic yard of the specified mix concrete.

Aggregate. Aggregate will be measured and paid for at the Contract unit price for one or more of the following.

- (a) No. 2 Aggregate for Stormwater Management Facilities per cubic yard.
- (b) No. 7 Aggregate for Stormwater Management Facilities per cubic yard.
- (c) No. 57 Aggregate for Stormwater Management Facilities per cubic yard.

Removal of contaminated aggregate and replacement with clean aggregate will be at no additional cost to the Administration.

Geotextile. Geotextile will not be measured but the cost will be incidental to the excavation.

Subdrain Pipe. Perforated and solid-wall subdrain pipe will be measured and paid for at the Contract unit price per linear foot for the specified size of subdrain pipe. Fittings, caps, geotextile sock, cleanouts, vents, observation wells, and other incidentals will not be measured but the cost will be incidental to the subdrain pipe.

Coarse Sand. Coarse Sand will be measured and paid for at the Contract unit price per cubic yard for Coarse Sand for Stormwater Management Facilities.

Removal of contaminated coarse sand and replacement with uncontaminated coarse sand will be at no additional cost to the Administration.

Check Dams. Check dams will be measured and paid for at the Contract unit price for one or more of the following.

- (a) Topsoil Check Dams per each.
- (b) Concrete Check Dams per each.

Bioretention Soil Mixture (BSM). BSM will be measured and paid for at the Contract unit price per cubic yard.

Removal of contaminated BSM and replacement with clean BSM will be at no additional cost to the Administration.



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Water. Water used for saturation of coarse sand and BSM will not be measured but the cost will be incidental to the pertinent items.

Shredded Hardwood Bark (SHB) Mulch. SHB Mulch will be measured and paid for at the Contract unit price per square yard for Shredded Hardwood Bark Mulching, 3 in. depth.

Sediment Control for Discharge from Subdrain Pipe Outlets. Control for any sediment-laden discharge from subdrain pipe outlets will not be measured but will be incidental to the pertinent Erosion and Sediment Control items.

Topsoil. As specified in 701.04.

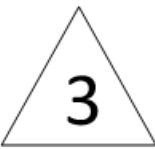
Vegetation Installation and Establishment. Vegetation installation and establishment will be measured and paid for at the Contact unit price for the pertinent landscaping items as specified in 705.04, 707.04, 708.04, 710.04 and 711.04.

Soil Stabilization Matting. As specified in 709.04.

Stormwater Management (SWM) Facility As-Built Certification. As specified.

CATEGORY 400
STRUCTURES

SECTION 456 — ARCHITECTURAL TREATMENT



456.00 GENERAL. Provide Architectural Treatment on Concrete Retaining Wall to be constructed per the requirements in TC 3.11 – Structural Performance Specification. The type of architectural treatment shall be as specified in the Contract Documents under section 456.01. Form release agents, form stripping methods, patching materials, and construction procedures shall be mutually compatible with the surface finish and concrete stain to be applied. Architectural treatments not requiring form liners or stain shall conform to all applicable requirements including sample panels.

Form Liner. The form liner finish shall match the textured finish specified in the Contract Documents.

The form liner shall attach easily to the forming system, and shall not compress more than 0.021 ft when poured vertically at a rate of 10 ft/hr. The liners shall be capable of withstanding anticipated concrete pour pressures without leakage causing physical or visual defects. The liners shall be removable without causing concrete surface deterioration or weakness in the substrate.

Form liner butt joints shall be carefully blended into the approved pattern and finished off the final concrete surface. There shall be no visible vertical or horizontal seams or conspicuous form marks created by butt joining form liners. The finished texture, pattern, and color shall conform to the approved sample panel, and shall be continuous without visual disruption. The Engineer may reject portion of the structure for failure to comply with these requirements. Rejected portions of the structure shall be completely removed from the project at no additional cost to the Administration.

Prior to each pour, the form liners shall be cleaned and free of build-up. Each liner shall be visually inspected for blemishes and tears. Repairs shall be made in conformance with the manufacturer's recommendations, and shall not change the appearance of the final product.

Form liners shall be securely attached to forms in conformance with the manufacturer's recommendations, and with less than a 1/4 in. seam.

Form or Wall Ties. When form or wall ties are used that result in a portion of the tie permanently embedded in the concrete, submit the type of form ties to the Engineer for approval prior to use in this work.

Form Release Agent. The release agent shall be compatible with the surface finish and concrete stain to be applied. The release agent shall be applied in conformance with the manufacturer's recommendations.

Concrete Stain. The colors of the concrete stain shall reference Federal Standard 595 for colors as specified in the Contract Documents. The coloring agent shall be a penetrating stain mix, compatible color finish designed for exterior application on new or old concrete with field evidence of resistance to moisture, alkali, acid, mildew, mold and fungus discoloration or degradation. The coloring agent shall be breathable, allowing moisture and vapor transmission. Concrete stain shall be selected from a list of prequalified concrete stains that is maintained by the Office of Materials and Technology. Unless otherwise specified, two coats of concrete stain shall be applied in conformance with the manufacturer's recommendations and as directed by the Engineer.

When the concrete is at least 28 days old, surfaces to be stained shall be pressure washed with a pressure washer set at 3000 psi to remove laitance. The fan nozzle shall be held perpendicular to the surface at a distance of 1 to 2 ft. Abrasive blasting is prohibited. The completed surface shall be free of blemishes, discolorations, surface voids, and conspicuous form marks as approved by the Engineer. Correct any surface problems at no additional cost to the Administration.

Expansion Joint Material. When the Contract Documents include expansion joints, the joint material shall be finished so as to visually continue the simulated stone pattern uninterrupted. A sample of the colored expansion joint material shall be included in the sample panel for approval.

Shop Drawings. Prior to beginning any work for the concrete to receive the simulated stone finish, working drawings representing the full size of the unit shall be provided for the simulated stone form liner pattern. The working drawings shall be drawn at a scale sufficient to show the detail of all stone and joint patterns, and the layout of the finish pattern.

The working drawings shall be submitted to the Project Landscape Architect for approval. Any revisions to the working drawings shall be performed at no additional cost to the Administration.

Sample Panels. Workmanship shall be demonstrated by constructing an approved sample panel for the form liner type specified using approved form lining materials and surface coloring. Formwork including form or wall ties proposed for use and concrete placement for the sample panel shall be the same as that used for the finished structure.

The form liner used shall produce the same pattern that is intended for use on the finished structure. When the finished structure will contain vertical or horizontal form liner seams/joints, the sample panel shall include the same appropriate seams/joints. The sample panel shall be unreinforced concrete cast in the same position (vertically or horizontally) as will be the finished product to determine the surface texture resulting by use of the form liner. The minimum size of concrete sample panel shall be 6 in. thick, 4 ft wide and 4 ft high.

The sample panel approved by the Project Landscape Architect shall remain on the site as a basis for comparison to the structure. Samples rejected by the Landscape Architect shall be removed from the project and a new sample be submitted at no additional cost to the Administration.

Sample Panel Digital Photograph Inspection. Provide color digital photographs of the sample panel (4 x 4 ft as specified in the Contract Documents). The photographs shall be supplied by e-mail or CD Rom at the time the Project Landscape Architect is notified of panel delivery to the project site. The photographs will be used in evaluating the acceptance of the finish, but will not replace or supercede the delivery of sample panels as required in the Specifications. The Administration reserves the right to make an on site inspection at any time, or to request additional photographs.

The digital camera shall have a minimum resolution of 3.1 megapixels, and all photographs shall be taken without the use of the camera's zoom features. All photographs shall be taken with the camera's line of sight being approximately perpendicular on the horizontal to the surface of the sample panel. This requirement shall be heeded throughout this procedure regardless of the orientation of the sunlight. Multiple photographs shall be taken with variations in the angle of the sunlight shining on the sample panel. This may be accomplished by rotating the sample panel so that the sunlight shines from almost directly behind the camera (90 degrees from the sample panel face), to a side lighting view where the sunlight shines on the surface from about 170 degrees from the sample panel face. Photographs shall be taken in approximately 15 degree increments, and be free of shadows from the camera and other foreign objects. The camera may be required to be plus or minus perpendicular to accomplish this requirement when the sun is shining on the sample panel at a 90 degree angle.

Additional photographs depicting the relief, colors, etc., may also be submitted provided that they conform to these requirements.

Photographs shall be taken so that the top and bottom of the sample panel takes up the full top and bottom of the camera's view screen without the use of the zoom feature. Included in each photograph shall be a card placed adjacent to the sample panel identifying the Administration's Contract Number, the supplier, the casting date for each panel; and a 1 x 6 in. black bar, a ruler, or other means of showing scale that is legible when viewing the photograph.

All photographs shall be taken in the presence and at the direction of the Administration's Inspector, and electronic copies made directly from the camera's memory device shall be submitted to them at the time of the inspection (enhancing or modifying the photographs in any way is prohibited). The Inspector will forward the information to the Project Landscape Architect for final approval. The certification with the photographs shall contain the following information:

- (a) Casting date.
- (b) Contract Number.
- (c) Description of the sample with file names for each sample.
- (d) Number of images sent.
- (e) Date and time the images were shot.
- (f) Panel serial numbers, or other identifying markings.
- (g) A certification that the panel has not been used on a previous project, that the panel is uniquely marked, and that the photographs were taken in their presence.

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456- ARCHITECTURAL TREATMENT

Failure to produce legible electronic photographs in conformance with these requirements will be cause to delay the evaluation of sample panels/posts, which shall be at no additional cost to the Administration or any Contract time extension.

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
Cast-In-Place Concrete Retaining Wall	456.01	Multiple shades of Brick Red	Used Brick pattern along Entire wall FACE and ENDS below coping.
	456.01	To match natural color of concrete sidewalk	Entire 4" wall Coping.
	456.01	To match natural color of concrete sidewalk	All mortar joints

* Color of stain shall match that of the existing bridge overpass walls at MD 140 and I-695 and will be subject to approval by the Project Landscape Architect.



CATEGORY 400
STRUCTURES
SECTION 456 — ARCHITECTURAL TREATMENT

456.01 USED BRICK

456.01.01 DESCRIPTION. Construct a simulated used brick wall with a running bond finish on Concrete Retaining Wall to be cast-in-place as specified in TC 3.11 – Structural Performance Specification. This work shall include developing, furnishing and placing form liners and applying a color system to the finished concrete surface as shown on the Plans or directed by the Engineer.

Patterns. The form liner pattern shall be used brick, running bond, to match that of the existing bridge overpass walls at MD 140 and I-695 (see photo below) and will be subject to approval by the Project Landscape Architect.



456.01.02 MATERIALS. Refer to 456.00

Concrete Stain. The concrete stain color shall be variations of brick reds for the brick faces and edges and match the natural color of concrete sidewalks for the coping and mortar joints, as detailed in the construction plans, to match that of the existing bridge overpass walls at MD 140 and I-695. The coloration of the simulated stone shall be hand applied to match the appearance, texture and the full range of colors present on the existing bridge overpass walls at MD 140 and I-695. The hand applied colors shall consist of a minimum of 4 (four) and a maximum of 8 (eight) different colors and will be subject to approval by the Project Landscape Architect.

456.01.03 CONSTRUCTION. Refer to 456.00

456.01.04 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 Used Brick Wall with Running Bond Pattern form liner finish including application of colors, and all materials, 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 Concrete Retaining Wall with Architectural Treatment item.

CATEGORY 500
PAVING

FOAMED ASPHALT STABILIZED BASE COURSE

DESCRIPTION. Construct a foamed asphalt stabilized base course (FASBC) using a mix consisting of a water-foamed performance-graded asphalt binder and an aggregate blend, as specified.

MATERIALS.

Hot Mix Asphalt Pavement	504.03
Foamed Asphalt Stabilized Base Course	900
Recycled Asphalt Pavement (RAP)	900.03
Reclaimed/Recycled Concrete (RC)	900.03
Aggregate	901
Portland cement	902.03
Fly Ash	902.06.04
Performance Graded Asphalt Binders	904
Production Plants	915
Water	921.01
Lime	921.03

CONSTRUCTION.

Mix Design. At least 30 days prior to placement of the FASBC material, submit to the Engineer a mix design approval from SHA's Office Materials Technology's (OMT) Lab (Soils and Aggregate Technology Division). Refer to 904.04.03. Work will not be allowed to commence without OMT's approval.

Quality Control Plan. At least 30 days prior to the placement of any FASBC, submit a Plant Quality Control Plan to the Office of Material Technology and a Field Quality Control Plan to the District Engineer's representative for approval. Refer to 504.03, 915, and the following:

The Plant Quality Control Plan shall also contain the following:

- (a) Contact information and certifications for key personnel.
- (b) Laboratory location, equipment calibration information, and accreditations
- (c) Plant calibration information
- (d) Binder source.
- (e) Plant half-life and expansion ratio testing frequency.
- (f) Cleaning and maintenance schedule for plant foaming nozzles.
- (g) Construction method and historical composition of RAP, RC, and FASBC stockpiles

- (h) Gradation, moisture, and temperature testing frequency of stockpiled materials.
- (i) Moisture control methods for stockpiles.
- (j) Mixture sampling and testing frequency for gradation, binder quantity, and moisture

At a minimum, the Field Quality Control Plan shall contain the following:

- (a) Identification of production plants and their locations with respect to the project site.
- (b) Contact information and qualifications for key personnel.
- (c) Inspection and record keeping methods and minimum frequencies of sampling and testing.
- (d) Field density and thickness testing method and frequency.
- (e) Corrective actions that will be taken for unsatisfactory construction practices and deviations from the material Specifications.

Maintain and make available upon request complete records of sampling, testing, corrective actions, and quality control inspections.

Mixing Plant. Refer to 915.04 and the following:

- (1) Capable of producing a homogeneous mix free from foamed asphalt globules and stringers.
- (2) Capable of mixing the RAP, RC, reclaimed aggregate material, aggregates, mineral filler, or any combination of the above, water, asphalt binder and additives meeting the approved job mix formula to form a homogenous mass that will bond together when compacted.
- (3) Equipped with an exterior test nozzle to verify proper foaming action and to provide a representative sample of the foamed asphalt.
- (4) Equipped with an internal electric heat cleaning system for self-cleaning foaming nozzles. Diesel fuel shall not be used to clean foaming nozzles.

Equipment. Refer to 504.03.01.

Weather Restrictions.

- (a) **Temperature.** A minimum surface temperature of 50° F and air temperature of 55°F are required during FASBC placement. Surface and air temperatures must be measured in the shade and away from artificial heat. Do not place FASBC when temperatures below 40° F are anticipated within the next 24 hours.
- (c) **Precipitation.** The existing aggregate base or subgrade must be dry at the time of placement. Do not begin placement when fog, showers, or rain are anticipated within 24 hours. When placement is ceased due to precipitation, all material en route shall

be wasted at no additional cost.

Storage and Transportation. FASBC must be stockpiled at the plant in a manner that prevents moisture changes. FASBC can be stockpiled for a maximum of 7 days prior to placement, unless otherwise approved. Stockpiling is not permitted for mixes containing cement or Class C fly ash. Handle and transport FASBC in a manner that minimizes segregation and loss of moisture. Do not dump FASBC into piles, haul over the completed aggregate base course, or stockpile on the job site without the Engineer's approval.

Placement. All FASBC material is to be placed using pavers. If multiple lifts are to be placed, moisten the underlying surface prior to paving.

Compaction. Refer to 504.03.06 and as follows:

Measure in-place density by either MSMT 350 Case C or MSMT 352 Method B. When MSMT 352 Method B is used, all nuclear density gauges used on the project shall be calibrated during placement of the control strip to the specific FASBC job mix formula, and the nuclear gauge moisture content corrected for the presence of asphalt in the FASBC. Compacted dry density must be at least 97 percent of the maximum dry density and the compacted moisture content must be within 2 percentage points of optimum.

The initial moisture content correction for the nuclear gauge shall be based on the direct moisture content measurements made on the control strip. At the beginning of each day's production, a moisture content specimen will be taken from the first load of delivered FASBC and sent to the laboratory for an overnight moisture content determination via a slow oven burn (temperature less than 230 F). This moisture content will then be used to determine the nuclear gauge moisture correction for the next day's production.

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.

Curing and Maintenance. The FASBC shall be allowed to cure under ambient environmental conditions and must be successfully proof rolled per Section 204 or a 20-ton loaded truck before overlaying, unless otherwise approved. Repair any damaged areas of the FASBC prior to overlaying as directed. Areas that cannot be repaired must be replaced for the full depth of the base. Only allow necessary construction traffic on the FASBC unless directed otherwise.

Measure the FASBC mat moisture per T 110, T 265 or D 4643 content every 2,500 lane feet through the full lift depth with a minimum sample weight of 3 pounds daily until final cure is complete. Moisture may also be measured with a nuclear density gauge using the same method and locations used during compaction and applying asphalt and

cement moisture corrections. Final cure will be considered complete when the moisture content drops at least 50% from the final compaction moisture and the FASBC is satisfactorily proof rolled as directed. Repair any damage to the completed FASBC material prior to overlaying, as directed.

Sampling and Testing for Foamed Asphalt Cement Content. Sample for Asphalt Cement Content behind the paver using MSMT 457 sampling method A or B before compaction of the FASBC. Obtain a total of three random samples per placement day using the Random Sample Location program used in HMA core testing. A Contractor's Certified Technician must sample the mixture at the project site as witnessed by the Administration.

The Administration will test at least one of the random behind-the-paver mix samples per T-308. The Administration will determine the added foamed asphalt content of the random sample (s) using the ignition oven correction factor and results previously developed from the approved bag samples. The average of the foamed asphalt content of the behind-the-paver sample(s) must be within ± 0.4 of the Job Mix Formula's foamed asphalt cement target but no less than 2%. If the average is not within ± 0.4 of the Job Mix Formula target, the FASBC must be removed and replaced at no additional cost to the Administration.

Control Strip. Construct a control strip at an approved location to determine the roller patterns needed to achieve optimum density after compaction and after curing. Use the control strip to calibrate the nuclear density gauges used for QC and QA testing during placement. Place a minimum of 100 tons of FASBC in the control strip. The control strip shall be one-lane wide at the specified thickness and optimum foamed asphalt content.

Measure in-place density and moisture content in the control strip at 6 random locations per MSMT 350 Case C. The average compacted dry density must be at least 97 percent of the Proctor (AASHTO T 180D) maximum dry density and the average compacted water content must be within 2 percentage points of optimum. Moisture content must be measured at each location using either a slow oven burn or microwave drying, or other approved suitable means with the temperature not to exceed 110°F. The measured moisture content shall be used to determine the moisture offset for the nuclear gauge to correct for the presence of asphalt in the FASBC. A successful proof roll of the control strip per Section 204 or a 20-ton loaded truck and meeting the compaction requirements are needed before proceeding with remaining FASBC construction.

Accepted control strips may remain in-place and will be accepted and measured as a part of the completed foamed stabilized base. Tests used for the test strip will not be included in the evaluation for payment. Should the removal of any control strip be necessary, the Contractor must remove it at no additional cost to the Administration.

The Administration reserves the right to collect additional samples and perform additional tests on the material from all FASBC areas for information purposes as

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directed by the Engineer. The results of these additional tests will not be used for acceptance or payment.

MEASUREMENT AND PAYMENT. Foamed Asphalt Stabilized Base Course will be measured and paid for at the Contract unit price per square yard of the specified thickness. Surface area measurements will be based on the specified width of the base and the actual length measured along the centerline of the FASBC. Payment will be full compensation for all aggregate, asphalt binder, other additives, furnishing, hauling, placing, curing, control strip, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Temporary graded aggregate base wedge constructed in conformance with Standard No. MD 104.01-28 will not be measured but the cost will be incidental to the FABSC item. The cost of the Control Strip will not be measured but the cost will be incidental to the FASBC item.

CATEGORY 500
PAVING

SECTION 504 — HOT MIX ASPHALT PAVEMENT

504.03 CONSTRUCTION

470 **DELETE: 504.03.04 Tack Coat** in its entirety.

INSERT: The following.

504.03.04 Tack Coat. Dry and clean the surface of all loose and foreign materials prior to application of the tack coat. Apply the tack coat uniformly across the surface as directed using an application rate of 0.01 to 0.05 gal/yd².

476 **DELETE: 504.03.12 Thin Lifts and Wedge/Level Courses** in its entirety.

INSERT: The following.

504.03.12 Thin Lifts and Wedge/Level Courses. When the HMA course is determined by the Engineer to be a thin lift in accordance with the “Thin Lift Mix Design Identification Table” in Section 904.04.03, construct a 400 to 500 ft control strip on the first day of paving to determine optimum pavement density.

Using an asphalt density gauge in accordance with the manufacturer’s recommendation, take readings from the control strip in 5 random locations to determine roller patterns and the number of passes needed to obtain optimum density. Optimum density is defined as when the average density does not change by more than 1.0 percent between successive roller passes and the percent density is between 90.0 and 97.0.

Core the five random gauge reading locations to verify the gauge calibration and to determine the percent pavement density. The cores will be tested by the contractor’s QC laboratory and results will be verified by the Office of Materials Technology. The QA cores will be saved by the contractor and made available to the Administration for retesting until the end of the project or as otherwise determined.

On the first day of paving, the target optimum density will be determined using the density gauge readings from the control strip; verified by the core results. The lot average density from the five control strip cores will be used as the target optimum density.

Take a minimum of 10 QC/QA gauge readings daily from random locations per day’s paving per mix or two per 500 tons of paving per mix; whichever yields the higher frequency of locations. A density lot is defined as a day’s paving per mix. A subplot shall not exceed 500 tons. A paving day shall begin with a new lot and sublots.

For the remainder of the project, any lot average 2.0 percent or more below optimum and below 92 percent shall require a new control strip to be constructed, tested and approved before paving continues.

Take a minimum of 2 QA cores daily when production is in excess of 500 tons per location, or when successive days of less than 500 tons production totals 1000 tons or greater. If the average of the two density gauge readings and the average of the two respective QA core densities are within 3.0 lb per cubic foot, the Administration will accept all the daily density gauge readings. If they do not compare within 3.0 lb per cubic foot, a new control strip will be run and the density gauge recalibrated.

Wedge/Level courses placed at variable thicknesses shall be tested and accepted in accordance with this Thin Lift specification. Incentives are not applicable.

504.04 MEASUREMENT AND PAYMENT.

478 **DELETE: 504.04.01 Price Adjustment for Asphalt Binder** in its entirety.

INSERT: The following.

504.04.01 Price Adjustment for Asphalt Binder. 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 asphalt binder.

For adjustment purposes, the prevailing base index price will be the price specified for PG 64-22 Asphalt Binder posted at www.roads.maryland.gov (Business Center /Contracts Bids and Proposals) at time of the submittal of Technical and Price Proposals as defined in TC 2.08.03.1. Cost differentials between PG 64-22 and a binder specified shall be included in the price bid per ton for Hot Mix Asphalt. A historical database will be maintained by the Administration.

The PA will be made when the index price for the month of placement increases or decreases more than 5 percent of the prevailing base index price. Computations will be as follows:

$$\text{Percent Change} = ((P_p - P_b) / P_b) \times 100$$

$$PA = T \times Q \times ((P_p - (D \times P_b))$$

Where:

- PA = Price Adjustment for the current month
- T = Design target asphalt content expressed as a decimal
- Q = Quantity of Hot Mix Asphalt placed for the current month
- P_p = Index price for PG 64-22 Asphalt Binder per ton for the month of placement
- D = 1.05 for increases over 5 percent; 0.95 for decreases over 5 percent
- P_b = Prevailing base index price for PG 64-22 Asphalt Binder per ton

PA resulting in increased payment to the contractor will be paid under the item Price Adjustment for Asphalt Binder. 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.

479 **DELETE: 504.04.02 Price Adjustments for Hot Mix Asphalt Mixture and Pavement Density** in its entirety.

INSERT: The following.

504.04.02 Payment Adjustments for Pavement Density and Hot Mix Asphalt Mixture. Payment adjustments for pavement density will be based on individual subplot core test data for a given lot and the lot average density as specified in this section and Table 504A. Payment reductions for density and for mixture will be made by adjusting the payment for Hot Mix Asphalt. Incentive payments will be made using the Contract items for Pavement Density and Hot Mix Asphalt Mixture. The item amounts established by the Administration shall not be revised. Payment reductions for density will be waived for portions of the pavement where a poor foundation is determined as the cause for inadequate density.

TABLE 504A		
Dense Graded HMA Mixes – Percent of Maximum Density		
Lot Average % Minimum	No Individual Sublot Below %*	Pay Factor (DF)
94.0	94.0	1.050
93.8	93.7	1.045
93.6	93.4	1.040
93.4	93.1	1.035
93.2	92.8	1.030
93.0	92.5	1.025
92.8	92.2	1.020
92.6	91.9	1.015
92.4	91.6	1.010
92.2	91.3	1.005
92.0	91.0	1.000
91.8	90.8	0.990
91.6	90.6	0.980
91.4	90.4	0.970
91.2	90.2	0.960
91.0	90.0	0.950
90.8	89.8	0.940
90.6	89.6	0.930
90.4	89.4	0.920
90.2	89.2	0.910
90.0	89.0	0.900
89.8	88.8	0.890
89.6	88.6	0.880
89.4	88.4	0.870
89.2	88.2	0.860
89.0	88.0	0.850
88.8	87.8	0.840
88.6	87.6	0.830
88.4	87.4	0.820
88.2	87.2	0.810
88.0	87.0	0.800
Less than 88.0	87.0	0.750 or rejected by Engineer

Note 1: When any test data is above 97.0, the Engineer may reject the lot. When not rejected, the lot will receive a pay adjustment in accordance with the following:
 (a) When the density lot average is above 97.5, the pay factor = 0.750.
 (b) When 3 subplot densities are above 97.0, the pay factor = 0.950.
 (c) When 4 or more subplot densities are above 97.5, the pay factor = 0.750.

Note 2: Pay incentive or pay disincentive will not be paid for placements identified as wedge/level courses or thin lift courses.

- *Note 3: When the Contractor's core specific gravity data does not compare with the Administration's core specific gravity data, only the Administration's single subplot values and lot average value will be used in acceptance decision.
- *Note 4: The average subplot values and the lot average will be used in acceptance decision.

Acceptance of a mixture lot will be in conformance with Sections 904, 915, and MSMT 735. A composite pay factor (CPF) for asphalt content and gradation will be based on the total estimated percent of the lot that is within Specification limits as computed using the quality level analysis in conformance with MSMT 735.

Payment adjustments will be computed as follows:

$$\text{Density Lot Payment Adjustment} = (\text{DF} - 1) \times (\text{AP}) \times (\text{TL})$$

$$\text{Mix Design Lot Payment Adjustment} = (\text{MF} - 1) \times (\text{AP}) \times (\text{TL})$$

where:

- MF = Mixture pay factor [0.55 + (0.5 x CMPWSL)]
Refer to MSMT 735 for CMPWSL.
- DF = Density pay factor from Table 504A.
- AP = Adjusted/applicable unit price per 504.04.01.
- TL = Applicable tonnage per lot.

An in-place density lot containing material with a pay factor of less than 1.000 may be accepted at the reduced pay factor provided the pay factor for density is at least 0.800, and there are no isolated defects.

A mixture lot containing material with a pay factor of less than 1.000 may be accepted at the reduced pay factor provided the composite pay factor for asphalt content and grading is at least 0.750, and there are no isolated defects.

An in-place density lot containing nonconforming material that fails to obtain at least a 0.800 pay factor and a mixture lot containing nonconforming material that fails to obtain at least a 0.750 pay factor for asphalt content and gradation will be evaluated to determine acceptance. Lots that are rejected shall be replaced.

Lots with less than five Quality Control or Quality Assurance samples per in-place density lot will not be evaluated for incentive payment.

When less than three mix samples have been obtained at the time of the acceptance sampling or at the time a lot is terminated, the Engineer will determine if the material in a shortened lot will be considered a part of the previous lot or whether it will be accepted based on the individual test data.



**CATEGORY 500
PAVING**

SECTION 505—HOT MIX ASPHALT PATCHES

505.03 CONSTRUCTION.

485 **DELETE: 505.03.08 Patch Placement** in its entirety.

INSERT: The following.

505.03.08 Patch Placement. Thoroughly clean and tack coat the exposed vertical surfaces of the adjacent pavement as specified in 504.03.04 prior to placing the HMA patch. Spread the HMA with a shovel, rake, or by other approved methods. Do not place HMA on a frozen base.

Maintain lift thickness in conformance with the following:

HOT MIX ASPHALT LIFT THICKNESS		
MIX DESIGNATION (mm)	MINIMUM (in.)	MAXIMUM (in.)
9.5	1.0	2.0
12.5	1.5	3.0
19.0	2.0	4.0
25.0	3.0	5.0
37.5	4.0	6.0



**CATEGORY 500
PAVING**

486 **DELETE:** SECTION 506 — HOT MIX ASPHALT GAP-GRADED in its entirety.

INSERT: The following.

SECTION 506 — GAP-GRADED STONE MATRIX ASPHALT

506.01 DESCRIPTION. Place gap-graded stone matrix asphalt surface (GGSMA) as specified. GGSMA shall conform to Section 504, except as specified herein.

506.02 MATERIALS.

Gap-Graded Stone Matrix Asphalt	904.05
Production Plant	915

506.03 CONSTRUCTION.

506.03.01 Demonstration. Before proceeding with the actual work, the Contractor shall demonstrate to the Engineer that a satisfactory mix can be produced, placed, and the compactive effort determined. A minimum of 100 tons of GGSMA shall be placed outside the project limits for the demonstration. A new strip will be required if a project carries over to a new season. Paver and rollers shall conform to 504.03.01. A material transfer vehicle may be used as part of the demonstration strip.

506.03.02 Hauling Units. Dry soap powder, as approved by the Engineer, may be used with the release agent specified in 915.02(f). Truck beds shall be raised to drain excess water before being loaded with GGSMA.

A light dusting of No. 10 aggregate coated with 1 percent asphalt may be used in lieu of the liquid release agent.

The time between plant mixing and shipment shall not exceed one hour (storage time may vary depending upon gradation, type of binder and/or stabilizer. Storage material shall consistently have results of no less quality than mixtures discharged directly into hauling vehicles). Each load shall be completely covered with a full tarp extending a minimum of 6 in. over each side of the truck body and securely fastened.

506.03.03 Weather Restrictions. Placement of GGSMA will be permitted only when the ambient and surface temperatures are at least 50 F and in accordance with 504.03.02.

506.03.04 Material Transfer Vehicle (MTV). Use a material transfer vehicle to apply the final surface course. The MTV shall perform additional mixing of the Gap-Graded SMA material and then deposit the mixture into the paver at a uniform temperature and consistency.



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506 – GAP GRADED STONE MIX ASPHALT

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506.03.05 Mix Temperature. The minimum temperature of the mixture at the time of placement shall be established during the mix design procedure.

506.03.06 Pavement Thickness. The thickness of the pavement shall be as specified in the Contract Documents. Thin Lift specification 504.03.12 is not applicable to GGSMA.

506.03.07 Tack Coat. Refer to 504.03.04 except that, the resulting coating shall be residual asphalt applied at a rate of 0.03 to 0.05 gal/yd².

506.03.08 Compaction. Compaction shall be performed using a minimum of three steel-wheeled rollers, each weighing 10 to 12 tons. The rollers shall follow the paver within 500 ft. or roll as approved in the QC Plan. Rolling shall start immediately after placement. In place density shall conform to 504.03.11 (c), except that the density shall be 94 to 97 percent of maximum density. Sampling and testing shall be performed as specified in 504.03.11.

The rollers shall be equipped with a watering or soapy watering system that prevents material from sticking to the rollers.

506.03.09 Control Strip. The Contractor may opt to construct a control strip for guidance in determining roller patterns to achieve optimum density. When a control strip is constructed, it shall be placed on the first workday in which SMA is placed and shall be between 400 and 500 ft in length. Based on the Contractor's evaluation of the initial control strip, paving may continue at the Contractor's risk.

The Contractor will not be assessed a density pay adjustment for the amount of material required for construction of the control strips. Should the removal of any control strip be necessary, the Contractor shall remove it at no additional cost to the Administration.

The Engineer may require the Contractor to construct a control strip any time during placement of SMA based on the evaluation of compaction results.

506.03.10 Pavement Profile. Refer to the Pavement Surface Profile requirements specified in the Contract Documents.

506.03.11 Sampling and Testing for Density and Mixture. For sampling and testing for density and mixture refer to 504.03.10 and 11.

506.04 MEASUREMENT AND PAYMENT. Gap-Graded Stone Matrix Asphalt will be measured and paid for at the Contract unit price per ton, complete and in place. The payment will be full compensation for furnishing, hauling, placing all materials, material transfer vehicle, antistripping additive, tack coat, control strips, setting of lines and guides where specified, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Material produced for the demonstration will not be measured but the cost will be incidental to the item GGSMA.



SPECIAL PROVISIONS INSERT
506 – GAP GRADED STONE MIX ASPHALT

506.04.01 Price Adjustment for Stone Matrix Asphalt Mixture and Pavement Density.
Refer to 504.04 except as follows:

GAP GRADED STONE MATRIX ASPHALT MIXES		
PERCENT OF MAXIMUM DENSITY		
LOT AVERAGE MINIMUM (%)	NO INDIVIDUAL SUBLLOT BELOW (%)	PAY FACTOR (%)
95.0	95.0	105.0
94.9	94.8	104.5
94.8	94.6	104.0
94.7	94.4	103.5
94.6	94.2	103.0
94.5	94.0	102.5
94.4	93.8	102.0
94.3	93.6	101.5
94.2	93.4	101.0
94.1	93.2	100.5
94.0	93.0	100.0
93.8	92.7	99.0
93.6	92.4	98.0
93.4	92.1	97.0
93.2	91.8	96.0
93.0	91.5	95.0
92.8	91.2	94.0
92.6	90.9	93.0
92.4	90.6	92.0
92.2	90.3	91.0
92.0	90.0	90.0
91.8	89.7	89.0
91.6	89.4	88.0
91.4	89.1	87.0
91.2	88.8	86.0
91.0	88.5	85.0
Less than 91.0	—	75.0 or rejected per Engineer

Note 1: When any test data is above 97.0, the lot may be rejected per the Engineer. When not rejected, the lot will receive a pay adjustment in accordance with the following:

- (a) When the density lot average is above 97.5, the pay factor = 75%.
- (b) When 3 subplot densities are above 97.0, the pay factor = 95%.
- (c) When 4 or more subplot densities are above 97.5, the pay factor = 75%.



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- Note 2: Pay incentive or pay disincentive will not be paid for placements identified as wedge/level courses or thin lift courses.
- Note 3: When the Contractor's core specific gravity data does not compare with the Administration's core specific gravity data, only the Administration's single subplot values and lot average value will be used in acceptance decision.
- Note 4: The average subplot values and the lot average will be used in acceptance decision.

506.04.02 Dispute Resolution. Refer to 915.02.01, Responsibilities of the Administration, (e).



SPECIAL PROVISIONS INSERT
520 — PLAIN AND REINFORCED PORTLAND CEMENT
CONCRETE PAVEMENTS

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CATEGORY 500
PAVING

SECTION 520 — PLAIN AND REINFORCED
PORTLAND CEMENT CONCRETE PAVEMENTS

520.03 CONSTRUCTION.

503 **DELETE:** 520.03.11 Texturing and Edging in its entirety.

INSERT: The following.

520.03.11 Texturing and Edging.

Texturing. Texture the surface of the pavement with longitudinally tined grooves using a mechanical device (such as a wire comb), following concrete finishing and surface check. The device shall have a single row of tines with nominal widths of 5/64 inch to 1/8 in. each. The nominal spacing of the tines shall be $3/4 \pm 1/8$ in. center-to-center. The nominal depth of the tined grooves shall be $1/8 \pm 1/32$ in. The device shall have horizontal and vertical controls to ensure straight, tined grooves of uniform depth.

Begin texturing when the concrete is plastic enough to allow texturing to the depth specified, but dry enough to prevent the concrete from flowing back into the grooves. Avoid overlaps and tearing of the concrete. Protect a 2 to 3-in. wide strip of pavement surface from tining for the length of the pavement; centered along longitudinal joints. Extend the tining as close as possible to the edge of any adjacent pavement to be placed without damaging the edge. Do not tine areas 6 in. from the edge of pavements where adjacent pavement is not placed. Do not tine areas 1 ft from the curb in closed sections. Hand operated tining equipment that produces an equivalent texture with the specified spacing may be used on small or irregularly shaped areas. The completed textured finish shall exhibit a uniform appearance.

Edging. Edge textured transverse and longitudinal slabs using a 1/4 in. radius edging tool when the concrete has reached its initial set.

506 **ADD:** The following after 520.03.16.

520.03.17 Dowel Bar Placement Checks. After each day's placement of the PCC pavement is complete and cured, the alignment and placement of the dowel bars will be checked by the Administration using a non-destructive test method. All joints will be tested to determine conformance with the following.

(a) **Vertical Skew.** The vertical skew shall be no greater than 1/2 in. tolerance over a 12 in. length of dowel bar.



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- (b) **Horizontal Skew.** The horizontal skew shall be no greater than 1/2 in. tolerance over a 12 in. length of dowel bar.
- (c) **Depth of Dowel Bar.** The dowel bar shall be located within the middle third of the slab thickness. A minimum cover depth of 3 in. is required for the top, and a minimum cover depth of 2.5 in. is required for the bottom.
- (d) **Joint.** The joint saw cut shall be in the middle third of the dowel bar length. The minimum embedment length on either side of the joint shall be 4 in.
- (e) **Missing Dowel Bar.** A missing dowel bar shall be considered misaligned.

A joint is in nonconformance or misaligned if any dowel bar in the wheelpaths are not in conformance.

- (a) For 12 ft wide or narrower lanes, the 3 outermost bars and 3 bars under the inside wheelpath must be in conformance.
- (b) For widened slabs, the 3 bars under the outside wheelpath and the 3 bars under the inside wheelpath must be in conformance.
- (c) In addition, a joint is in nonconformance or misaligned if at least 3 dowel bars in non-wheelpath areas do not conform to the above.

After testing is complete, the percentage of those joints not meeting the above will be determined. Deficiency will be subject to a reduced payment as specified in 520.04. This is in addition to the reduced pay for slab thickness.

520.04 MEASUREMENT AND PAYMENT.

506 **ADD:** The following after 520.04.01.

520.04.02 Dowel Bar Misalignment Price Adjustment. Payment for the percentage of joints accepted at a reduced price for not conforming to the proper alignment will be adjusted by the factors shown in the following table. Alignment is determined by procedures specified in 520.03.17. This shall be a reduced price for the portland cement concrete pavement item in addition to any reduction due to pavement thickness.



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DOWEL BAR PRICE ADJUSTMENT	
Percent of Misaligned Joints *	Percent of Payment, Contract Unit Price **
0 to 10	100
>10 to 15	95
>15 to 20	90
>20 to 25	85
>25 to 30	75
>30 to 50	70
Greater than 50	Corrective action***

*This is the percentage of all joints tested.

**This price adjustment is to the PCC price and not for the dowel bars or joints. This is in addition to any price adjustment for pavement thickness.

***Corrective action may include removal and replacement, dowel bar retrofit, or other method approved by the Administration.



**CATEGORY 500
PAVING**

SECTION 522 — PORTLAND CEMENT CONCRETE PAVEMENT REPAIRS

522.02 MATERIALS.

509 **DELETE:** 522.02 MATERIALS in its entirety.

INSERT: The following:

522.02 MATERIALS. Refer to 520.02 except as follows:

Graded Aggregate for Base Course	901.01
Crusher Run Aggregate CR-6	901.01
Concrete Mix No. 9	902.10
Nonshrink Grout	902.11(c)
Epoxy Grout	902.11(d)
Epoxy Adhesive	921.04

522.02.01 Polyester Grout. A polyester grout may be used in lieu of epoxy grout, provided the grout conforms to 902.11(d). Identify cartridge type systems by batch or lot number.

522.02.02 Epoxy Adhesives. Refer to 921.04. Use water insensitive materials classified as Type IV, Grade 3, Class B and C.

522.02.03 Reinforcement. Section 908 for reinforcement, including load transfer assemblies, tie bars, deformed steel bars, and longitudinal tie devices, except all material shall be epoxy coated.

CATEGORY 500
PAVING

SECTION 535 — PAVEMENT SURFACE PROFILE

535.01 DESCRIPTION. This work shall consist of measuring the roughness of the final surface of Hot Mix Asphalt (HMA) or Portland Cement Concrete (PCC) pavements. The Contractor shall use 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 as amended in these Specifications. The Administration will use an IRI Inertial Profiler to perform all Quality Assurance (QA) testing and acceptance. All traveled roadway surfaces shall be measured unless otherwise indicated in this Specification.

535.01.01 Existing Conditions. The following are the IRI values measured along MD 4 for this project:

IRI INDICATOR	REPORTED VALUES FOR BOTH WHEEL PATHS (in./mile)	REPORTED STATEWIDE Urban Other Principal Arterial VALUES (2012) (in./mile)
Average	105	107
Maximum	169	637
Minimum	77	27
Standard Deviation	26	70

- 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 pavement longitudinal profile measured in the outside travel lane in both directions of traffic.
- NOTE 3: The average, maximum, minimum, and standard deviation IRI values are based on intervals of 1/10 of a mile in length.
- NOTE 4: 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
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535.02 MATERIALS. Not applicable.

535.03 CONSTRUCTION.

535.03.01 Equipment Standardization Testing. Standardization testing shall be completed on Administration specified sites at regular intervals in conformance with MSMT 563. Additional standardization testing may be required for a device that is potentially out of conformance between regular standardization tests. Standardization shall be completed and a copy of the results shall be on file at the Administration’s Office of Materials Technology (OMT). QC test data obtained with a profiler that has not completed standardization testing in conformance with MSMT 563 will not be accepted.

535.03.02 Quality Control Testing for Pavement Profile. The finished surface of all pavements shall be measured with a profiler by the Contractor in conformance with MSMT 563 and E 950. Pavement profiles shall be measured in both wheel paths simultaneously, parallel to the right edge of the lane, and in the direction of travel for each lane. The Contractor shall establish and document in the HMA Field Quality Control Plan (504.03) or the PCC Proposed Paving Plan (520.03) a regular schedule of pavement profiling to verify conformance with these Specifications. The Contractor shall notify the Engineer prior to performing any QC testing. The Contractor’s QC data shall be submitted to the Engineer, in accordance with the approved QC plan submitted to OMT, within 72 hours of completion of the paving operations.

Data Submittal. All submittals shall be sent to the Engineer and to the Administration’s 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

When any profile testing and data submission has not been completed within the specified times and in conformance with MSMT 563 for all sections on the project, the tested pavement will not be eligible for incentive payment as stated in 535.04.03(a). The Contractor’s QC data will still be required for material clearance per Frequency Guide.

The QC IRI shall be determined using the Contractor's Inertial Profiler and shall be reported in sections equal to 25 ft in length and one lane in width. Tested sections shorter than 25 ft due to exempt areas or the project end shall be ignored. A full 25 ft section shall be started after each exempt area. Three runs shall be made as described in MSMT 563. The coefficient of variation of the overall average IRIs shall be less than or equal to 4 percent for three runs for the data to be accepted. When the first three runs do not meet the above criteria, additional runs shall be performed until three measured runs meet the criteria. Those three runs shall be submitted to the

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Administration; however, only the median run (based on average IRI) will be considered from Contractor's QC data, and will be used to compute any pay adjustments.

(a) **Areas Not Profiled.** The following pavement areas shall not be profiled and not reported 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, 2, 3, 4, and 5 above.)
- (7) Ramps greater than 1,000 centerline feet with radius less than 2,000 feet.

Pavement Surface Checks shall be performed on areas listed above in conformance with Section 504.03.14.

(b) **Defects.** When any section IRI is greater than or equal to IRI_e (table in 535.04), the Contractor shall take one of the following corrective actions, as directed and approved by the Engineer, at no additional cost to the Administration:

- (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 with these Specifications, or
- (3) Accept the Defect Cost ($P_{\text{defect},i}$ in 535.04) for any defect section where corrective action is not performed.

Items 1, 2, or 3 above shall be applied to each defect section as directed by the Engineer. Any approval from the Engineer to waive items 1 or 2 shall not constitute a waiver of item 3 unless explicitly stated by the Engineer. The Contractor shall re-profile all affected pavement sections, including any additional transverse paving joints created, after any corrective work to determine if the sections are within Specification. The re-profiled data shall include the section prior to the corrected sections and the four sections after the corrected sections. 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 (table in 535.04).

Defects not due to Contractor’s Workmanship. When the Engineer determines that a defect is not the result of the Contractor’s workmanship, the Engineer shall provide a written justification for removing the defect from final pay calculations to the Administration’s OMT (Attention: Asphalt Technology Division). The Engineer will discuss this matter with OMT’s Asphalt Technology Division before making the final determination of pay adjustment.

535.03.03 Paving Quality Assurance Testing for Pavement Profile (IRI). The Administration may test sections of the pavement to verify the Contractor’s QC data. When the QA testing has not been performed within 14 calendar days from the date that the final, 100 percent QC data submittal is received by OMT, only the QC data will be used for any pay adjustments on the project. The QA testing will follow the same procedures required in 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 acceptance of QC data. 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)

When the Contractor’s QC data falls within the above tolerances, the Contractor’s QC data will be used for all pay adjustments. When the Contractor’s QC data does not agree with the initial QA data as described above, and a cause cannot be identified, the Administration will profile a minimum of two additional QA runs. The three QA runs (one initial and two retests) 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 all three runs. When the three QA runs do not meet the above criteria, additional runs will be performed until three measured QA runs meet the criteria. The median run (based on average IRI) of the three QA runs will then be recompared with the Contractor’s QC data in conformance with the above table.

When the QC and QA data are still not within the tolerances as described above for Average IRI or Number of Defects after three QA runs, both profilers shall be retested on a standardization test site to determine if either profiler no longer conforms to MSMT 563. When either profiler is out of standardization, the equipment shall be recalibrated or repaired as necessary to bring the device back into compliance with MSMT 563. When the Contractor’s profiler is not restandardized and brought into compliance with MSMT 563 within three paving days, the Contractor shall cease the paving operation or use another standardized profiler for QC data collection. Once the Contractor’s profiler complies with MSMT 563, the Contractor may retest sections for comparison with the Administration’s data or accept the Administration’s QA data as the basis for any pay adjustment on all sections. When the Administration’s profiler is out of standardization, the Contractor’s QC data for all sections will be accepted. When both profilers

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are found to be in noncompliance with MSMT 563, the profilers shall be repaired or recalibrated as necessary and all QC and QA testing since the previous QC/QA comparison shall be repeated.

When the QC and QA data for Number of Tested Sections are not within the tolerance as described above, the Contractor and the Administration shall recalibrate their respective Distance Measuring Instruments (DMIs), and perform additional QC testing until the QC data meets the tolerance criteria for Number of Tested Sections.

535.04 MEASUREMENT AND PAYMENT. Pavement surface profile testing costs will be incidental to the HMA surface material or PCC material as specified in the Contract Documents. Payment will be full compensation for all set up, technicians, traffic control, any type of corrective work to bring the pavement into conformance with this Specification, and for all material, labor, equipment, tools, and incidentals necessary to complete the work. The pay adjustment numbers for the Overall IRI (535.04.01) and for Defects (535.04.02) shall be calculated first. The pay adjustment for pavement surface profile applied on the Contract shall be the Total Pay Adjustment in conformance with 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 shown below. This pay adjustment applies only to the pavement within the tested sections.

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 = $PF \times NS \times (25/5280 \text{ lane miles per section})$

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 = $PF \times NS \times (25/5280 \text{ lane miles per section})$

535.04.02 Defects. The IRI for each individual section on the project will be used to calculate any cost to be applied for defects on the project. The pay adjustment for defects will be calculated based on the factors shown below. This pay adjustment applies only to the pavement within the tested sections.

DEFECT COST = Sum of the defect costs ($P_{defect,i}$) for all defect sections

Where:

	DESCRIPTION	MD 4 Resurfacing	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	33	Inches per mile
IRI _b	Minimum IRI for Full Pay	45	Inches per mile
IRI _c	Maximum IRI for Full Pay	68	Inches per mile
IRI _d	IRI for Maximum Disincentive	79	Inches per mile
IRI _e	IRI threshold for Defects	160	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 along MD 4 will be computed using the following formula:

$$P_{\text{defect}, i} = 100 + \left(\frac{190 * (IRI_{\text{defect}} - IRI_e)}{(600 - IRI_e)} \right)$$

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 to the Contractor 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 by the Contractor. TPA resulting in decreased payment will be deducted from monies owed the Contractor. The TPA shall be subject to conditions (a) and (b) below.

$$\text{Total Pay Adjustment} = \text{INCENTIVE} - \text{DISINCENTIVE} - \text{DEFECT COST}$$

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- (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. All other sections of this Specification shall still apply.

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 $P_{\min} \times NS \times (25/5280 \text{ lane miles per section})$ then Total Pay Adjustment = $- P_{\min} \times NS \times (25/5280 \text{ lane miles per section})$

CATEGORY 500
PAVING

SECTION 550 — PAVEMENT MARKING PAINT

550.01 DESCRIPTION. Furnish and apply nontoxic lead free waterborne pavement marking paint to pavement surfaces as specified in the Contract Documents or as directed by the Engineer. These markings includes lines (striping), legends (letters and numbers) and symbols.

550.02 MATERIALS. Paint is a nontoxic lead free waterborne pavement marking and is a non-durable material. All Paint Pavement Marking material shall be selected from the Qualified Products List.

Nontoxic Lead Free Waterborne
Pavement Marking Material

951.01

550.03 CONSTRUCTION.

550.03.01 Quality Control / Quality Assurance. Refer to Section 549.

550.03.02 Application. The location, width, and type of marking shall be as specified in the Contract Documents or as directed by the Engineer.

- (a) **Temperature.** The markings shall be applied when the paint, ambient and surface temperature, and relative humidity conform to the manufacturer's recommendations.
- (b) **Glass Beads.** The Contractor shall apply the Maryland Blend gradation of glass beads uniformly across the surface of the stripe, at the rate of 7 to 9 lb/gal of paints.
- (c) **Thickness.** The paint shall be applied at a wet film thickness of 18 ± 1 mils.
- (d) **Color.** The color of the dry markings shall match Federal Standard 595 (38907 - yellow or 37925 - white). The Contractor shall make available the specified color chips for the Engineer's use to visually determine that the waterborne material matches the specified color.
- (e) **No-Track.** The paint shall conform to 60 second no-track requirements. The no-track condition shall be determined by passing over the applied line at approximately 30 degrees with a standard passenger car or pickup truck. When viewed from a distance of 50 ft, the pavement surface shall show no evidence of the paint being picked up and redeposited on the pavement by the vehicle.
- (f) **Retroreflectance.** The minimum retroreflectance shall be 150 millicandelas/lux/square meter for yellow and 250 millicandelas/lux/square meter for white as determined in conformance with MSMT 729.

550.03.03 Application Equipment. The equipment used for application of the paint shall be approved by the Engineer prior to start of work, and shall be capable of applying waterborne traffic paint that has been approved by the Administration. The Contractor shall provide access to the paint application equipment for inspection by the Engineer.

The paint carriage on the left side of the paint truck shall have three paint and bead guns. The paint carriage on the right side of the paint truck shall have two paint and bead guns.

All 10 in. lines shall be applied using two paint and bead guns. Raising the paint carriage in order to paint these lines with one paint gun and bead gun is prohibited.

The footage counters used to measure pavement markings shall be calibrated, and a notarized certification shall be submitted to the Engineer as part of the Quality Control Plan.

Temperature gauges shall be calibrated every six months and a copy of the calibration certification shall be submitted to the Engineer as part of the Quality Control Plan.

The applicator shall apply the surface dressing beads to the wet paint marking by means of a pressurized bead dispenser or other mechanical conveying method not dependent upon gravity for uniform application. The bead dispenser shall be equipped with an automatic cutoff system that will stop the flow of the paint material whenever there is a disruption in the application of the beads so that all markings placed shall be covered with a uniform layer of surface dressing beads.

Application equipment shall be capable of applying the markings at multiple width settings ranging from 4 to 12 in.

The applicator shall provide a method for cleanly cutting off stripe ends and shall be capable of applying all longitudinal pavement markings.

The equipment shall be mobile and maneuverable to the extent that straight lines can be followed and all standard curves can be made in true arcs.

All parts of the equipment shall be thoroughly cleaned of foreign material or different colored material prior to the introduction of a new batch of material.

550.04 MEASUREMENT AND PAYMENT. The payment will be full compensation for all pavement preparation, furnishing and placing of markings, testing, and for all material, labor, equipment, tools, and incidentals necessary to complete the work. Refer to 549.04.

Pavement Marking Paint will be measured and paid for at the Contract unit price for one or more of the following items:

- (a) Pavement Marking Paint lines (striping) will be measured and paid for at the Contract unit price per linear foot for the color and width specified.
- (b) Pavement Marking Paint Legends (letters and numbers) and Symbols will be measured and paid for at the Contract unit price per square foot. The square foot pay quantity for Legends (letters and numbers) and Symbols will be as specified in the Administrations Standard Details.

CATEGORY 500
PAVING

SECTION 552 — EPOXY PAVEMENT MARKING

552.01 DESCRIPTION. Furnish and apply lead-free two component epoxy white or yellow pavement markings with large and standard glass beads. The locations and patterns shall be as specified in the Contract Documents or as directed by the Engineer.

552.02 MATERIALS.

Lead Free Two Component Epoxy Pavement Marking Materials	951.08
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Epoxy is a durable pavement marking material.

552.03 CONSTRUCTION.

552.03.01 Quality Assurance/Quality Control. Refer to Section 549.

552.03.02 Application. The location, width, and type of marking, shall be as specified in the Contract Documents or as directed by the Engineer.

Placing pavement marking material over longitudinal joints is prohibited; they shall be offset 2 in. or as directed by the Engineer.

Epoxy pavement markings shall conform to the following:

- (a) **Temperature.** The markings shall be applied when the epoxy, ambient, and surface temperatures, and the relative humidity conform to the manufacturer's recommendations.
- (b) **Thickness.** The epoxy pavement marking material shall be applied at a thickness of 20 ± 1 mils.
- (c) **Glass Beads.** The Contractor shall apply a double-drop of large and standard glass beads uniformly across the surface of the stripe, at the rate of 11 to 13 lb/gal with a maximum total application of 25 lb/gal. The bead guns shall be calibrated in conformance with MSMT 729.
- (d) **Color.** The color of the dry markings shall match Federal Standard 595 (13538 - yellow or 17886 - white). The Contractor shall make available the specified color chips for the Engineer's use to visually determine that the epoxy material matches the specified color.
- (e) **Retroreflectance.** The minimum retroreflectance shall be 200 millicandelas/lux/square meter for yellow and 275 millicandelas/lux/square meter for white as determined in conformance with MSMT 729.

552.03.03 Application Equipment. The equipment used for application of the epoxy shall be approved by the Engineer prior to start of work, and shall be capable of applying material that has been approved by the Administration. The Contractor shall provide access to the application equipment for inspection by the Engineer.

The gun carriage on the left side of the striping truck shall have three epoxy and bead guns. The gun carriage on the right side of the truck shall have two epoxy and bead guns.

All 10 in. lines shall be applied using two epoxy and bead guns. Raising the gun carriage in order to stripe these lines with one epoxy gun and one bead gun is prohibited.

The footage counters used to measure pavement markings shall be calibrated and a notarized certification shall be submitted to the Engineer prior to application as part of the Quality Control Plan.

Temperature gauges shall be calibrated every six months and a copy of the calibration certification shall be submitted to the Engineer, as part of the Quality Control Plan.

The applicator shall apply the surface dressing beads to the epoxy marking by means of a pressurized bead dispenser or other mechanical conveying method not dependent upon gravity for uniform application. The bead dispenser shall be equipped with an automatic cutoff system that will stop the flow of the epoxy material whenever there is a disruption in the application of the beads so that all markings placed shall be covered with a uniform layer of surface dressing beads.

Application equipment shall be capable of applying the markings at multiple width settings ranging from 4 to 12 in. as specified in the Contract Documents.

The applicator shall provide a method for cleanly cutting off stripe ends and shall be capable of applying all longitudinal pavement markings.

The equipment shall be mobile and maneuverable to the extent that straight lines can be followed and all standard curves can be made in true arcs.

All parts of the equipment shall be thoroughly cleaned of foreign material or different colored material prior to the introduction of a new batch of material.

Testing performed by the Administration will provide the basis for final acceptance.

552.04 MEASUREMENT AND PAYMENT. Epoxy Pavement Marking will be measured and paid for at the Contract unit price per linear foot for the color and width specified. The payment will be full compensation for all pavement preparation, furnishing and placing of markings, testing, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

CATEGORY 500
PAVING

SECTION 553 — LEAD FREE REFLECTIVE THERMOPLASTIC
PAVEMENT MARKINGS

553.01 DESCRIPTION. Prepare and apply lead free reflective thermoplastic pavement markings to roadway surfaces as specified in the Contract Documents or as directed by the Engineer.

553.02 MATERIALS.

Lead Free Reflective Thermoplastic Pavement Markings 951.02

553.03 CONSTRUCTION.

553.03.01 Quality Assurance/Quality Control. Refer to 549.03.01.

553.03.02 Application Equipment. An oil or air jacketed kettle shall be utilized for uniform melting and heating of the thermoplastic material. The kettle shall provide continuous mixing and agitation of the material. The kettle and the applicator shall be equipped with an automatic thermostatic device to provide positive temperature control.

The equipment shall be constructed so that all mixing and conveying parts, up to and including the application apparatus, maintains the material at the specified temperature. Conveying parts of the applicator between the reservoir and the application apparatus shall be constructed to prevent clogging and accumulation. The applicator shall be capable of containing a minimum of 600 lb of molten thermoplastic material.

The kettle and applicator shall be constructed and arranged to conform to the requirements of the National Board of Fire Underwriters (NBFU), the National Fire Protection Association (NFPA), and State and local authorities.

Temperature gauges shall be calibrated every six months and a copy of the calibration certification shall be submitted to the Engineer.

The applicator shall apply the surface dressing beads to the molten thermoplastic marking by means of a pressurized bead dispenser or other mechanical conveying method not dependent upon gravity for uniform application. The bead dispenser shall be equipped with an automatic cutoff system that will stop the flow of the thermoplastic material whenever there is a disruption in the application of the beads so that all markings placed shall be covered with a uniform layer of surface dressing beads.

Application equipment shall be capable of applying the markings at multiple width settings ranging from 4 to 12 in. as specified in the Contract Documents.

The applicator shall provide a method for cleanly cutting off stripe ends and shall be capable of applying all longitudinal pavement markings.

The equipment shall be mobile and maneuverable to the extent that straight lines can be followed and all standard curves can be made in true arcs.

All parts of the equipment shall be thoroughly cleaned of foreign material or different colored material prior to the introduction of a new batch of thermoplastic material.

553.03.03 Cleaning Pavement Surfaces. Refer to 549.03.02.

553.03.04 Application. The ambient and surface temperatures shall be at least 50 F and rising at the time of application.

Thermoplastic pavement markings shall be sprayed onto the pavement surface. Only the spray method of application shall be permitted. Gore areas, crosswalks, small intersections, roundabouts, and other areas which preclude the application of the markings with truck mounted equipment will be exempt from the spray application requirement.

Thermoplastic pavement markings shall conform to the following:

- (a) **Temperature.** The molten material temperature shall be between 400 and 440 F unless otherwise recommended by the manufacturer, and approved by the Engineer.
- (b) **Primer.** A primer shall be used if thermoplastic is applied to portland cement concrete. Any primer used shall be compatible with the thermoplastic material.
- (c) **Thickness.** The pavement markings shall yield a solid thickness range of 80 to 95 mils above the roadway surface across the middle two-thirds of the line width when tested as specified in MSMT 729. Variation from this range will be used for the price adjustment specified in 553.04.01.
- (d) **Glass Beads.** Glass beads shall be uniformly applied to the surface of the molten thermoplastic at the minimum rate of 7 to 9 lb/100 ft², as specified in MSMT 729.
- (e) **Color.** The color of the dry markings shall match Federal Standard 595 (13538 - yellow or 17886 - white). The Contractor shall supply the specified color chips for the Engineer's use to visually determine that the thermoplastic material matches the specified color.
- (f) **Retroreflectance.** Refer to MSMT 729. The millicandellas/lux/square meter values taken anytime within the first 30 days shall conform to the following:

RETROREFLECTANCE

COLOR	RETROREFLECTIVITY	CORRECTIVE ACTION
White	equal to or greater than 250	None
Yellow	equal to or greater than 150	
White	less than 250	Necessary corrective actions, including grinding if necessary, and re-tracing
Yellow	less than 150	

(g) **Width.** Refer to 549.03.01(a).

(h) **Alignment.** Refer to 549.03.01(a).

SPECIAL PROVISIONS
553 — LEAD FREE THERMOPLASTIC MARKINGS

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(i) **Layout Markings.** Refer to 549.03.01(a).

553.03.05 Quality Control Test Strip. Refer to 549.03.03.

553.03.06 Responsibility. Refer to Section 549.

553.03.07 Observation Period. Refer to Section 549.03.06.

553.04 MEASUREMENT AND PAYMENT. Refer to 549.04. The reflectometer will become the property of the Contractor at the completion of the project.

553.04.01 Price Adjustment for Film Thickness. The unit price for Lead Free Reflective Thermoplastic Pavement Markings will be per striped linear foot based on MSMT 729 calculations for thickness, and will be adjusted in conformance with the following:

MIL THICKNESS	PERCENT OF PAYMENT - UNIT PRICE
80 – 95 (a)(b)	100
75 – 79	90
70 – 74	88
65 – 69	82
60 – 64	72
Less than 60	Retrace to achieve a thickness of 80 to 95 mils. Retrace thickness shall be 30 mils min (b).

(a) The Engineer may require the Contractor to remove excess material thickness.

(b) Removal of excess material and retracing pavement markings shall be performed at no additional cost to the Administration.

CATEGORY 500 PAVING

**SECTION 556 — PREFORMED
THERMOPLASTIC PAVEMENT MARKINGS**

556.01 DESCRIPTION. Furnish and install heat applied preformed thermoplastic pavement marking symbols, legends, and lines as specified in the Contract Documents or as directed by the Engineer.

556.02 MATERIALS.

Preformed Thermoplastic is a durable pavement marking material. All Preformed Thermoplastic Pavement Marking material shall be selected from the Qualified Products List.

Heat Applied Permanent Preformed Thermoplastic Pavement Marking Material	951.06
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556.03 CONSTRUCTION.

556.03.01 Quality Assurance/Quality Control. Refer to 549.

556.03.02 Application. The location, width, and type of marking, shall be as specified in the Contract Documents or as directed by the Engineer.

Applying pavement markings over longitudinal joints is prohibited; they shall preferably be offset 2 in. from them.

Thermoplastic Pavement Marking shall conform to the following:

- (a) **Temperature.** The markings shall be applied when the thermoplastic, ambient, and surface temperature, and relative humidity conform to the manufacturer's recommendations.
- (b) **Color.** The color of the dry markings shall match Federal Standard 595 (13538 - yellow or 17886 - white). The Contractor shall supply the specified color chips for the Engineer's use to visually determine that the thermoplastic material matches the specified color.
- (c) **Primer.** When specified by the manufacturer, a primer shall be used if thermoplastic is applied to Portland cement concrete.
- (d) **Retroreflectance.** The minimum retroreflectance shall be 150 millicandelas/lux/square meter for yellow and 250 millicandelas/lux/square meter for white as determined in conformance with MSMT 729.

SPECIAL PROVISIONS

556 — PREFORMED THERMOPLASTIC PAVEMENT MARKINGS

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556.03.05 Packaging. The material shall be handled for shipping, unloading and storage as recommended by the manufacturer. Each shipping package shall be marked with the following information:

- (a) Manufacturer's name.
- (b) Description of item.
- (c) Date of manufacture.
- (d) Contractor's name.
- (e) Purchase order number.
- (f) Lot number.
- (g) Color.

556.04 MEASUREMENT AND PAYMENT. The payment will be full compensation for all pavement preparation, furnishing and placing of markings, testing, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Preformed Thermoplastic Pavement Marking Legends (letters and numbers) and Symbols will be measured and paid for at the Contract unit price per square foot. The square foot pay quantity for Legends (letters and numbers) and Symbols will be as specified in the Administrations Standard Details

Preformed Thermoplastic Pavement Marking lines will be measured and paid for at the Contract unit price per linear foot for the color and width specified.

SPECIAL PROVISIONS

557 — SNOWPLOWABLE RAISED PAVEMENT MARKERS

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**CATEGORY 500
PAVING**

SECTION 557 – SNOWPLOWABLE RAISED PAVEMENT MARKERS

557.01 DESCRIPTION. Furnish and install new Snowplowable Raised Pavement Markers (SRPM) and replacement components as specified in the Contract Documents or as directed by the Engineer.

557.02 MATERIALS.

Castings	Qualified Products List / 951.05
Pavement Marker Reflector Lenses	Qualified Products List / 951.05
Epoxy	951.05

Snowplowable Raised Pavement Markers are durable materials.

557.03 CONSTRUCTION.

Casting. Recycled iron castings are prohibited.

Placement. Snowplowable Raised Pavement Markers shall be installed and located as specified in the Contract Documents and in conformance with the Maryland Manual of Uniform Traffic Control Devices (MdMUTCD).

General Installation Requirements.

- (a) The Contractor shall install the SRPM no later than two weeks after the completion of the final surface or as directed by the Engineer.
- (b) At the time of installation, the road surface and ambient temperature shall be as specified in the manufacturers’ recommendations. Installing markers on wet pavement surfaces as determined in MSMT 729 is prohibited.
- (c) At the time of installation, the Contractor shall have on the jobsite all the materials necessary to complete the installation.
- (d) The quality control test strip containing a minimum of 10 groove cuts spaced as specified in the Contract Document shall be constructed to verify the accuracy and ability of the equipment and personnel. The contractor shall replace at no additional cost to the Administration any incorrect groove cuts and any incorrect casting placements within the test strip.
- (e) At the time of installation, SRPM castings delivered with Pavement Marker Reflector Lens affixed should be free of dirt, dust, oil, grease, rust, moisture, or any foreign matter that will impair adhesion to the pavement. Any residual material that inhibits retroreflectivity of the reflector lens shall be removed without damage to the lens surface. It shall be the contractor’s responsibility to clean each contaminated casting by sand blasting, wire brushing or other procedure approved by the Engineer to remove all foreign matter prior to installation. The use of chemicals to remove rust from the castings is prohibited.

- (f) The contractor shall replace at no additional cost to the Administration any incorrect groove cut and any incorrect casting placement. An additional test strip may be required by the Engineer in the event of incorrect installations. Incorrect installations, as determined by the Engineer, shall be corrected and repaired by the contractor at no additional cost to the Administration.

Pavement Marker Reflector Lens. 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 in the Contract Documents or as directed by the Engineer.
- (b) Two-Way Applications: The backside for Two-Way Markers shall be the same color as the adjacent pavement marking.

The pavement marker reflector lens shall be imprinted with the model/batch number and the manufacturers' name.

Castings. The casting shall be imprinted with the model number and the manufacturer's name.

New Installation.

- (a) The SRPM shall be installed in accordance with manufacturer's recommendations and D 4383. 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 contaminant which may reduce its bond to the epoxy adhesive. All requirements of the manufacturer's installation instructions shall be met.
- (b) The groove cut for the casting shall be the appropriate dimensions to allow 0.125 in. movement side to side of the casting. All leveling lugs on the casting must contact the pavement. The leading and trailing edges of the casting must lie below the pavement surface and the casting properly seated. All other requirements of the manufacturer's installation instructions shall be met.
- (c) Lenses used shall be of a type specifically manufactured and approved for use as SRPM reflector lenses. Lenses that are manufactured exclusively for recessed pavement markers are not permitted as substitutes for SRPM reflector lenses.

Replacement.

- (a) Casting Replacement. The re-use of damaged or removed castings is prohibited.
- (b) Pavement Marker Reflector Lens Replacement. The Contractor shall remove and dispose of any damaged reflector lens and replace with a new lens. Previously installed undamaged castings which are missing a reflector lens shall have a new reflector lens installed. The replacement lenses shall be installed per manufacturer's written instructions.
- (c) Casting Groove Cut Replacement and Accuracy. The re-use of existing groove cuts is prohibited; castings shall only be installed in new groove cuts. Previously used groove cuts shall be permanently patched in accordance with applicable sections of 504, 505 and 522 or

SPECIAL PROVISIONS

557 — SNOWPLOWABLE RAISED PAVEMENT MARKERS

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as directed by the Engineer. The location of the replacement groove cut shall be within 10 percent longitudinally in front (with the direction of traffic) and no lateral deviation exceeding 1-1/2 in.

Casting Adhesive. The epoxy adhesive used to fasten the castings to the pavement surface shall conform to D 4383-05 Table X1.1.

Reflector Lens Adhesive in Casting. The adhesive used to fasten the reflector lens to the casting shall meet the manufacturers' recommendations.

Quality Assurance/Quality Control. Section 549.

Observation Period. The Contractor shall replace at no additional cost to the Administration, any SRPM or Pavement Marker Reflector Lenses found to be damaged, non-retroreflective or missing due to improper installation or manufacturing defects within 180 days after opening to traffic.

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.

- (a) Snowplowable Raised Pavement Markers will be paid for at the Contract unit price per each. Furnishing and installing SRPM includes the casting, reflector, adhesive and grooving.
- (b) Removal of existing Castings, excluding any incorrect installation by the Contractor, and repair of Groove Cuts will be paid for at the Contract unit price per each.
- (c) Replacement of Pavement Marker Reflector Lenses will be paid for at the Contract unit price per each.

SPECIAL PROVISIONS

559 — PREFORMED PATTERNED REFLECTIVE MARKINGS

CONTRACT NO. PG7585184

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**CATEGORY 500
PAVING**

**SECTION 559 — PERMANENT PREFORMED PATTERNED
REFLECTIVE PAVEMENT MARKINGS**

559.01 DESCRIPTION. Furnish and apply permanent preformed patterned reflective pavement (PPPRP) markings as specified in the Contract Documents or as directed by the Engineer.

559.02 MATERIALS.

Permanent Preformed Patterned Reflective Pavement Marking Materials	951.07
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559.03 CONSTRUCTION.

559.03.01 General. PPPRP markings shall be applied in conformance with the manufacturer's recommendations or as directed by the Engineer.

On new hot mix asphalt projects, the PPPRP markings shall be inlaid into the hot surface of the top course of pavement. No top course paving shall be permitted unless the stripping crew and marking materials are at the project site.

When the Contract Documents specifies the use of PPPRP markings on concrete pavements or existing asphalt pavements, the Contractor shall use heat, solvent, or other type of adhesive primer in conformance with the manufacturer's recommendations.

Preformed legends and symbols shall conform to the applicable shape and sizes as specified in the MdMUTCD, and Contract Documents.

PPPRP markings shall conform to pavement contours and be resistant to deformation by traffic and damage from snow removal equipment. Surface preparation, use of solvents and primers and equipment used in the application of PPPRP markings shall conform with the manufacturer's recommendations and be approved by the Engineer. After PPPRP markings are applied, they shall be immediately ready for traffic.

559.03.02 Quality Assurance/Quality Control. Refer to 549.03.01.

559.03.03 Cleaning Pavement Surfaces. Refer to 549.03.02.

553.03.04 Application. Refer to 549.03.03 and the following:

- (a) **Manufacturer's Recommendations.** The Contractor shall provide a copy of the manufacturer's recommendations to the Engineer, and shall follow them for the installation of the line markings.
- (b) **Adherence.** Adherence of PPPRP markings shall be randomly checked by using a paint scraper or another approved tool, which shall be held nearly parallel with the highway surface, so there is no dislodging of the tape.

SPECIAL PROVISIONS

559 — PREFORMED PATTERNED REFLECTIVE MARKINGS

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- (c) **Thickness.** The finished thickness of the PPPRP markings shall have a minimum caliper of 0.060 in. at the thickest portion of the patterned cross section, and a minimum caliper of 0.020 in. at the thinnest portion of the cross section. Measurements shall be made from the top of finished pavement surface.
- (d) **Color.** The color of the markings shall match Federal Standard 595 (33538 - yellow, 37886 – white, or 37038 - black). The Contractor shall supply the specified color chips for the Engineer’s use to visually determine that the PPPRP markings match the specified color.
- (e) **Retroreflectance.** Refer to MSMT 729 and the following:

MINIMUM RETROREFLECTANCE

COLOR	RETROREFLECTIVITY	CORRECTIVE ACTION
White	350 or higher	None
Yellow	250 or higher	
White	less than 350	Necessary corrective actions, removal, replacement
Yellow	less than 250	

- (f) **Width.** Refer to 549.03.01(a).
- (g) **Alignment.** Refer to 549.03.01(a).
- (h) **Layout Markings.** Refer to 549.03.01(a).

559.03.05 Quality Control Test Strip. Refer to 549.03.03.

559.03.06 Responsibility. Refer to Section 549.

559.03.07 Observation Period. The Contractor shall be responsible for any defects in materials and workmanship of the PPPRP markings for a period of 180 days from the date the markings are applied and under traffic.

The Engineer will not assess time charges during the observation period provided all other work on the Contract is complete. At the end of the observation period, the Engineer will inspect the pavement marking for durability, color, reflectivity, and inform the Contractor of all pavement markings that have failed and require replacement. The pavement marking will be considered failed for any of the following conditions:

- (a) More than five percent of the substrate is exposed in any 2000 ft section of longitudinal pavement marking line.
- (b) Retroreflectance values have dropped below 300 mcd/L/m² for white or 220 mcd/L/m² for yellow.
- (c) Marking is discolored on a visual comparison with the color chips.

SPECIAL PROVISIONS

559 — PREFORMED PATTERNED REFLECTIVE MARKINGS

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The Contractor shall remove and replace all failed PPPRP markings within 30 days of receiving written notification from the Engineer at no additional cost to the Administration. Work shall be in conformance with the manufacturer's recommendation and as approved by the Engineer before the project is accepted. The replacement markings shall conform to the same requirements as the original markings. If the work is not completed in this period, the Engineer will resume time charges until this work is completed.

At the end of the observation period, the Engineer will accept the work and terminate the Contractor's responsibilities upon satisfactory inspection of the PPPRP markings.

559.04 MEASUREMENT AND PAYMENT. Measurement and payment for the pertinent Permanent Preformed Patterned Reflective Pavement Marking items will be as specified in 549.04. The reflectometer will become the property of the Contractor at the completion of the project.

**CATEGORY 500
PAVING****SECTION 565 — REMOVAL OF EXISTING PAVEMENT MARKINGS**

565.01 DESCRIPTION. Remove existing pavement markings (lines, letters, numbers, arrows, and symbols) during temporary or permanent traffic shifts, and repairing any roadway areas damaged during the removal process. This Specification does not apply to raised or recessed pavement markers. Temporary blackout tape shall be applied when existing pavement markings will require salvaging for reuse after completion of temporary traffic shifts necessary to perform work specified in the Contract Documents. Refer to 104.11.02.

565.02 MATERIALS. Not applicable.

565.03 CONSTRUCTION. The Contractor shall layout and apply all new pavement markings (temporary or permanent) as specified in Section 549 before any removal of existing pavement markings begin.

565.03.01 Quality Control/Quality Assurance. At least two weeks prior to the start of pavement markings removal, the Contractor shall submit a Quality Control Plan (QCP) to the Engineer for review. The QCP shall contain (as a minimum) the following information:

- (a) How the Contractor proposes to perform the work while ensuring conformance with the Specifications.
- (b) Proposed method of removal based on road conditions, type and number of equipment to be used, manpower expectations, and time frame to complete the work based on maintenance of traffic (MOT) restrictions.
- (c) Location and quantity of markings to be removed.
- (d) Protective shielding plan and containment system, particularly in the case of markings that may contain toxic materials.

The QCP shall also detail when, how, and what corrective actions will be taken for unsatisfactory construction practices and deviations from the Contract Documents. Any deviation from the QCP shall be cause for immediate suspension of work. Operations shall not resume without the Engineer's approval.

565.03.02 Quality Control Test Strip. Prior to the beginning of work, the Contractor shall demonstrate the removal method to the Engineer for approval. A minimum of 100 ft of existing pavement markings shall be removed as a test strip at a location determined by the Engineer. If the method does not work or shows signs of damaging the road surface, then another method shall be tried. Additional control strips will be required. The preferred method is that which least damages the roadway and completely removes the markings.

SPECIAL PROVISIONS

565 — REMOVAL OF EXISTING PAVEMENT MARKINGS

CONTRACT NO. PG7585184

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565.03.03 Methods of Removal. The following removal methods are based on the pavement condition and type of marking material:

- (a) **Manual.** A scraper or putty knife shall be used to lift tape from the pavement surface. Open flame for tape removal is prohibited.
- (b) **High Pressure Water Blasting.** A high pressure water blast shall be used to break the bond between the marking material and the pavement surface. The water blast may contain fine grit.
- (c) **Alternate Methods.** Abrasive blasting or grinding methods shall be submitted for approval to the Office of Materials Technology prior to use.

565.03.04 Cleaning Pavement Surfaces. Immediately behind the removal operation, a vacuum equipped street sweeper capable of removing all loose material shall be used to remove all dust and debris generated by the removal process prior to returning the area to traffic. The Contractor shall prevent debris from draining into inlets and waterways, and all debris shall be collected and disposed of on an approved spoil area or landfill.

565.03.05 Alignment. Removal shall be performed in a straight and uniform manner, and shall follow the longitudinal alignment of the markings with a lateral deviation of no more than 1 in. in any 10 ft section. Affected area shall not exceed 1/2 in. on either side of the existing marking. The depth shall be uniform throughout, 1/8 in. or less, with no gouge areas in the pavement surface. If a second pass is necessary to completely remove the markings, the edges of the groove shall be feathered to a width of 1.25 in. on each side for every additional 1/8 in. of depth.

565.03.06 Corrective Action. Any pavement surface damaged beyond the requirements specified herein by the Contractor's operations shall be repaired or repaved as determined by the Engineer at no additional cost to the Administration.

565.04 MEASUREMENT AND PAYMENT. The payment will be full compensation for the removal of the markings, pavement clean up, test strips, protective shielding, containment, disposal of marking material and pavement debris, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Removal of the existing pavement markings will be measured and paid for at the Contract unit price for one or more of the following items:

- (a) Removal of Existing Pavement Marking Lines per linear foot, any width.
- (b) Removal of Existing Pavement Marking Letters, Symbols, Arrows, and Numbers per square foot.



**CATEGORY 600
SHOULDERS**

SECTION 605 — METAL TRAFFIC BARRIERS

605.02 MATERIALS.

530 **CHANGE:** “Brown Polyester Coating 917.03” to read,
“Brown Polyester Coating 465.03.02(b)”

CHANGE: “W Beam 918.01” to read,
“W Beam/Thrie Beam 918.01”.

605.03.04 Brown Polyester Coated Traffic Barrier W Beam Using 6 Foot Post or 8 Foot Post.

531 **ADD:** The following before the first sentence of the first paragraph, “Ensure that all...unloading, and installation.”

“Apply polyester powder as specified in 465.03.02(b). Ensure that all...unloading, and installation.”

532 **ADD:** The following after **605.03.08 End Treatments.**

605.03.09 Remove and Dispose of Existing Traffic Barrier. Assume all responsibility and make every effort to recycle or stockpile for noncontract use, all existing metal components of traffic barrier. Written certification (including date, time, materials, measurement and other pertinent information) shall be submitted to the Administration upon completion and upon request. Certification of material recycled or stockpiled shall be required prior to payment for this item or as otherwise directed. All cost associated with these activities are incidental to the item.

605.04 MEASUREMENT AND PAYMENT.

DELETE: 605.04.05 in its entirety.

INSERT: The following.

605.04.05 Removal and Disposal of Existing Traffic Barriers and any end treatments will be measured and paid for at the Contract unit price per linear foot. A written certification as specified in 605.03.09 will be required.



SPECIAL PROVISIONS INSERT

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606 — PERMANENT TRAFFIC BARRIER END TREATMENTS

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**CATEGORY 600
SHOULDERS**

**SECTION 606 — PERMANENT TRAFFIC
BARRIER END TREATMENTS**

606.03 CONSTRUCTION.

606.03.01 End Treatments.

534 **DELETE:** (e) **Finish Coat.** in its entirety.

INSERT: The following.

- (e) **Finish Coat.** Traffic barrier end treatments shall have the same finish coat as the W beam traffic barrier to which they are attached. Refer to Section 605. If end treatments are designated to be powder coated, coater shall contact the manufacturer of the end treatment for recommendations as to areas that can be coated without having an effect on the NCHRP or MASH crash rating.

CATEGORY 700
LANDSCAPING

SECTION 701 — TOPSOIL AND SUBSOIL

544 **DELETE:** Section 701 — Topsoil and Subsoil, in its entirety.

INSERT: The following.

SECTION 701 — SUBSOIL AND TOPSOIL

701.01 DESCRIPTION. Prepare existing topsoil, or salvage and place subsoil and topsoil for vegetation establishment. Perform Temporary Mulch or Temporary Seed in conformance with Section 704 to provide temporary soil stabilization.

Performance of Subsoil and Topsoil as specified herein complies with all requirements of the Maryland Department of the Environment for handling and placing soils in preparation for permanent seeding or other permanent vegetation establishment.

701.02 MATERIALS.

Existing Topsoil	920.01.01
Salvaged Topsoil	920.01.01
Furnished Topsoil	920.01.02
Salvaged Subsoil	920.01.03
Furnished Subsoil	920.01.04
Water	920.09.01
Pesticides	920.09.03

701.03 CONSTRUCTION.

701.03.01 General

(a) **Schedule.** Perform subsoil and topsoil operations when soil moisture and weather conditions are suitable. Cease operations when soil is muddy, frozen, or otherwise unsuitable.

(b) **Pesticide Application.** Apply pesticides in conformance with the Maryland Pesticide Applicator's Law and the manufacturer's label. 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; (3-A) Ornamental Plant Exterior; (3-C) Turf; (5) Aquatic; (6) Right-of-Way and Weed. Pesticides shall be applied by a Maryland Certified Pesticide Applicator, or by a Registered Pesticide Applicator under the supervision of a Certified Pesticide Applicator.

- (c) **Pesticide Application Reporting.** Record the location, acreage treated, pesticide name and quantity applied on the Pesticide Application Reporting Form. Submit the Form within 24 hours after applying pesticide.
- (d) **Nutrient Management Plan (NMP).** The specified application rates of the pertinent vegetation establishment will be the NMP unless the Administration develops a substitute NMP. Replace application rates of the pertinent specification as required by the NMP.
- (e) **Nutrient Management Reporting.** Record the fertilizer analysis, the square yards covered, and the pounds of fertilizer applied on the Nutrient Management Reporting Form. Submit the Form within 24 hours after applying fertilizer.

701.03.02 Site Preparation and Salvaging.

- (a) **Prohibited Weeds.** Refer to 920.01.01. Existing topsoil, and topsoil and subsoil to be salvaged, will be inspected and shall be free of prohibited weeds. Control prohibited weeds when preparing existing topsoil for vegetation establishment, or before salvaging operations. Prevent the spread of prohibited weeds as needed or as directed.

When herbicide application is necessary for control of prohibited weeds, apply glyphosate 3% solution in water, or other herbicide as directed. Refer to 701.03.01(b) and complete the Pesticide Application Reporting Form in conformance with 701.03.01(c).

- (b) **Removal.** Remove vegetation, brush, and other debris from the areas of existing topsoil, and from areas where topsoil and subsoil will be salvaged. Remove topsoil and subsoil to the depth as specified or directed. Transport salvaged topsoil and subsoil separately, and keep them apart from other materials. Do not remove existing topsoil.
- (c) **Storage.** Constructing stockpiles on well drained land, away from streams, drainage areas, and floodplains as specified in Section 308. Maintain stockpiles of salvaged topsoil and salvaged subsoil away from other materials, and separate from each other.

Apply temporary mulch or temporary seed in conformance with Section 704 immediately after constructing stockpiles. Install and maintain silt fence around stockpiles in conformance with 308.03.29. Control prohibited weeds as needed or as directed.

- (d) **Excess.** Existing topsoil, salvaged topsoil, and salvaged subsoil, are the property of the Administration. Do not remove soils without written approval.

701.03.03 Placing Subsoil and Topsoil.

- (a) **Removal from Stockpile.** Stockpiles of salvaged subsoil and salvaged topsoil will be inspected and shall be free of prohibited weeds.

Do not remove surface debris or transport soil from stockpiles before the inspection is completed, or before prohibited weeds are controlled. Control prohibited weeds as needed or as directed.

Remove grass, weeds, brush and other debris from the surface of stockpiles before transporting soil.

- (b) Spreading Subsoil.** Ensure the site where subsoil will be spread is uniformly graded true to line and cross section. Spread and compact subsoil in layers up to 8 in. thickness to provide a firm and uniform subsoil base, and to ensure spreading of the specified depth.

Track slopes 4:1 and steeper with cleated track equipment operated perpendicular to the slope. Check subsoil thickness, lines, grades, and elevations to ensure the completed work is as specified.

Remove stones and other debris with a length or width greater than 4 in. from the surface of the subsoil before spreading topsoil.

- (c) Spreading Topsoil.** Ensure the site where topsoil will be spread is uniformly graded true to line and cross section, and that the surface of the subsoil base is loose and able to provide a suitable bond for the topsoil layer to be spread.

If the subsoil is crusted or excessively compacted, then roughen and loosen the surface of the subsoil base with approved machinery before spreading topsoil.

Spread topsoil over the designated areas and lightly firm the topsoil to ensure uniform thickness of the specified depth, and to meet the required grades.

Track slopes 4:1 and steeper with cleated track equipment operated perpendicular to the slope.

When placing topsoil for grading adjustment, the minimum thickness shall be 1/2 in. and the maximum thickness shall be 8 in.

Ensure that topsoil is uniformly spread and firmed near sidewalk and pavement edges, and that the topsoil surface is without gaps, mounds, depressions, soft spots, or areas that may impair surface drainage or future maintenance. Check topsoil thickness, lines, grades, and elevations to ensure the completed work is as specified.

In areas within 10 feet of the pavement edge and near commercial and residential property, remove stones, wood, metal, and other debris with a length or width greater than 2 in. from the soil surface when spreading is completed. In all other areas, remove debris with a length or width greater than 4 in., or as directed.

(d) Soil Amendments and Fertilizer. Apply limestone, sulfur, gypsum, compost, and fertilizer to existing topsoil, salvaged topsoil, and furnished topsoil as specified in the NMP, or as specified in the pertinent section for vegetation establishment.

701.03.04 Inspection and Acceptance. Submit a request for Acceptance when operations are completed. Inspection will be conducted to verify that operations were completed as specified. Acceptance will be granted at that time.

701.04 MEASUREMENT AND PAYMENT. Subsoil and topsoil 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.

701.04.01 Existing topsoil will not be measured but the cost of preparing existing topsoil will be incidental to the Contract unit price for clearing and grubbing, or will be incidental to the pertinent Contract unit price for the vegetation establishment.

701.04.02 Salvaging Subsoil and Salvaging Topsoil will not be measured but the cost will be incidental to the Contract unit price for Class 1 Excavation.

701.04.03 Placing Salvaged Subsoil and Placing Salvaged Topsoil will be measured and paid for at the pertinent Contract unit price per square yard for the specified depth, or per cubic yard.

701.04.04 Placing Furnished Subsoil and Placing Furnished Topsoil will be measured and paid for at the pertinent Contract unit price per square yard for the specified depth, or per cubic yard.

701.04.05 Placing Salvaged Topsoil for Grading Adjustment and Placing Furnished Topsoil for Grading Adjustment will be measured and paid for at the pertinent Contract unit price per square yard, or per cubic yard. No payment will be made for topsoil placed less than 1/2 inch depth.

701.04.06 Temporary Mulch, Temporary Seed, Turfgrass Establishment and other permanent vegetation establishment will be measured and paid for at the pertinent Contract unit price.

SPECIAL PROVISIONS

704 — TEMPORARY MULCH AND TEMPORARY SEED

CONTRACT NO. PG7585184

1 of 4

**CATEGORY 700
LANDSCAPING**

**SECTION 704 — TEMPORARY MULCH
AND TEMPORARY SEED**

547 **DELETE:** Section 704 — Temporary Seed and Temporary Mulch, in its entirety.

INSERT: The following.

**SECTION 704 — TEMPORARY MULCH
AND TEMPORARY SEED**

704.01 DESCRIPTION. Perform Temporary Mulch and Temporary Seed to provide temporary soil erosion protection as follows.

For areas that are not at final grade or which are not ready for permanent stabilization, apply Temporary Mulch to stabilize topsoil, subsoil, common borrow, or other specified soil substrate for up to 2 months after installation.

For areas that are not at final grade or when redisturbance is expected in 2 to 6 months, apply Temporary Seed to stabilize topsoil, subsoil, common borrow, or other specified soil substrate up to 6 months after installation.

When redisturbance is expected in more than 6 months, refer to Section 705 and perform Turfgrass Establishment.

Performance of Temporary Mulch and Temporary Seed as specified herein complies with all requirements of the Maryland Department of the Environment for temporary stabilization of soils.

704.02 MATERIALS.

Fertilizer	920.03.01
Straw Mulch	920.04.01
Wood Cellulose Fiber Mulch	920.04.02
Soil Stabilization Matting	920.05.01
Fasteners	920.05.02
SHA Temporary Seed Mix	920.06.07
Water	920.09.01

SPECIAL PROVISIONS

704 — TEMPORARY MULCH AND TEMPORARY SEED

CONTRACT NO. PG7585184

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704.03 CONSTRUCTION.

704.03.01 General.

- (a) **Schedule.** Apply Temporary Mulch and Temporary Seed any time of the year.
- (b) **Nutrient Management Plan (NMP).** The fertilizer application rate specified in 704.03.03 shall be the NMP rate for Temporary Seed unless the Administration develops a substitute NMP.
- (c) **Nutrient Management Reporting.** Record the fertilizer analysis, the square yards covered, and the pounds of fertilizer applied on the Nutrient Management Reporting Form. Submit the Form within 24 hours after applying fertilizer.

704.03.02 Temporary Mulch. Temporary Mulch may be either temporary straw mulch or temporary matting mulch.

Apply temporary straw mulch or temporary matting mulch to provide temporary erosion protection in flat or mildly sloping areas.

Apply temporary matting mulch to provide temporary erosion protection in slopes or channels where flowing water may dislodge temporary straw mulch.

- (a) **Temporary Straw Mulch.** Lightly smooth excessively rough areas, but do not till the soil. Immediately apply straw and cover with wood cellulose fiber. Apply materials as follows.

TEMPORARY MULCH AND TEMPORARY SEED		
TABLE 1 - APPLICATION RATES - TEMPORARY STRAW MULCH		
MATERIAL	LB PER SY	LB PER ACRE
Straw Mulch	0.826	4000
Wood Cellulose Fiber Mulch	0.155	750

Cover at least 90 percent of the soil surface with straw mulch. When applied with mulch blower, apply straw mulch to a loose depth of 3/4 to 2 in. When applied by hand, apply straw mulch to a loose depth of 1-1/2 to 3 in.

Secure straw mulch immediately after the completion of mulching operations by applying wood cellulose fiber uniformly over the straw without displacing the mulch.

Do not operate machinery during windy weather that may interfere with uniform application. Do not allow materials to blow onto sensitive areas or structures.

- (b) **Temporary Matting Mulch.** Select Type A, Type B, Type D, or Type E soil stabilization matting for installation in areas that will be redisturbed within 2 months. Install any of these matting types using methods and fasteners as per Section 709 for Type E Soil Stabilization Matting.

SPECIAL PROVISIONS

704 — TEMPORARY MULCH AND TEMPORARY SEED

Smooth the soil surface to allow uniform installation of matting. Install matting over the soil surface without tenting. Overlap edges of the matting at least 2 in. Install fasteners no more than 24 inches apart along edges, overlaps, and throughout the matting to firmly secure the matting to the soil surface. Do not water the matting.

Remove matting and fasteners before performing permanent vegetation establishment. When approved, matting and fasteners may be removed and reused as Temporary Mulch in the same or different locations when their integrity is not degraded by damage or decomposition.

704.03.03 Temporary Seed. Prepare the soil and apply seed, fertilizer, straw mulch, and wood cellulose fiber mulch to areas that will remain undisturbed for 2 to 6 months.

Complete grading and shaping operations as directed. Loosen soil surfaces before applying seed and fertilizer.

Refer to 705.03.06(b) regarding application equipment and apply fertilizer materials according to Table 2. Immediately apply straw and wood cellulose fiber over seeded and fertilized areas as specified in 704.03.02(a).

TEMPORARY MULCH AND TEMPORARY SEED		
TABLE 2 - APPLICATION RATES - TEMPORARY SEED		
MATERIAL	LB PER SY	LB PER ACRE
SHA Temporary Seed Mix	0.026	125
Fertilizer (15-30-15)	0.031	150
Straw Mulch	0.826	4000
Wood Cellulose Fiber Mulch	0.155	750

704.03.04 Repair. Repair Temporary Mulch or Temporary Seed that is defective before Acceptance.

704.03.05 Acceptance. Submit a request for Acceptance when operations are completed. Inspection will be conducted to verify completion.

704.03.06 Replacement. Replace Temporary Mulch and Temporary Seed as additional work when directed.

- (a) **Replace Temporary Mulch** with approved materials when it has degraded, or when more than 2 months have elapsed since Acceptance.
- (b) **Replace Temporary Seed** with approved materials when it has degraded, or when more than 6 months have elapsed since Acceptance.

SPECIAL PROVISIONS

CONTRACT NO. PG7585184

704 — TEMPORARY MULCH AND TEMPORARY SEED

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704.04 MEASUREMENT AND PAYMENT. Temporary Mulch and Temporary Seed 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.

704.04.01 Temporary Mulch, applied as either temporary straw mulch or temporary matting mulch, will be measured and paid for at the Contract unit price per square yard.

704.04.02 Temporary Seed will be measured and paid for at the Contract unit price per square yard.

704.04.03 Turfgrass Establishment will be measured and paid for at the Contract unit price per square yard.

CATEGORY 700
LANDSCAPING

SECTION 705 — TURFGRASS ESTABLISHMENT

550 **DELETE:** Section 705 — Turfgrass Establishment, in its entirety.

INSERT: The following.

SECTION 705 — TURFGRASS ESTABLISHMENT

705.01 DESCRIPTION. Perform Turfgrass Establishment as follows.

For areas that are at final grade, establish turfgrass in topsoil or other specified soil substrate to provide permanent vegetation groundcover.

For areas that are not at final grade, or areas that will not be redisturbed for at least 6 months after seeding operations are completed, establish turfgrass in topsoil, subsoil, common borrow, or other specified soil substrate to provide temporary vegetation groundcover.

When it is not possible to perform Turfgrass Establishment, refer to Section 704 and perform Temporary Mulch or Temporary Seed, or as directed.

Performance of Turfgrass Establishment as specified herein complies with all requirements of the Maryland Department of the Environment for permanent seeding.

705.02 MATERIALS.

Limestone	920.02.01
Sulfur	920.02.02
Gypsum	920.02.04
Compost	920.02.05
Fertilizer	920.03.01
Straw Mulch	920.04.01
Wood Cellulose Fiber	920.04.02
Seed	920.06
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

705.03 CONSTRUCTION.

705.03.01 General.

(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 and Seed Mixes.** 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.

TURFGRASS ESTABLISHMENT				
TABLE 1 - SEEDING SEASONS AND SEED MIXES				
REGION	SEEDING SEASON - MONTH/DAY			
	Spring	Summer	Fall	Late Fall
	SHA Turfgrass Seed Mix¹			
1	3/1 to 6/14	6/15 to 7/31	8/1 to 9/30	10/1 to 11/15
2	2/1 to 5/14	5/15 to 7/31	8/1 to 10/14	10/15 to 11/15
3	2/1 to 4/30	5/1 to 7/31	8/1 to 10/31	11/1 to 11/15
		Plus Additive ²		Plus Additive ²
Notes:				
¹ When seeding within 4 miles of a State airport: Use no additives and use SHA Special Purpose Seed Mix in lieu of SHA Turfgrass Seed Mix on slopes 4:1 and steeper, or in designated areas.				
² Additive = SHA Temporary Seed Mix				

(c) **Nutrient Management Plan (NMP).** Soil testing will be performed and a NMP will be developed by the Administration. Replace application rates of 705.03.02 as required by the NMP. When a NMP has not been developed, apply 200 lb. per acre of 20-16-12 (83% UF with MAP & SOP) fertilizer as the NMP rate for Turfgrass Establishment.

(d) **Nutrient Management Reporting.** Record the fertilizer analysis, the square yards covered, and the pounds of fertilizer applied on the Nutrient Management Reporting Form. Submit the Form within 24 hours after applying fertilizer.

705.03.02 Application Rates. Apply materials according to Table 2.

TURFGRASS ESTABLISHMENT		
TABLE 2 - APPLICATION RATES ^{a, b, c, d}		
MATERIAL	LB PER SY	LB PER ACRE
SOIL AMENDMENTS per Nutrient Management Plan for topsoil or other specified soil substrate.		
Compost	0 to 1.033	0 to 5000
Gypsum	0 to 0.455	0 to 2200
Limestone	0 to 0.930	0 to 4500
Sulfur	0 to 0.052	0 to 250
MATERIAL	LB PER SY	LB PER ACRE
INITIAL FERTILIZER		
20-16-12 (83% UF with MAP & SOP)	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
SEED MIXES; select one		
SHA Turfgrass Seed Mix, applied to roadsides, facilities, and other designated areas	0.041	200
or		
SHA Special Purpose Seed Mix, applied to slopes 4:1 and steeper within four miles of a State airport, and other designated areas.	0.041	200
ADDITIVE SEED; when required per Table 1		
SHA Temporary Seed Mix	0.006	25
STRAW MULCH	0.826	4000
WOOD CELLULOSE FIBER to secure straw mulch	0.155	750
REFERTILIZING		
20-16-12	0.041	200
Notes:		
^a Apply compost, gypsum, limestone, sulfur, and initial fertilizer at rates specified in the NMP. ^b For salvaged topsoil, the application rates will be included in the Contract documents. For furnished topsoil, 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 initial fertilizer, and do not apply any soil amendments. Apply refertilizing when specified in the Contract documents. ^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.		

705.03.03 Modification Request. Submit a written Modification Request to perform seeding between Late Fall and Spring Seeding Seasons; to install an approved tackifier at manufacturer’s recommended application rates in lieu of wood cellulose fiber to secure straw mulch; or to use Type A, Type D, or Type E Soil Stabilization Matting per Section 709 in lieu of straw mulch and wood cellulose fiber in areas where those mattings have not 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.

705.03.04 Grade Repair. Ensure that soil meets specified grades. Repair any gullies, washes, or disturbed areas that develop before preparing soil.

705.03.05 Preparing Topsoil. Provide a uniform and porous surface that is free of debris and weeds as follows.

- (a) **Areas Flatter than 4:1.** Apply soil amendments and till to a depth of 2 in. to uniformly incorporate amendments into the soil. After tilling, remove clods, stones, wood, metal and other debris with a length or width greater than 1-1/2 in. from the soil surface.
- (b) **Slopes 4:1 and Steeper.** Track slopes 4:1 and steeper with cleated track equipment operated perpendicular to the slope. After tracking, remove stones, wood, metal, and other debris with a length or width greater than 3 in. from the soil surface. Apply soil amendments to tracked soil.

705.03.06 Seeding and Initial Fertilizer. Apply seed and initial fertilizer after preparing soil. Do not apply fertilizer from November 15 thru March 1.

- (a) **Application Equipment.** Use hydroseeders, spreaders, drills, or other approved machinery. Calibrate equipment before application. Apply materials accurately and uniformly to avoid misses and overlaps. Do not operate machinery during windy weather that may interfere with uniform application.
- (b) **Hydroseeders.** Hydroseeders shall be equipped with an agitation system able to keep solids in suspension, and have a gauge to show fill levels and tank capacity. Apply fertilizer and seed mixtures within two hours after mixing. Direct hydroseeding mixtures so the droplets produce a uniform spray. Do not allow materials to runoff or cause erosion., or to blow onto sensitive areas or structures.
- (c) **Mechanical Seeders.** Mechanical seeders shall be capable of uniformly placing seed and fertilizer at the specified rate.

705.03.07 Mulching. Apply mulch immediately after seeding.

- (a) **Soil Stabilization Matting.** Refer to Section 709 and install soil stabilization matting in lieu of straw mulch in designated areas.
- (b) **Straw Mulch.** Cover at least 90 percent of the soil surface with straw mulch. When applied with mulch blower, apply straw mulch to a loose depth of 3/4 to 2 in. When applied by hand, apply straw mulch to a loose depth of 1-1/2 to 3 in. Secure straw mulch immediately after the completion of mulching operations by applying wood cellulose fiber uniformly over the straw without displacing the mulch.

Do not operate machinery during windy weather that may interfere with uniform application. Do not allow materials to blow onto sensitive areas or structures.

705.03.08 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.

705.03.09 Establishment Phase. The Establishment Phase will begin upon Seeding Phase Acceptance.

(a) **Period of Maintenance.** Maintain seeded areas until Final Acceptance.

(b) **Required Maintenance.** Perform the following during the Establishment Phase.

Watering. Apply water as needed to ensure survival of the turfgrass. Apply water to seeded and mulched areas with approved machinery. Do not allow water to cause erosion or to displace the mulch.

Overseeding. Overseeding consists of seeding and mulching in areas where living turfgrass coverage is 40 to 90 percent. When living turfgrass groundcover is not acceptable, perform overseeding as directed. In areas to be overseeded, cut the turfgrass to a height of 3 to 5 in. and remove debris that may interfere with seeding. Apply seed mixtures, seed additives, fertilizer, mulch, and secure mulch as specified in 705.03.01 thru .07, but do not repair grade or prepare soil.

Reseeding. Reseeding consists of tilling, seeding and mulching in areas where turfgrass coverage is less than 40 percent. When living turfgrass groundcover is not acceptable, perform reseeding as directed. In areas to be reseeded, cut the turfgrass to a height of 3 to 5 in. and remove debris that may interfere with seeding. Repair grades, prepare soil, apply seed, fertilizer, and mulch, and secure mulch as specified in 705.03.01 thru .07.

Mowing. Mow turfgrass in areas flatter than 4:1 before the grass grows to a height of 12 in. when directed. Use approved machinery to cut to a height of 3 to 5 in.

(c) **Refertilizing.** Apply 20-16-12 fertilizer as specified in 705.03.02 at least 1 month after initial fertilizer was applied. Do not refertilize from November 15 thru March 1.

705.03.10 Final Acceptance. The Engineer and the Landscape Operations Division will complete an Inspection Report of turfgrass height, color, and percent groundcover. 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 the seedlings of turfgrass species have grown at least 4 in. tall, exhibit dark green color, and are least 95 percent groundcover.

705.04 MEASUREMENT AND PAYMENT. Turfgrass 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.

705.04.01 Turfgrass Establishment, including grade repair, preparing soil, applying fertilizer, soil amendments, seed mixes, seed additives, mulching, securing mulch, watering, overseeding, reseeding, and mowing, 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 shall be incidental to the Contract unit price, and will not be measured or paid for.

(a) **Payment Schedule.** Payments will be made according to Table 3 when construction requirements are met.

TURFGRASS ESTABLISHMENT		
TABLE 3 - PAYMENT SCHEDULE		
CONSTRUCTION REQUIREMENTS	PERCENT OF TOTAL CONTRACT PRICE	PAYMENT FOR COMPLETED WORK
705.03.01 thru .08	80	At Seeding Phase Acceptance
705.03.09 (a) and (b) and 705.03.10	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.

705.04.02 Refertilizing will be measured and paid for at the Contract unit price per square yard.

705.04.03 Temporary Mulch and Temporary Seed will be measured and paid for at the pertinent Contract unit price.

CATEGORY 700
LANDSCAPING

SECTION 706 — SHRUB SEEDING

560 **DELETE:** Section 706 — Shrub Seeding, in its entirety.

INSERT: The following.

SECTION 706 — SHRUB SEEDING ESTABLISHMENT

706.01 DESCRIPTION. Establish shrub seeding in topsoil or other specified soil substrate to provide permanent vegetation groundcover. When it is not possible to perform Shrub Seeding Establishment to provide permanent soil stabilization, refer to Section 704 and perform Temporary Mulch, or as directed. Performance of Shrub Seeding Establishment as specified herein complies with all requirements of the Maryland Department of the Environment for permanent seeding.

706.02 MATERIALS.

Limestone	920.02.01
Sulfur	920.02.02
Compost	920.02.05
Fertilizer	920.03.01
Straw Mulch	920.04.01
Wood Cellulose Fiber	920.04.02
Tall Fescue, Hard Fescue, Kentucky Bluegrass	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)
Shrub Seed	920.06.06(f)
Water	920.09.01
Seed Carrier	920.09.02
Pesticides	920.09.03

706.03 CONSTRUCTION.

706.03.01 General.

(a) **Regions.** 705.03.01(a).

(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.

SHRUB SEEDING ESTABLISHMENT				
TABLE 1 - SEEDING SEASONS AND SEED MIXES				
REGION	SEEDING SEASON - MONTH/DAY			
	Spring	Summer	Fall	Late Fall
	SHA Lowland Shrub Seed or SHA Upland Shrub Seed			
1	3/1 to 6/14	6/15 to 7/31	8/1 to 9/30	10/1 to 11/30
2	2/1 to 5/14	5/15 to 7/31	8/1 to 10/14	10/15 to 11/30
3	2/1 to 4/30	5/1 to 7/31	8/1 to 10/31	11/1 to 11/30
		Plus Additive A*		Plus Additive B*
Notes*				
Additive A = Tall Fescue Additive B = Common Oat				

- (c) **Pesticide Application.** Apply pesticides in conformance with the Maryland Pesticide Applicator’s Law and the manufacturer’s recommendations. 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; (3-A) Ornamental Plant Exterior; (3-C) Turf; (5) Aquatic; (6) Right-of-Way and Weed. Pesticides shall be 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, acreage treated, pesticide name and quantity applied on the Pesticide Application Reporting Form. Submit the Form within 24 hours after applying pesticide.
- (e) **Nutrient Management Plan (NMP).** Soil testing will be performed and a NMP will be developed by the Administration. Replace application rates of 706.03.04 as required by the NMP. When a NMP has not been developed, apply 200 lb. per acre of 20-16-12 (83% UF with MAP & SOP) fertilizer as the NMP rate for Shrub Seeding Establishment.
- (f) **Nutrient Management Reporting.** Record the fertilizer analysis, the square yards covered, and the pounds of fertilizer applied on the SHA Nutrient Management Reporting Form. Submit the Form to the Engineer within 24 hours after applying fertilizer.
- (g) **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.
- (h) **IPM Program and Establishment Schedule.** Develop an IPM Program 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.

SPECIAL PROVISIONS

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706.03.02 Modification Request. Submit a written Modification Request to perform seeding between Late Fall and Spring Seeding Seasons; to install other species or to adjust seeding rates; to install an approved tackifier at manufacturer’s recommended application rates in lieu of wood cellulose fiber to secure straw mulch; or to use Type D or Type E Soil Stabilization Matting per Section 709 in lieu of straw mulch and wood cellulose fiber in areas where those mattings have not 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.

706.03.03 Grade Repair and Preparing Soil. 705.03.03 and .04.

706.03.04 Seed Delivery, Weighing, and Mixing. Deliver seed unmixed with label showing common name and scientific name per 920.06. Test seed as specified in 920.06.05 before weighing and mixing. Use a scale with 0.01 oz or gram accuracy to verify application rates and quantities of seed. Mix and apply seed separately or with other specified seed.

706.03.05 Application Rates. Refer to 706.03.01(b) and include seed additives as specified. Apply materials according to Table 2, Table 3 and Table 4.

SHRUB SEEDING ESTABLISHMENT		
TABLE 2 - APPLICATION RATES^{a, b, c, d}		
MATERIAL	LB PER SY	LB PER ACRE
SOIL AMENDMENTS per Nutrient Management Plan for topsoil or other specified soil substrate.		
Compost	0 to 1.033	0 to 5000
Gypsum	0 to 0.455	0 to 2200
Limestone	0 to 0.930	0 to 4500
Sulfur	0 to 0.052	0 to 250
FERTILIZER		
20-16-12 (83% UF with MAP & SOP)	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
SEED MIXES; select one		
SHA Lowland Shrub Seed	Refer to Table 3 - Application Rates	
SHA Upland Shrub Seed	Refer to Table 4 - Application Rates	
ADDITIVE SEED; when required per Table 1		
A = Tall Fescue	0.005	25
B = Common Oat	0.010	50
STRAW MULCH	0.413	2000
WOOD CELLULOSE FIBER to secure straw mulch	0.103	500
Notes:		
^a Apply compost, gypsum, limestone, sulfur, and fertilizer at rates specified in the NMP.		

SPECIAL PROVISIONS

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- ^b For salvaged topsoil, the application rates will be included in the Contract documents. For furnished topsoil, 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.

SHRUB SEEDING ESTABLISHMENT					
TABLE 3 - APPLICATION RATES - LOWLAND SHRUB SEED					
SHRUB SPECIES Select 7 Marked 'x'	SEEDING RATE		REGION		
	GRAM PER SY	LB PER ACRE	1	2	3
American Cranberrybush	0.281	3.0	x	x	x
American Black Elderberry	0.235	2.5	x		
Blackhaw	0.281	3.0	x	x	x
Common Buttonbush	0.328	3.5	x	x	
Common Winterberry	0.281	3.0	x		
Desert False Indigo	0.281	3.0	x	x	
Inkberry	0.328	3.5		x	x
Maryland Senna	0.188	2.0	x	x	x
Ninebark	0.094	1.0	x	x	x
Red Chokeberry	0.188	2.0	x		
Redosier Dogwood	0.328	3.5	x	x	x
Silky Dogwood	0.188	2.0		x	x
Southern Arrowwood	0.328	3.5	x	x	x
Steeplebush	0.094	1.0		x	x
Swamp Rose	0.141	1.5	x	x	x
OTHER SPECIES Select all marked 'x'					
Blackeyed Susan, PLS ¹	0.094	1.0	x	x	x
Deertongue, PLS ¹	0.188	2.0	x	x	x
Kentucky Bluegrass	0.469	5.0	x	x	x
Purpletop, PLS ¹	0.094	1.0	x	x	x
Switchgrass, PLS ¹	0.094	1.0	x	x	x
Purple Coneflower, PLS ¹	0.188	2.0	x	x	x
Note:					
¹ 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.					

SHRUB SEEDING ESTABLISHMENT					
TABLE 4 - APPLICATION RATES - UPLAND SHRUB SEED					
SHRUB SPECIES Select 7 Marked 'x'	SEEDING RATE		REGION		
	GRAM PER SY	LB PER ACRE	1	2	3
Black Chokeberry	0.094	1.0	x	x	x
Blackhaw	0.281	3.0	x	x	x
Bristly Locust	0.235	2.5	x		
Chokecherry	0.281	3.0	x	x	

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Fragrant Sumac	0.281	3.0	x		
Gray Dogwood	0.281	3.0	x	x	
Mapleleaf Viburnum	0.141	1.5		x	x
Nannyberry	0.281	3.0	x	x	x
Red Elderberry	0.047	0.5	x		
Smooth Sumac	0.281	3.0	x	x	x
Spicebush	0.281	3.0		x	x
Staghorn Sumac	0.281	3.0	x	x	x
Witch Hazel	0.281	3.0		x	x
OTHER SPECIES					
Select all marked 'x'					
Blackeyed Susan, PLS ¹	0.047	0.5	x	x	x
Hard Fescue	1.876	20.0	x	x	x
Indiangrass, PLS ¹	0.188	2.0	x	x	x
Purpletop, PLS ¹	0.094	1.0	x	x	x
Switchgrass, PLS ¹	0.094	1.0	x	x	x
Wild Bergamot, PLS ¹	0.019	0.2	x	x	x
Note:					
¹ 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.					

706.03.06 Preparing Soil. Provide a uniform and porous surface that is free of debris and weeds as follows.

- (a) **Areas Flatter than 4:1.** Apply soil amendments and till to a depth of 2 in. to uniformly incorporate amendments into the soil. If no soil amendments are required per the NMP, and when a drill seeder will be used for seeding, tilling will not be required.
- (b) **Slopes 4:1 and Steeper.** Track slopes 4:1 and steeper with cleated track equipment operated perpendicular to the slope. Apply soil amendments to tracked soil.
- (c) **Debris Removal.** Remove stones, wood, metal, and other debris with a length or width greater than 3 in. from the soil surface.

706.03.07 Fertilizing and Seeding. Use spreaders, drills, or other approved machinery. Hydroseeders shall not be used to apply seed or fertilizer. Apply fertilizer and seed after preparing soil. Seeders shall be capable of uniformly placing seed and fertilizer at the specified rate. Calibrate equipment before application.

Apply materials accurately and uniformly to avoid misses and overlaps. Do not operate machinery during windy weather that may interfere with uniform application.

706.03.08 Mulching. 705.03.07.

706.03.09 Seeding Phase Acceptance. 705.03.08.

706.03.10 Establishment Phase. The Establishment Phase will begin upon Seeding Phase Acceptance.

- (a) **Period of Maintenance.** Maintain seeded areas for 12 months after Seeding Phase Acceptance.
- (b) **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. 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.

Overseeding. Overseeding consists of seeding and mulching areas where living seedling coverage is less than 70 percent. When living seedling groundcover is not acceptable, perform overseeding as directed. Repair grades but do not cut vegetation or prepare soil. Apply seed mixtures, seed additives, fertilizer, mulch, and secure mulch as specified in 706.03.01 thru .08.

- (c) **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.

706.03.11 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 shrub seedlings and other permanent seeded species have grown at least 4 in. tall, exhibit dark green color, and are at least 95 percent groundcover.

706.04 MEASUREMENT AND PAYMENT. Shrub Seeding 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 5 when construction requirements are met.

SHRUB SEEDING ESTABLISHMENT		
TABLE 5 - PAYMENT SCHEDULE		
CONSTRUCTION REQUIREMENTS	PERCENT OF TOTAL CONTRACT PRICE	PAYMENT FOR COMPLETED WORK
706.03.01 thru .09	70	At Seeding Phase Acceptance
706.03.10	15	At Partial Establishment Phase Acceptance
706.03.10 and .11	15	At Final Acceptance
Total Payment	100%	

(b) Forfeiture. Failure to complete operations as required or directed in conformance with the Payment Schedule will result in forfeiture of that percentage of payment.

706.04.01 Upland Shrub Seeding. Upland Shrub Seeding, including grade repair, preparing soil, applying fertilizer, soil amendments, seed mixes, seed additives, mulching, securing mulch, 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 shall be incidental to the Contract unit price, and will not be measured or paid for.

706.04.02 Lowland Shrub Seeding. Lowland Shrub Seeding, including grade repair, preparing soil, applying fertilizer, soil amendments, seed mixes, seed additives, mulching, securing mulch, 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 shall be incidental to the Contract unit price, and will not be measured or paid for.

706.04.03 Temporary Mulch will be measured and paid for at the Contract unit price.

CATEGORY 700
LANDSCAPING

SECTION 707 — MEADOW ESTABLISHMENT

566 **DELETE:** Section 707 — Meadow Establishment and Wildflower Seeding,
in its entirety.

INSERT: The following.

SECTION 707 — MEADOW ESTABLISHMENT

707.01 DESCRIPTION. Establish meadow in topsoil or other specified soil substrate to provide permanent vegetation groundcover. When it is not possible to perform Meadow Establishment, refer to Section 704 and perform Temporary Mulch, or as directed. Performance of Meadow Establishment as specified herein complies with all requirements of the Maryland Department of the Environment for permanent seeding.

707.02 MATERIALS.

Limestone	920.02.01
Sulfur	920.02.02
Compost	920.02.05
Fertilizer	920.03.01
Straw Mulch	920.04.01
Wood Cellulose Fiber	920.04.02
Tall Fescue, Hard Fescue, Kentucky Bluegrass	920.06.06(a)
Common Oat, Perennial Ryegrass	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
Pesticides	920.09.03

707.03 CONSTRUCTION.

707.03.01 General.

(a) **Regions.** Refer to 705.03.01.

(b) **Seeding Seasons.** Perform operations in conformance with 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.

MEADOW ESTABLISHMENT				
TABLE 1 - SEEDING SEASONS AND SEED MIXES				
REGION	SEEDING SEASON - MONTH/DAY			
	Spring	Summer	Fall	Late Fall
	SHA Wet Meadow Seed, SHA Lowland Meadow Seed, SHA Upland Meadow Seed			
1	3/1 to 6/14	6/15 to 7/31	8/1 to 9/30	10/1 to 11/30
2	2/1 to 5/14	5/15 to 7/31	8/1 to 10/14	10/15 to 11/30
3	2/1 to 4/30	5/1 to 7/31	8/1 to 10/31	11/1 to 11/30
All Regions	Plus Additive A*	Plus Additive B*	Plus Additive B*	Plus Additive D*
	Plus Additive B*	Plus Additive C*	Plus Additive D*	Plus Additive E*
Notes * Additive A for Lowland Meadow and Upland Meadow = Garden Cosmos Additive B for Lowland Meadow and Upland Meadow = Plains Coreopsis Additive C for Lowland Meadow and Upland Meadow = Tall Fescue Additive C for Wet Meadow = Perennial Ryegrass Additive D for Lowland Meadow and Upland Meadow = Corn Poppy Additive E for all Meadow Establishment = Common Oat				

- (c) Pesticide Application.** Refer to 701.03.01(b).
- (d) Pesticide Application Reporting.** Refer to 701.03.01(c).
- (e) Nutrient Management Plan (NMP).** Soil testing will be performed and a NMP will be developed by the Administration. Replace application rates of 707.03.08 as required by the NMP. When a NMP has not been developed, apply 200 lb. per acre of 20-16-12 (83% UF with MAP & SOP) fertilizer as the NMP rate for Meadow Establishment.
- (f) Nutrient Management Reporting.** Record the fertilizer analysis, the square yards covered, and the pounds of fertilizer applied on the Nutrient Management Reporting Form. Submit the Form within 24 hours after applying fertilizer.
- (g) 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.
- (h) IPM Program and Establishment Schedule.** Develop an IPM Program 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.

707.03.02 Modification Request. Submit a written Modification Request to perform seeding between Late Fall and Spring Seeding Seasons; to install other species or to adjust seeding rates; to install an approved tackifier at manufacturer’s recommended application rates in lieu of wood cellulose fiber to secure straw mulch; or to use Type D, or Type E Soil Stabilization Matting per Section 709 in lieu of straw mulch and wood cellulose fiber in areas where those mattings have not 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.

707.03.03. Application Rates. Refer to 707.03.01(b) and include seed and seed additives as specified. Apply materials in accordance with Table 2 thru Table 5.

MEADOW ESTABLISHMENT		
TABLE 2 - APPLICATION RATES^{a, b, c, d}		
MATERIAL	LB PER SY	LB PER ACRE
SOIL AMENDMENTS per Nutrient Management Plan for topsoil or other specified soil substrate		
Compost	0 to 1.033	0 to 5000
Gypsum	0 to 0.455	0 to 2200
Limestone	0 to 0.930	0 to 4500
Sulfur	0 to 0.052	0 to 250
FERTILIZER	LB PER SY	LB PER ACRE
20-16-12 (83% UF with MAP & SOP)	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
SEED MIXES; select one		
SHA Wet Meadow Seed	Refer to Table 3 - Application Rates	
SHA Lowland Meadow Seed	Refer to Table 4 - Application Rates	
SHA Upland Meadow Seed	Refer to Table 5 - Application Rates	
ADDITIVE SEED; per Table 1	LB PER SY	LB PER ACRE
A = Garden Cosmos	0.028	0.3
B = Plains Coreopsis	0.028	0.3
C = Tall Fescue or Perennial Ryegrass	2.345	25
D = Corn Poppy	0.028	0.3
E = Common Oat	4.690	50
STRAW MULCH	LB PER SY	LB PER ACRE
WOOD CELLULOSE FIBER to secure straw mulch	0.103	500

Notes:
^a Apply compost, gypsum, limestone, sulfur, and fertilizer at rates specified in the NMP.
^b For salvaged topsoil, the application rates will be included in the Contract documents. For furnished topsoil, 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.

MEADOW ESTABLISHMENT					
TABLE 3 - WET MEADOW SEED					
FORBS	PURE LIVE SEED *		GRASSES, SEDGES and RUSHES	PURE LIVE SEED *	
	GRAM PER SY	LB PER ACRE		GRAM PER SY	LB PER ACRE
Select 8			Include All		
Allegheny Monkeyflower	0.038	0.4	Common Rush	0.150	1.6
Crimsoneyed Rose Mallow	0.038	0.4	Fox Sedge	0.094	1.0
Flat-top Goldenrod	0.038	0.4	Fowl Bluegrass	0.188	2.0
King of the Meadow	0.038	0.4	Longhair Sedge	0.056	0.6
New York Aster	0.038	0.4	Rattlesnake Mannagrass	0.094	1.0
New York Ironweed	0.038	0.4	Shallow Sedge	0.056	0.6
Seedbox	0.038	0.4	Woolgrass	0.056	0.6
Swamp milkweed	0.019	0.2			
Swamp Sunflower	0.56	0.6			
Swamp Verbena	0.131	1.4			
Trumpetweed or Spotted Trumpetweed	0.038	0.4			
			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.		

MEADOW ESTABLISHMENT					
TABLE 4 - LOWLAND MEADOW SEED					
FORBS	PURE LIVE SEED *		GRASSES, SEDGES and RUSHES	PURE LIVE SEED *	
	GRAM PER SY	LB PER ACRE		GRAM PER SY	LB PER ACRE
Select 8			Include All		
Common Boneset	0.019	0.2	Big Bluestem	0.188	2.0
Eastern Purple Coneflower	0.113	1.2	Gamagrass	0.188	2.0
Evening Primrose	0.019	0.2	Hard Fescue	1.876	20.0
Lanceleaf Tickseed	0.141	1.5	Indiangrass	0.188	2.0
Maximilian Sunflower	0.047	0.5	Kentucky Bluegrass	0.469	5.0
New England Aster	0.019	0.2	Switchgrass	0.094	1.0
New York Ironweed	0.019	0.2	Virginia Wildrye	0.047	0.5
Showy Tickseed	0.019	0.2			
Stiff Goldenrod	0.028	0.3			
Swamp Verbena	0.066	0.7			
Trumpetweed or	0.019	0.2			
			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		

Spotted Trumpetweed			Seed.		
MEADOW ESTABLISHMENT					
TABLE 5 - UPLAND MEADOW SEED					
FORBS	PURE LIVE SEED *		GRASSES, SEDGES and RUSHES	PURE LIVE SEED *	
	GRAM PER SY	LB PER ACRE		GRAM PER SY	LB PER ACRE
Select 8			Include All		
Blackeyed Susan	0.094	1.0	Broomsedge	0.094	1.0
Browneyed Susan	0.094	1.0	Deertongue	0.188	2.0
Eastern Purple Coneflower	0.225	2.4	Hard Fescue	1.876	20.0
Gray Goldenrod	0.038	0.4	Little Bluestem	0.188	2.0
Lanceleaf Tickseed	0.263	2.8	Purpletop	0.094	1.0
Maryland Senna	0.056	0.6	Virginia Wildrye	0.047	0.5
Partridge Pea	0.225	2.4	Note:		
Smooth Blue Aster	0.038	0.4	* 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.		
Sundial Lupine	0.263	2.8			
Talus Slope Penstemon	0.038	0.4			
Wild Bergamot	0.038	0.4			

707.03.04 Grade Repair. 705.03.04.

707.03.05 Preparing Soil. 706.03.06. Use rakes, soil rollers, and similar tools and equipment as necessary to ensure a firm and uniform soil surface in preparation for seeding.

707.03.06 Seed Delivery, Weighing, and Mixing. 706.03.04.

707.03.07 Fertilizing and Seeding. 706.03.07.

707.03.08 Mulching. 705.03.07.

707.03.09 Seeding Phase Acceptance. 705.03.08.

707.03.10 Establishment Phase. 706.03.10.

707.03.11 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.

707.04 MEASUREMENT AND PAYMENT. 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 6 when construction requirements are met.

MEADOW ESTABLISHMENT		
TABLE 6 - PAYMENT SCHEDULE		
CONSTRUCTION REQUIREMENTS	PERCENT OF TOTAL CONTRACT PRICE	PAYMENT FOR COMPLETED WORK
707.03.01 thru .09	70	At Seeding Phase Acceptance
707.03.10	15	At Partial Establishment Phase Acceptance
707.03.10 and .11	15	At Final Acceptance
Total Payment	100%	

(b) **Forfeiture.** Failure to complete operations as required or directed in conformance with the Payment Schedule will result in forfeiture of that percentage of payment.

707.04.01 Wet Meadow Establishment. Wet Meadow Establishment, including grade repair, preparing soil, applying fertilizer, soil amendments, seed mixes, seed additives, mulching, securing mulch, 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 shall be incidental to the Contract unit price, and will not be measured or paid for.

707.04.02 Lowland Meadow Establishment. Lowland Meadow Establishment, including grade repair, preparing soil, applying fertilizer, soil amendments, seed mixes, seed additives, mulching, securing mulch, 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 shall be incidental to the Contract unit price, and will not be measured or paid for.

707.04.03 Upland Meadow Establishment. Upland Meadow Establishment, including grade repair, preparing soil, applying fertilizer, soil amendments, seed mixes, seed additives, mulching, securing mulch, 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 shall be incidental to the Contract unit price, and will not be measured or paid for.

707.04.04 Temporary Mulch will be measured and paid for at the Contract unit price.

CATEGORY 700
LANDSCAPING

SECTION 708 — TURFGRASS SOD ESTABLISHMENT

578 **DELETE**: Section 708 — Turfgrass Sod Establishment, in its entirety.

INSERT: The following.

SECTION 708 — TURFGRASS SOD ESTABLISHMENT

708.01 DESCRIPTION. Establish turfgrass sod on topsoil or other specified soil substrate to provide permanent vegetation groundcover. When it is not possible to perform Turfgrass Sod Establishment, refer to Section 704 and perform Temporary Mulch, or as directed. Performance of Turfgrass Sod Establishment as specified herein complies with all requirements of the Maryland Department of the Environment for permanent vegetation groundcover.

708.02 MATERIALS.

Limestone	920.02.01
Sulfur	920.02.02
Gypsum	920.02.04
Compost	920.02.05
Fertilizer	920.03.01
Turfgrass Sod	920.06.03
Fasteners	920.05.02
Water	920.09.01

708.03 CONSTRUCTION.

708.03.01 General.

(a) **Regions.** Refer to 705.03.01(a).

(b) **Installation Season and Species.** Perform operations when soil moisture and weather conditions are suitable. Cease operations when sod or soil is frozen, or conditions are unsuitable.

Tall Fescue Sod. Install in Region 1, Region 2, and Region 3 regions unless another species is specified, from August 15 to November 15, and from March 1 to May 31.

Zoysiagrass Sod. Install in specified areas of Region 2 and Region 3 from March 1 to June 15, and from August 1 to September 15.

Bermudagrass Sod. Install in specified areas of Region 3 from March 1 to June 15, and from August 1 to September 15.

(c) Nutrient Management Plan (NMP). Soil testing will be performed and a NMP will be developed by the Administration. Replace application rates of 708.03.04 as required by the NMP. When a NMP has not been developed, apply 200 lb. per acre of 20-16-12 (83% UF with MAP & SOP) fertilizer as the NMP rate for Turfgrass Sod Establishment.

(d) Nutrient Management Reporting. Record the fertilizer analysis, the square yards covered, and the pounds of fertilizer applied on the Nutrient Management Reporting Form. Submit the Form within 24 hours after applying fertilizer.

708.03.02 Grade Repair. 705.03.04.

708.03.03 Preparing Soil. 705.03.05.

708.03.04 Application Rates. Apply materials according to Table 1.

TURFGRASS SOD ESTABLISHMENT		
TABLE 1 - APPLICATION RATES ^{a, b, c, d}		
MATERIAL	LB PER SY	LB PER ACRE
SOIL AMENDMENTS per Nutrient Management Plan for topsoil or other specified soil substrate		
Compost	0 to 1.033	0 to 5000
Gypsum	0 to 0.455	0 to 2200
Limestone	0 to 0.930	0 to 4500
Sulfur	0 to 0.052	0 to 250
INITIAL FERTILIZER		
20-16-12 (83% UF with MAP & SOP)	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
REFERTILIZING		
20-16-12	0.027	200
Notes:		
<p>^a Apply compost, gypsum, limestone, sulfur, and initial fertilizer at rates specified in the NMP.</p> <p>^b For salvaged topsoil, the application rates will be included in the Contract documents. For furnished topsoil, the application rates will be developed for the approved source of supply.</p> <p>^c When no NMP has been developed, apply 200 lb per acre of 20-16-12 initial fertilizer, and do not apply any soil amendments. Apply refertilizing when specified in the Contract documents.</p> <p>^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.</p>		

708.03.05 Initial Fertilizer. Use spreaders, drills, or other approved machinery. Apply initial fertilizer after preparing soil, or after installing sod. Seeders shall be capable of uniformly placing fertilizer at the specified rate. Calibrate equipment before application. Apply materials accurately and uniformly to avoid misses and overlaps. Do not operate machinery during windy weather that may interfere with uniform application.

708.03.06 Transporting and Handling Sod. Transport and install turfgrass sod within 48 hours after harvest. Handle sod without excessive breaking, tearing, or loss of soil.

708.03.07 Placing Sod. Place sod neatly over the soil surface. Ensure that sod edges are tightly abutted. Do not overlap edges of sod, or leave gaps between strips of sod.

708.03.08 Securing. Install fasteners in locations where sod may be dislodged by water flow. Secure turfgrass sod to the soil of ditches and slopes with at least two fasteners per strip spaced no more than 2 ft apart. Drive the fasteners through the sod and firmly into the soil, so there is no gap at the top of the fastener.

708.03.09 Firming. Tamp or roll turfgrass sod after installation and securing sod to close press the sod firmly into the soil. Hand tampers shall weigh approximately 15 lb with a flat surface of approximately 100 in². Rollers shall weigh approximately 40 lb per ft of width.

708.03.10 Initial Watering. Gently apply water with a sprinkler or water-breaker nozzle over the surface of the sod. Do not allow water to cause erosion or to displace the sod. Perform the first watering within 4 hours after placing sod. Wet the soil to a depth at least 2 in. below the sod.

708.03.11 Installation Acceptance. Submit a request for Installation Phase Acceptance when operations are completed. Inspection will be conducted to verify completion. Installation Phase Acceptance will be granted at that time.

708.03.12 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 sod until Final Acceptance.

(b) **Required Maintenance.** Perform the following during the Establishment Phase.

Watering. Apply water to ensure survival of sod in good condition. Apply water with approved machinery. Do not allow water to cause erosion, or to displace the sod.

Reset Sod. When sod is not firmly fastened to the soil, repair the unsecured areas using fasteners as needed or as directed.

Sod Replacement. When sod does not meet acceptance standards, remove the unacceptable sod and install new sod as needed or as directed.

Mowing. Mow sod before it grows to a height of 12 in. when directed. Use approved machinery to cut to a height of 3 to 5 in.

(c) **Refertilizing.** Apply 20-16-12 fertilizer as specified in 708.03.04 at least 1 month after initial fertilizer was applied. Do not refertilize from November 15 thru March 1.

708.03.13 Final Acceptance. The Engineer and the Landscape Operations Division will complete an Inspection Report of sod height, color, and percent groundcover. 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 the turfgrass sod has grown at least 4 in. tall, exhibits dark green color, is firmly rooted into the soil, and is at least 99 percent groundcover.

708.04 MEASUREMENT AND PAYMENT. Turfgrass Sod 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 2 when construction requirements are met.

TURFGRASS SOD ESTABLISHMENT		
TABLE 2 - PAYMENT SCHEDULE		
CONSTRUCTION REQUIREMENTS	PERCENT OF TOTAL CONTRACT PRICE	PAYMENT FOR COMPLETED WORK
708.03.01 thru .11	80	At Installation Phase Acceptance
708.03.12 (a) and (b) and 705.03.13	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.

708.04.01 Turfgrass Sod Establishment, including grade repair, preparing soil, applying fertilizer at installation, soil amendments, sod, fasteners, watering, resetting sod, sod replacement, and mowing will be measured and paid for at the Contract unit price per square yard.

708.04.02 Zoysiagrass Sod Establishment, including grade repair, preparing soil, applying fertilizer at installation, soil amendments, sod, fasteners, watering, resetting sod, sod replacement, and mowing will be measured and paid for at the Contract unit price per square yard.

708.04.03 Bermudagrass Sod Establishment, including grade repair, preparing soil, applying fertilizer at installation, soil amendments, sod, fasteners, watering, resetting sod, sod replacement, and mowing will be measured and paid for at the Contract unit price per square yard.

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708.04.04 Refertilizing will be measured and paid for at the Contract unit price per square yard.

708.04.05 Temporary Mulch will be measured and paid for at the Contract unit price.

CATEGORY 700
LANDSCAPING

SECTION 709 — SOIL STABILIZATION MATTING

583 **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 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 soil stabilization matting 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.

Topsoil	920.01
Turfgrass Sod	920.04.06
Soil Stabilization Matting	920.05.01
Fasteners	920.05.02
Water	920.09.01

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 soil stabilization matting 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 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 conditions are unsuitable.

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 thru .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 an approved roller to ensure uniform soil surface and firmness. The roller shall weigh approximately 40 lb per ft of width.

Install SSM as specified in 709.03.03 thru .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 thru .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 thru .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 thru .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.
B	Check trenches; folds of matting perpendicular to water flow every 40-45 ft.
C	All edges.
C	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.
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 709.05.05 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, install the fastener type and length best suited to the installation conditions, or as directed.

SOIL STABILIZATION MATTING					
TABLE 2 - FASTENER SELECTION					
MATTING TYPE	FASTENER SHAPE	FASTENER LENGTH¹			
		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		X	X	X
Note: ¹ X = Denotes fasteners acceptable for the matting type.					

(b) Placement of Fasteners. Install fasteners at the specified distance apart as required for the matting type and the area of matting according to Table 3.

SOIL STABILIZATION MATTING		
TABLE 3 - FASTENER PLACEMENT		
AREA OF MATTING	MATTING TYPE	MAXIMUM DISTANCE BETWEEN FASTENERS In.
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	B ¹	12
Check Trenches in Folds Every 20-25 ft	C	12
Note: ¹ Do not install check trenches in Type B SSM installed over Type C SSM.		

709.03.07 Infilling Type C SSM. Infill the matting with approved topsoil to fill matting voids and to slightly cover the matting. 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.

Reseeding. When live seedling groundcover is not acceptable, perform overseeding in conformance with specifications for the pertinent vegetation as directed.

When Turfgrass Establishment or other seeded vegetation has not met acceptance standards, remove Type A, B, D, or E SSM to perform reseeding operations. Remove Type C matting when directed.

Prepare soil, reseed the specified vegetation, and apply water. Install new matting unless the original matting is approved for reuse.

Sod Replacement. When Turfgrass Sod Establishment does not meet acceptance standards, 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.

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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 specified items. The payment will be full compensation for all material, fasteners, 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 thru .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.

**CATEGORY 700
LANDSCAPING**

**SECTION 710 — TREE, SHRUB, AND PERENNIAL
INSTALLATION AND ESTABLISHMENT**

587 **DELETE:** Section 710 — Tree, Shrub, and Perennial Installation and Establishment in its entirety.

INSERT: The following.

**SECTION 710 — TREE, SHRUB, AND PERENNIAL
INSTALLATION AND ESTABLISHMENT**

710.01 DESCRIPTION. Install and establish trees, shrubs, perennials, vines, and grasses in topsoil or Bioretention Soil Mix. When it is not possible to perform this work, refer to Section 704 and perform Temporary Mulch, or as directed to provide temporary soil stabilization.

710.02 MATERIALS.

Furnished Subsoil	920.01.04
Limestone	920.02.01
Sulfur	920.02.02
Compost	920.02.05
Fertilizer	920.03
Shredded Hardwood Bark (SHB) Mulch	920.04.03
Plant Materials	920.07
Marking and Staking Materials	920.08
Water	920.09.01
Pesticides	920.09.03
Marking Dye	920.09.04
Spray Adjuvant and Wetting Agent	920.09.05

710.03 CONSTRUCTION.

710.03.01 General.

(a) **Planting Seasons.** Perform operations 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.

(b) **Modification Request.** Submit a written Modification Request to install plants of different species, cultivars, sizes, growth habits, or planting stock type. 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 afterwards.

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710 — TREE, SHRUB, AND PERENNIAL INSTALLATION & ESTABLISHMENT 2 of 13

(c) Pesticide Application. Apply pesticides in conformance with the Maryland Pesticide Applicator’s Law, OSHA and MOSH regulations, and the manufacturer’s label and Material Data Safety Sheets (MSDS).

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; (3-A) Ornamental Plant Exterior; (3-C) Turf; (5) Aquatic; (6) Right-of-Way and Weed.

Pesticides shall be 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, acreage treated, pesticide name and quantity applied on the Pesticide Application Reporting Form. Submit the Form within 24 hours after applying pesticide.

(e) Nutrient Management Plan (NMP). The specified application rates of 14-14-14 fertilizer will be the NMP unless the Administration develops a substitute NMP. Replace application rates of 710.03.04 and .05 as required by the NMP.

(f) Nutrient Management Reporting. Record the fertilizer analysis, the square yards covered, and the pounds of fertilizer applied on the Nutrient Management Reporting Form. Submit the Form within 24 hours after applying fertilizer.

(g) Plant Storage and Handling. Refer to 920.07.05.

710.03.02 Submittals and Inspection. Submit the following items.

(a) Breakdown List of Contract Prices. Refer to 710.04.01 and develop a Breakdown List of Contract Prices for each plant in the Contract. Include the cost of all installation and establishment operations in the per plant price.

Submit the written Breakdown List within 14 days after Award of Contract. The Breakdown List will be reviewed by the Engineer and Landscape Operations Division for completeness and balance, and will be approved or returned for correction.

(b) Installation Phase Schedule. Develop a Schedule with dates for completing operations related to 710.03.01 thru .15 according to Table 1.

TREE, SHRUB, AND PERENNIAL	
TABLE 1 - OPERATIONS IN INSTALLATION PHASE SCHEDULE	
1	Layout, utilities review and marking.
2	Undesirable vegetation removal and herbicide application.
3	Planting pit excavation, soil preparation, and plant installation.
4	Planting beds rototilling and soil preparation, applying shredded hardwood bark

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	(SHB) mulch, and plant installation.
5	Applying fertilizer solution after installation, and cleanup.

Submit the written Schedule at least 30 days before beginning landscape work. The Schedule will be reviewed by the Engineer and Landscape Operations Division for completeness and feasibility, and will be approved or returned for correction.

(c) Plant Material Inspection and Approval. The Inspection will be conducted by the Landscape Operations Division as specified in 920.07.03.

(d) Establishment Phase Schedule & IPM Program. Develop a Schedule with dates for completing 710.03.22. Include an Integrated Pest Management (IPM) Plan with methods of pest monitoring (weeds, diseases, insects, mammals, etc.), pesticide selection, application rates, and scheduling.

Submit the written Establishment Phase Schedule & IPM Program at the Installation Phase Inspection.

The Schedule will be reviewed by the Engineer and the Landscape Operations Division, and will be approved or returned for correction.

710.03.03 Utilities Marking, Layout, and Inspection. Refer to Section 875 when included in the Contract Documents.

(a) Utilities Marking. Contact ‘Miss Utility’ or another approved service to identify and mark utilities in the rights-of-way. Contact the District Utilities Engineer to mark utilities on Administration property.

(b) Conflicts. Notify the Administration of conflicts that may involve design changes. Conflicts will be reviewed by the Landscape Operations Division and resolved within 14 days after notice.

(c) Planting Layout. Provide the necessary materials and lay out the locations of planting pits and planting beds specified in the Contract Documents, or as adjusted by the Landscape Operations Division.

(d) Inspection. At least 7 days notice will be required to schedule each stage of a layout inspection in consultation with the Landscape Operations Division. Proceed with operations after layout approval.

710.03.04 Preparing Planting Pits. Perform the following operations when preparing planting pits for individual plants.

(a) Undesirable Vegetation. Manually remove undesirable vegetation or refer to 710.03.01(c) and 710.03.01(d) and apply non-selective herbicide in water with wetting agent and dye according to Table 2 at least 14 days before plant installation. Cut and

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710 — TREE, SHRUB, AND PERENNIAL INSTALLATION & ESTABLISHMENT 4 of 13

remove dead vegetation or debris that interferes with soil preparation, plant installation or future maintenance.

TREE, SHRUB, AND PERENNIAL	
TABLE 2 - NON-SELECTIVE HERBICIDE APPLICATION	
MATERIAL	RATE PER ACRE
Glyphosate Herbicide	5 lb of active ingredient
Marking Dye	6 to 15 oz
Water	40 to 50 gal

- (b) **Excavation.** Excavate planting pits to the depth required for the placement of root collars as specified in 710.03.09(c). Retain the excavated soil for preparation as backfill soil. Remove excess soil from the site, or spread as directed.

For Expanded Tree Pits (ETP), refer to the detail provided in the Contract documents. Excavate additional depth and width as shown in the detail, place furnished subsoil to the dimensions shown in the detail, and complete tree installation using Table 3. Remove excess soil from the site, or spread as directed.

- (c) **Planting Pit Diameter.** Use Table 3 to determine the diameter of the planting pit based upon the container or root ball diameter.

TREE, SHRUB, AND PERENNIAL					
TABLE 3 - PREPARING PLANTING PITS AND BACKFILL SOIL					
Container or Root Ball Diameter In.	ANSI Z60 Container Size	Planting Pit Diameter In.	Compost Ft.³	14-14-14 Fertilizer Oz.	Water per Event Gal.
3	#SP3	6	0.02	0.10	0.15
5	#SP4	10	0.02	0.12	0.2
6	#SP5 or #1	12	0.03	0.18	0.3
8	#2	17	0.09	0.30	0.5
10	#3	21	0.18	0.55	1.0
12	#5	24	0.28	0.75	1.5
14	#7	28	0.44	1.0	2.3
16	#10	32	0.65	1.3	3.5
18	#15	36	0.94	1.6	5.0
20	#20	40	1.27	2.0	6.8
24	#25	48	2.20	3.0	12
30	-	60	4.30	4.5	23
36	#45	72	7.40	6.5	40
42	#65	84	11.80	8.8	60
<p>Note:</p> <p>When water is applied over the surface of planting beds where most plants are less than 36 in. apart, apply water per plant in conformance with 'Water per Event', or apply at least 5 gallons of water per SY of planting bed.</p>					

- (d) **Compost and Fertilizer.** Use Table 3 to determine the quantity of compost and 14-14-14 fertilizer to mix into backfill soil, based upon planting pit diameter. Uniformly mix compost and fertilizer into the backfill soil.

Use a scale with 0.01 oz or gram accuracy to calibrate measures and verify application rates of 14-14-14 fertilizer when directed.

- (e) **Water.** Use Table 3 to determine the quantity of water to apply for each installed plant based upon planting pit diameter.

710.03.05 Preparing Planting Beds. Perform the following operations when preparing planting beds.

- (a) **Undesirable Vegetation.** Remove undesirable vegetation as specified in 710.03.04(a). Cut or mow dead vegetation to a height of 1 in. and remove the debris.

(b) Compost and Rototilling.

- (1) **Areas Flatter than 4:1.** Apply 2 in layer of compost over the soil surface of the planting bed. Rototill to a depth of 6 in. to thoroughly mix compost and any materials specified in the NMP. Do not apply compost or rototill Bioretention Soil Mix (BSM) unless specified otherwise.

- (2) **Slopes 4:1 and Steeper.** Do not rototill.

- (c) **Fertilizer.** Mix 14-14-14 fertilizer into the backfill soil of each planting pit within the bed according to Table 3.

- (d) **Debris Removal.** Remove debris, stones, and soil clods with a length or width greater than 2 in. that are uncovered during rototilling.

- (e) **Leveling.** Level the soil surface after rototilling, and leave it in a condition ready for shredded hardwood bark (SHB) mulching and plant installation.

710.03.06 Plant Acclimation. Ensure that container grown plants are acclimated to prevailing weather conditions before installing. Install bare root plants while dormant when soil and air temperatures are above freezing.

710.03.07 Plant Care. Begin plant care at the time each plant is installed, and continue until Installation Phase Acceptance is granted.

710.03.08 Pruning. Remove dead branches, damaged branches, water sprouts, and other undesirable growth manually with pruners. Preserve the natural appearance of trees and shrubs. Remove branches or portions of branches over sidewalks to ensure 8 ft clearance for pedestrians.

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710.03.09 Installing. Install plants vertically in planting pits and beds prepared as specified in 710.03.04 and .05, and as follows.

- (a) **Removing Containers, Burlap, Wire Baskets.** Remove containers. Remove twine, burlap or other fabric from the tops of root balls to a depth at least 6 in. below the surface of the backfilled planting pit. Cut and remove the tops of wire baskets from the upper half of the rootball. Discard containers and any removed twine, wire, burlap or other fabric.
- (b) **Preparing Roots.** Carefully remove the containers of container grown plants, and loosen the soil mass to eliminate girdling roots.

Spread the roots of bare root plants in a natural position, and firmly press backfill soil around the roots.

- (c) **Placing Root Collar.** Place the root collar of plants at or above the average soil surface grade outside the planting pit according to Table 4.

TREE, SHRUB, AND PERENNIAL	
TABLE 4- ROOT COLLAR PLACEMENT	
SOIL CONDITIONS	HEIGHT OF ROOT COLLAR
Normal, Well Drained	Place collar at same level to 1 in. above average surface grade.
Compacted	Place collar at 1 to 2 in. above average surface grade.
Poorly Drained or Wet	Place collar as needed to ensure 25% of root mass is above average surface grade.

- (d) **Backfilling.** Remove clods, stones and other foreign material with a length or width greater than 2 in. from soil used for backfilling.

Place backfill soil that has been mixed with compost and fertilizer as specified in 710.03.04 and .05 under and around roots to stabilize plants in upright position and restore the grade. Lightly firm and compact backfill soil to reduce air pockets.

710.03.10 Soil Berming. Form a 4 in. high berm of backfill soil around planting pits and planting beds as follows.

- (a) **Planting Pits.** On areas flatter than 4:1, form the berm around the entire planting pit. On slopes 4:1 and steeper, take soil from the upslope rim of the pit and place it on the downslope rim to form the berm.
- (b) **Planting Beds.** On slopes 4:1 and steeper, form the berm as a shoulder at the lower edge of the bed. Berm individual trees and shrubs installed within beds on slopes 4:1 and steeper as described in (a) above.

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710.03.11 Edging. Cut edging at a steep angle into the mulched area to a 3 in. depth into the soil. On slopes 4:1 and steeper, cut edging outside of the bermed area on the lower edge of berm. Remove and discard excess soil.

- (a) **Planting Pits.** Edge entirely around all planting pits except planting pits within planting beds.
- (b) **Planting Beds.** Smoothly cut edging around all planting beds to the shapes specified.

710.03.12 Staking and Guying. Stake and guy trees the same day they are installed.

- (a) **Installation.** When two or three stakes are specified for trees, install two stakes parallel to the direction of traffic, or as directed. Drive stakes vertically to a depth of 10 in. below the bottom of the pit, and 5 to 8 in. away from roots according to Table 5.

TREE, SHRUB, AND PERENNIAL				
TABLE 5 - STAKING AND GUYING				
TREE TYPE	CALIPER In.	HEIGHT Ft	SUPPORT	
			No. of Stakes	Length, ft
Shade	Under 1	6 and 8	2	6
	1 to 2	—	2	8
	2-1/2 to 3-1/2	—	3	10
	4 and over	—	—	3 guy wires attached to tree anchors
Flowering	3/4 to 2-1/2	—	2	5-8
	3 and over	—	—	3 guy wires attached to tree anchors
Evergreen	—	5 and 6	2	5-6
	—	7, 8 and 9	3	7-8
	—	10 and over	—	3 guy wires attached to tree anchors

- (b) **Maintenance.** Promptly straighten trees that become crooked after installation. Repair or replace stakes, guys, and other support materials as needed.

710.03.13 Mulching. Spread SHB mulch uniformly over the soil surface to a 3 in. depth. Promptly repair damage caused by washouts or construction activities.

- (a) **Planting Pits.** Spread SHB mulch the same day that plants are installed. Mulch around the base of each plant to cover the soil of the planting pit to its outside edge, including the soil berm. Do not allow mulch to touch the bark or main stem of the plant.

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- (b) **Planting Beds.** SHB mulch may be spread before or after installing plants. Spread mulch over the entire bed and rake it to an even surface, including berms and shoulders. Ensure that mulch does not cover plants.

For rototilled beds, spread mulch the same day after rototilling. For non-rototilled beds., spread mulch within 3 days after plant installation. When installation is completed, ensure that mulch uniformly covers the soil to a uniform 3 in. depth.

710.03.14 Watering after Installation.

- (a) **Application Equipment.** Watering equipment shall consist of sprinklers or hoses equipped with water breaker nozzles so the materials are applied with care to prevent damage to plants and minimize disturbance to SHB mulch.

For planting pits, refer to Table 4 and apply the required quantity of water to each plant.

For planting beds, apply water to the entire bed area to wet the soil to a depth of 3 in.

- (b) **Follow-Up Watering.** Monitor and apply water during the Installation Phase to supply plant needs.

710.03.15 Cleanup. Remove growers tape, plant stakes, pot markers, field tags, and similar materials at the time of installation. Ensure that the Administration's Material Inspection Approval Seals and plant tags remain on trees and shrubs until the end of the Establishment Phase.

Keep turfgrass areas, paved surfaces, and sidewalks clean. Promptly remove excess and waste materials. Take precautions to avoid damage to existing structures, plants, and turfgrass. Repair damage caused to surrounding areas during installation, and fill ruts and reestablish turfgrass as necessary.

710.03.16 Relocating Plants. Begin plant relocation operations within 7 days after notice to relocate, and continue until work is completed. Remove plants installed in undesirable locations as directed by the Engineer, and reinstall these plants as specified in herein.

710.03.17 Abandoned Planting Pits. Backfill abandoned planting pits when directed with excavated soil or approved backfill. Compact the backfill in 8 in. layers to the finished grade. Establish turfgrass as specified in Section 705.

710.03.18 Unacceptable Plants and Replacement Plants. Promptly remove and replace plants that are unacceptable at any time during the Installation Phase as specified in 920.07, or when requested.

Plants that are determined to be missing, dead, dying, damaged, diseased, deformed, underdeveloped, damaged by pesticides, or not true to species, cultivar, size or quality shall be replaced.

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Refer to GP-5.09 regarding removal of defective work and materials, and GP-7.16 regarding Contractor responsibility for work, theft, damage, and loss.

(a) **Criteria.** The criteria of Table 6 will be used to identify unacceptable plants.

TREE, SHRUB, AND PERENNIAL			
TABLE 6 - CRITERIA FOR UNACCEPTABLE PLANTS			
Item	Plant Type	Condition	Unacceptable
1	Tree, Shrub, Vine, Perennial Grass	Dead or Missing	Any dead or missing plant, any cause.
2	Tree, Shrub, Vine, Perennial Grass	Defoliation	More than 25% of leaf area dead, lost or dropped.
3	Tree, Shrub, Vine	Bark Wound	More than 15% of bark circumference or 2 in. length.
4	Shrub or Vine	Height Die-back	More than 25% of the shrub or vine height.
5	Tree	Leader Die-back	More than 10% of tree height.
6	Tree	Branch Die-back	More than 6 in. on 75% of branches.

(b) **Replacement Plants.** Replacement plants shall be true to species, cultivar, size, and quality as specified in the Contract Documents unless a Substitution Request is approved.

Install replacement plants as soon as feasible during the current Planting Season, or if between Planting Seasons, during the next Planting Season. Promptly submit a Modification Request as specified in 710.03.01(b) when it is not possible to obtain plants that meet specifications.

Replacement plants shall meet the specifications of 920.07, and be installed and established as specified in Section 710 for 12 months, until Final Acceptance.

710.03.19 Installation Phase Inspection. Submit a request for Installation Phase Inspection when operations are completed, and provide the Establishment Phase Schedule as specified in 710.03.02(d).

The Installation Phase Inspection will be scheduled by the Engineer at the project with the Contractor and the Landscape Operations Division to verify completion. At least 14 days notice will be provided before the scheduled Inspection so that it may be completed in the company of the Contractor.

710.03.20 Installation Phase Punch List. The Engineer in consultation with the Contractor and the Landscape Operations Division will develop the Installation Phase Punch List and list of plants to be replaced. Complete the Punch List requirements and replace plants as required.

710.03.21 Installation Phase Acceptance. Re-inspection will be performed as needed. Installation Phase Acceptance will be granted when the Punch List and all Installation Phase requirements are completed according to Table 7.

TREE, SHRUB, AND PERENNIAL		
TABLE 7 - REQUIREMENTS FOR INSTALLATION PHASE ACCEPTANCE		
Item	Requirement	Section
a	Submittals are accepted and Inspections are completed.	710.03.01(b), 710.03.02, 920.07
b	Damaging pests are controlled.	710.03.02(c)
c	Layouts are inspected and approved.	710.03.03
d	Fertilizer and compost is mixed soil, as required.	710.03.04 and 710.03.05
e	Planting pits and planting beds are weed free.	710.03.04(a) and 710.03.05(a)
f	Trees and shrubs are pruned.	710.03.08
g	Trees are installed vertically and straightened.	710.03.09
h	Planting pits and beds are bermed and edged.	710.03.10 and 710.03.11
i	Staking and guying are repaired or replaced.	710.03.12
j	SHB mulch is uniformly spread to the specified depth.	710.03.13
k	Washouts in planting pits and beds are repaired.	710.03.13
l	Plants receive initial watering and follow up watering.	710.03.04 and 710.03.14
m	Clean up is completed, plant tags and ribbons are removed.	710.03.15
n	Plants are relocated to approved locations.	710.03.16
o	Abandoned planting pits are filled and seeded.	710.03.17
p	Unacceptable plants are replaced.	710.03.18
q	Damage repairs and Installation Phase Punch List is completed.	710.03.20
r	Pesticide Application and Nutrient Management Reporting Forms are completed.	710.03.01(d) and (f)
s	Plants are properly installed, are none are unacceptable or require replacement.	710.03.01 thru .18
t	Establishment Phase Schedule & IPM Program is accepted.	710.03.02 (e) and 710.03.21

710.03.22 Establishment Phase. The Establishment Phase begins upon Installation Phase Acceptance. Maintain plants and provide care and replacement as specified in 710.03.01 thru 0.21, and as follows

- (a) **Period of Maintenance.** Maintain plants for 12 months after installation, until Final Acceptance.
- (b) **Plant Watering.** Monitor the soil moisture and water needs of plants. Promptly apply water as specified in 710.03.14 to planting pits and planting beds as needed, or as directed.
- (c) **Pest Management.** Monitor and promptly control weeds, insects and other pests in conformance with the IPM Program, or when requested. Control weeds in mulched areas in preparation for inspection. Remove dead weeds taller than 6 in. Refer to 710.03.01(d) and complete the Pesticide Application Reporting Form.
- (d) **Unacceptable Plants and Replacement Plants.** Refer to 710.03.18. Promptly remove and replace plants that have become unacceptable during the Establishment Phase as needed or as directed.

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- (e) **End-of-Season Foliage Removal.** For perennials, remove the aboveground parts that have declined during the months of November and December, or as directed. For grasses, remove the aboveground parts that have declined and in February or March, or as directed.
- (f) **Refertilizing.** Dissolve 40 lb of 20-20-20 water soluble fertilizer in 1000 gal water. Refer to 710.03.14 regarding application equipment. Apply fertilizer solution in the final 60 days of the Establishment Phase.

For planting pits, refer to Table 3 and apply gallons of fertilizer solution to each installed plant based upon the planting pit diameter and water per event gal.

For planting beds, apply 0.21 gal of fertilizer solution per SY of planting bed. Apply fertilizer solution to the entire bed area.

- (g) **Removing Supports and Seals.** Remove tree supports, hoses wires, guys and Material Inspection Approval Seals in the final 30 days of the Establishment Phase. Pull stakes from the soil or cut them to ground level.
- (h) **Partial Establishment Phase Inspection.** The Project Engineer will inspect plant establishment 6 months after Installation Phase Acceptance according to Table 8. The Inspection Report will include actions to perform before Partial Establishment Phase Acceptance is granted. Perform repairs, replacements, and other work as specified in the Contract Documents and Inspection Report.

710.03.23 Establishment Phase and Final Acceptance. The Engineer and the Landscape Operations Division will complete an Inspection Report 12 months after Installation Phase Acceptance. When it is not possible to perform the Inspection, Final Acceptance will be delayed until Inspection is possible.

Final Acceptance will be granted when the requirements of Table 8 are satisfactorily completed. The Inspection Report will be included in the Punch List requirements for the project. Complete the Punch List requirements as directed.

TREE, SHRUB, AND PERENNIAL		
TABLE 8 - REQUIREMENTS FOR ESTABLISHMENT PHASE AND FINAL ACCEPTANCE		
Item	Requirement	Section
1	Water sprouts are manually pruned and removed.	710.03.08
2	Trees are straightened.	710.03.09
3	Staking and guying are repaired or replaced.	710.03.12
4	Washouts in planting pits and beds are repaired.	710.03.13
5	Plants are relocated to approved locations.	710.03.16
6	Abandoned planting pits are filled and seeded.	710.03.17
7	Plants are successfully established.	710.03.22(a) and (b)

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8	Damaging pests are controlled.	710.03.22(c)
9	Planting pits and planting beds are weed free.	710.03.22(c)
10	Unacceptable plants are replaced.	710.03.22(d)
11	Annual foliage dieback of perennials and grasses is cut and removed.	710.03.22(e)
12	Plants are refertilized.	710.03.22(f)
13	Pesticide Application and Nutrient Management Reporting Forms are completed.	710.03.01(d) and (f)
14	Staking, guying, and Material Inspection Seals are removed.	710.03.22(g)
15	Damage repairs and Establishment Punch List are completed.	710.03.22(h)

710.04 MEASUREMENT AND PAYMENT. Tree, Shrub, and Perennial Installation and 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 plants, material, labor, equipment, tools, disposal fees and incidentals necessary to complete the work.

710.04.01 Tree, Shrub, and Perennial Installation and Establishment. Tree, Shrub, and Perennial Installation and Establishment shall include the cost of trees, shrubs, perennials, vines, and grasses, layout, marking, pruning, planting pit excavation and disposal of excavated soil, fertilizer, compost, backfilling, staking, guying, berming, edging, watering, pest management, plant maintenance, refertilizing, and all operations related to the Installation and Establishment Phases of each plant, until Final Acceptance.

Tree, Shrub, and Perennial Installation and Establishment will be paid according to Table 9 based upon the approved Breakdown List of Contract Prices. Refer to 710.03.02(a). In the event of change in the quantities required, payment adjustments will be based on the approved Breakdown List of Contract Prices.

(a) Payment Schedule. Payments will be made according to Table 9 when construction requirements are met.

TREE, SHRUB, AND PERENNIAL			
TABLE 9 - PAYMENT SCHEDULE			
CONSTRUCTION REQUIREMENTS		PERCENT OF TOTAL CONTRACT PRICE	PAYMENT FOR COMPLETED WORK
710.03.01 thru .21	Installation Phase	70	At Installation Phase Acceptance
710.03.22(a) thru (e)	Establishment Phase	15	At Partial Establishment Phase Acceptance
710.03.22(a) thru (h) and 710.03.23	Establishment Phase and Final Acceptance	15	At Final Acceptance
Total Payment		100%	

(b) Forfeiture. Failure to complete operations as required or directed in conformance with the Payment Schedule will result in forfeiture of that percentage of payment based upon the Breakdown List of Contract Prices.

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710 — TREE, SHRUB, AND PERENNIAL INSTALLATION & ESTABLISHMENT 13 of 13

710.04.02 Constructing Planting Beds. Constructing Planting Beds will be measured and paid for at the Contract unit price per square yard. The price shall include the cost of layout, marking, fertilizer, soil amendments, rototilling, berming, edging, applying 3 in. of SHB mulch, refertilizing, and all operations related to construction of the planting bed.

Mulching individual planting pits of trees, shrubs, perennials, vines, and grasses within planting beds will not be measured but the cost will be incidental to 710.04.02.

710.04.03 Expanded Tree Pit. Expanded Tree Pit will be measured and paid for at the Contract unit price per each. The price shall include the cost of excavation to the specified dimensions, furnished subsoil, disposal of excavated soil, and all operations related to construction of the expanded tree pit.

710.04.04 Temporary Mulch will be measured and paid for at the Contract unit price.

CATEGORY 700
LANDSCAPING

SECTION 712 — TREE BRANCH PRUNING

610 **DELETE:** Section 712 — Tree Branch Pruning, in its entirety.

INSERT: The following.

SECTION 712 — TREE BRANCH PRUNING

712.01 DESCRIPTION. Prune tree branches as indicated in the SP 700 Tree Preservation Program, or in the plans. Perform Tree Branch Pruning within a Tree Preservation Area per Section 120 when specified, but do not perform these operations within areas of Clearing and Grubbing.

712.02 MATERIALS. Not applicable.

712.03 CONSTRUCTION.

712.03.01 General.

- (a) **Permits.** Obtain a Roadside Tree Permit from the Maryland Department of Natural Resources - Forest Service.
- (b) **Tree Preservation Program (TPP).** Conform to the requirements of the TPP when developed by the Administration.
- (c) **Schedule.** Perform operations when weather conditions are suitable. Cease operations when conditions are unsuitable.

712.03.02 Breakdown List of Contract Prices. Refer to 712.04 and develop a Breakdown List of Contract Prices for each tree or group of trees in the Contract. Include costs for pruning and completing all operations per tree or group of trees.

Submit the written Breakdown List within 14 days after Notice of Award. The Breakdown List will be reviewed by the Engineer and Landscape Operations Division for completeness and balance, and will be approved or returned for correction.

712.03.03 Maryland Licensed Tree Expert (LTE). A LTE shall perform or directly supervise the Operations in conformance with the Maryland Roadside Tree Law, the Forest Conservation Act, and accepted arboricultural practices.

712.03.04 Meetings. Meet with the Engineer, the LTE, and the LOD to review areas, Operations, and the approved Breakdown List of Contract Prices before beginning Operations.

712.03.05 Marking. Identify trees to be pruned, and obtain approval before beginning Operations.

712.03.06 Equipment. Equipment and tools shall conform to accepted arboricultural practices.

712.03.07 Notice. Notify the Engineer at least 10 days before beginning Operations.

712.03.08 Operations. The Contract Documents will indicate the trees to be pruned or the dimensions or goals to be achieved by pruning. Meet ANSI A300 standards for Tree Care Operations in conformance with one or more of the following Operations, or as specified.

- (a) **Cleaning.** To remove dead, diseased, and broken branches.
- (b) **Thinning.** To reduce the density of live branches; or to remove crossed branches or a codominant leader.
- (c) **Raising.** To provide vertical clearance to a height of 15 ft, or as specified in the Contract Documents.
- (d) **Reducing.** To decrease the height or spread.
- (e) **Specialty Pruning.** To meet the needs of young trees, at planting, once established, pollarding, for restoration, to maintain vistas, or to accommodate utilities.

712.03.09 Wood Chipping. Dispose of wood, or chip wood and disperse chips to a depth of 1 in. as directed.

712.03.10 Cleanup and Restoration. Avoid damage to existing structures, plants, and turfgrass. Keep turfgrass areas, paved surfaces and sidewalks clean. Restore ruts and damaged turfgrass areas by seeding in conformance with Section 705, or perform Turfgrass Sod Establishment in conformance with Section 708 when directed, before beginning any other landscape operations.

712.03.11 Damage Repair. Do not injure vegetation to be preserved. Repair injuries to bark, trunks, or limbs by cutting, smoothing, and tracing the bark in accordance with ANSI A300 Standards for Tree Care Operations.

712.03.12 Damage Compensation. Monetary compensation for damage or loss of trees will be calculated and assessed in conformance with the Guide for Plant Appraisal of the Council of Tree & Landscape Appraisers.

712.04 MEASUREMENT AND PAYMENT. Tree Branch Pruning will not be measured, but will be paid for at the Contract lump sum price based upon the Breakdown List of Contract Prices. The payment will be full compensation for all labor, material, equipment, tools, wood chipping, cleanup and restoration, damage repair, disposal fees and incidentals necessary to complete the work. If the Administration requests a change, the units and payment will be adjusted on the basis of the approved Breakdown List of Contract Prices.

CATEGORY 700
LANDSCAPING

SECTION 715 — TREE ROOT PRUNING

617 **DELETE:** Section 715 — Tree Root Pruning, in its entirety.

INSERT: The following.

SECTION 715 — TREE ROOT PRUNING

715.01 DESCRIPTION. Prune tree roots as indicated in the SP 700 Tree Preservation Program, or in the plans. Perform Tree Root Pruning within a Tree Preservation Area per Section 120 when specified.

715.02 MATERIALS.

Salvaged Topsoil	920.01.01
Furnished Topsoil	920.01.02

715.03 CONSTRUCTION.

715.03.01 General.

- (a) **Permits.** Obtain a Roadside Tree Permit from the Maryland Department of Natural Resources - Forest Service.
- (b) **Tree Preservation Program (TPP).** Adhere to the requirements of the TPP when developed by the Administration.
- (c) **Schedule.** Perform operations when soil moisture and weather conditions are suitable. Cease operations when conditions are not suitable.

715.03.02 Maryland Licensed Tree Expert (LTE). A LTE shall perform or directly supervise the Operations in conformance with the Maryland Roadside Tree Law, the Forest Conservation Act, and accepted arboricultural practices.

715.03.03 Meetings. Meet with the Engineer, the LTE, and the Landscape Operations Division before beginning Operations.

715.03.04 Utilities Marking and Conflicts. Refer to Section 875 when included in the Contract Documents.

- (a) **Utilities Marking.** Contact 'Miss Utility' or another approved service to identify and mark utilities in the rights-of-way. Contact the District Utilities Engineer to mark utilities on Administration property.

(b) Conflicts. Notify the Administration of conflicts that may affect operations. Conflicts will be reviewed by the Landscape Operations Division and resolved within 14 days after notice.

715.03.05 Marking. Mark areas to be root pruned, and obtain approval before beginning Operations.

715.03.06 Equipment. Use a vibratory knife or other equipment and tools that conform to accepted arboricultural practices.

715.03.07 Notice. Notify the Engineer at least 10 days before beginning Operations.

715.03.08 Operations. Meet ANSI A300 standards for Tree Care Operations. Cleanly cut tree roots to a depth of 24 in. along the approved line, and immediately backfill trenches with excavated soil.

715.03.09 Cleanup and Restoration. Avoid damage to existing structures, plants, and turfgrass. Keep turfgrass areas, paved surfaces and sidewalks clean. Promptly remove, disperse, or dispose of wood debris and other waste materials as directed. Restore areas of root pruning, ruts and damaged turfgrass areas by seeding in conformance with Section 705, or perform Turfgrass Sod Establishment in conformance with Section 708 when directed, before beginning other landscape operations.

715.03.10 Damage Repair. Do not injure vegetation to be preserved. Repair injuries to bark, trunks, or limbs by cutting, smoothing, and tracing the bark in accordance with ANSI A300 Standards for Tree Care Operations.

715.03.11 Damage Compensation. Monetary compensation for damage or loss of trees will be calculated and assessed in conformance with the Guide for Plant Appraisal of the Council of Tree & Landscape Appraisers.

715.04 MEASUREMENT AND PAYMENT. Tree Root Pruning will be measured and paid for at the Contract unit price per linear foot. The payment will be full compensation for all labor, material, equipment, tools, cleanup and restoration, damage repair, disposal fees and incidentals necessary to complete the work.

CATEGORY 700
LANDSCAPING

SECTION 716 — TREE FERTILIZING

617 **DELETE:** Section 716 — Tree Fertilizing, in its entirety

INSERT: The following.

SECTION 716 — TREE FERTILIZING

715.01 DESCRIPTION. Fertilize trees as indicated in the SP 700 Tree Preservation Program, or in the plans. Perform Tree Fertilizing within a Tree Preservation Area per Section 120 when specified.

716.02 MATERIALS.

Fertilizer	920.03.01, and as specified in the TPP.
Water	920.09.01

716.03 CONSTRUCTION.

716.03.01 General.

- (a) **Permits.** Obtain a Roadside Tree Permit from the Maryland Department of Natural Resources - Forest Service.
- (b) **Tree Preservation Program (TPP).** Conform to the requirements of the TPP when developed by the Administration.
- (c) **Schedule.** Perform operations when soil moisture and weather conditions are suitable. Cease operations when conditions are unsuitable.
- (d) **Nutrient Management Plan (NMP).** The fertilizer application rates of this Section will be the NMP for Tree Fertilizing unless other rates are specified in the TPP.
- (e) **Nutrient Management Reporting.** Record the fertilizer analysis, the square yards covered, and the pounds of fertilizer applied on the Nutrient Management Reporting Form. Submit the Form within 24 hours after applying fertilizer.

716.03.02 Maryland Licensed Tree Expert (LTE). A LTE shall perform or directly supervise the Operations in conformance with the Maryland Roadside Tree Law, the Forest Conservation Act, and accepted arboricultural practices.

716.03.03 Meetings. Meet with the Engineer, the LTE, and the Landscape Operations Division before beginning Operations.

716.03.04 Marking. Identify trees to be fertilized, and obtain approval before beginning Operations.

716.03.05 Equipment. Equipment and tools shall conform to accepted arboricultural practices.

716.03.06 Notice. Notify the Engineer at least 10 days before beginning Operations.

716.03.07 Operations. Meet ANSI A300 standards for Tree Care Operations. One or more of the following Operations will be specified.

- (a) **Operation 1 - Injection Fertilizing.** Dissolve 200 lb of 20-20-20 water soluble fertilizer in 1000 gal of water, or as specified in the TPP.

Uniformly inject fertilizer solution through a pressurized probe at points 2 to 3 ft apart, to a depth of 8 to 10 in. below the soil surface, under the dripline of the tree, or at the spacing and depth specified in the TPP.

Inject fertilizer solution at the rate of 1000 gal of solution per acre, or 0.21 gal of solution per SY, or at the application rate specified in the TPP.

- (b) **Operation 2 - Drill Fertilizing.** Drill 1 to 3 in. diameter holes, at points 2 to 3 ft apart, to a depth of 8 to 10 in., or as specified in the TPP.

Uniformly apply 200 lb per acre of 20-16-12 (83% UF with MAP & SOP) into drilled holes, or at the rate specified in the TPP.

- (c) **Operation 3 - Broadcast Fertilizing.** Uniformly apply 200 lb per acre of 20-16-12 (83% UF with MAP & SOP) fertilizer over the soil surface under the dripline of the tree using approved fertilizer spreader machinery, or at the fertilizer application rate and locations specified in the TPP.

716.03.08 Cleanup and Restoration. Avoid damage to existing structures, plants, and turfgrass. Keep turfgrass areas, paved surfaces, and sidewalks clean. Restore ruts and damaged turfgrass areas by seeding in conformance with Section 705, or perform Turfgrass Sod Establishment in conformance with Section 708 when directed, before beginning other landscape operations.

716.03.09 Damage Repair. Do not injure vegetation to be preserved. Repair injuries to bark, trunks, or limbs by cutting, smoothing, and tracing the bark in accordance with ANSI A300 Standards for Tree Care Operations.

716.03.10 Damage Compensation. Monetary compensation for damage or loss of trees will be calculated and assessed in conformance with the Guide for Plant Appraisal of the Council of Tree & Landscape Appraisers.

SPECIAL PROVISIONS
716 — TREE FERTILIZING

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716.04 MEASUREMENT AND PAYMENT. Tree fertilizing 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 labor, fertilizer, water, material, equipment, tools, cleanup and restoration, damage repair, disposal fees and incidentals necessary to complete the work.

716.04.01 Tree Injection Fertilizing per square yard.

716.04.02 Tree Drill Fertilizing per square yard.

716.04.03 Tree Broadcast Fertilizing per square yard.

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, 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 of 100 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:

SPECIAL PROVISIONS
IP BASED VIDEO TRAFFIC DETECTION CAMERAS

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- (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.

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, 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

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 not be measured but the cost will be incidental to the installation of the proposed lighting system, including, but not limited to, duct cable, conduit, manholes, and foundations. Work will include all manholes, cable, conduit, connector kits, wood poles, luminaires, lighting arms, labor and incidentals needed to complete the work.

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MAST ARMS AND MAST ARM POLES – SINGLE, TWIN AND TRIPLE

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**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.

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MAST ARMS AND MAST ARM POLES – SINGLE, TWIN AND TRIPLE

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- (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

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- 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

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MAST ARMS AND MAST ARM POLES – SINGLE, TWIN AND TRIPLE

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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.

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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 typical.
- (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.

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Tag Details.

Single Mast Arm Pole

Mfg:	<u> [1] </u>	Contract. #:	<u> [2] </u>
Pole Height:	<u> [3] </u>		
Arm Sizes:	<u> [4] </u>		
Anchor Bolts:	<u> [5] </u>	Bolt Circle:	<u> [8] </u>
Flange Bolts:	<u> [7] </u>		

One Piece Mast Arm

Mfg:	<u> [1] </u>	Contract #:	<u> [2] </u>
Arm Length:	<u> [6] </u>		
Flange Bolts:	<u> [7] </u>		

Two or three Piece Mast Arm - Butt Section

Mfg:	<u> [1] </u>	Contract #:	<u> [2] </u>
Butt For Arms:	<u> [4] </u>		
Flange Bolts:	<u> [7] </u>		
Connection Bolt:	<u> [9] </u>		

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**Two or three Piece Mast Arm –
Extension Section**

Mfg:	<u>[1]</u>	Contract #:	<u>[2]</u>
Extension Arm:	<u>[6]</u>		
Connection Bolt:	<u>[9]</u>		

**Twin Mast Arm Pole
(Identical Size Flange Plates)**

Mfg:	<u>[1]</u>	Contract #:	<u>[2]</u>
Pole Height:	<u>[3]</u>		
Arm Sizes:	<u>[4]</u>		
Anchor Bolts:	<u>[5]</u>	Bolt Circle:	<u>[8]</u>
Flange Bolts:	<u>[7]</u>		

SPECIAL PROVISIONS

MAST ARMS AND MAST ARM POLES – SINGLE, TWIN AND TRIPLE

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**Twin Mast Arm Pole
(Different Size Flange Plates)**

Mfg:	<u>[1]</u>	Contract #:	<u>[2]</u>
Pole Height:	<u>[3]</u>		
Left Arm Sizes:	<u>[4]</u>		
Right Arm Sizes:	<u>[4]</u>		
Anchor Bolts:	<u>[5]</u>	Bolt Circle:	<u>[8]</u>
Left Arm Flange Bolts:	<u>[7]</u>		
Right Arm Flange Bolts:	<u>[7]</u>		
Pole Type	<u>[10]</u>		

**Triple Mast Arm Pole
(Different Size Flange Plates)**

Mfg:	<u>[1]</u>	Contract #:	<u>[2]</u>
Pole Height:	<u>[3]</u>		
Left Arm Sizes:	<u>[4]</u>		
Center Arm Sizes:	<u>[4]</u>		
Right Arm Sizes:	<u>[4]</u>		
Anchor Bolts:	<u>[5]</u>	Bolt Circle:	<u>[8]</u>
Left Arm Flange Bolts:	<u>[7]</u>		
Center Arm Flange Bolts:	<u>[7]</u>		
Right Arm Flange Bolts:	<u>[7]</u>		

Tag Reference.

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[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 Orientation¹.

<u>Pole Gauge Size</u>	<u>Indicate</u>
7 GA	38'
3 GA	50'
0 GA	60' or 70'

[5] Anchor Bolts.

<u>Pole Gauge Size</u>	<u>Indicate</u>
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.

<u>Constructed Extension for arm length</u>	<u>Indicate</u>
50'	50'
60'	60'-70'
70'	70'

[7] Flange Bolt Size².

¹For 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.

²For twin mast arm poles with identical size flange plates, indicate **L & R** preceding the 1-½" x 5" & washer

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<u>Pole Gauge Size</u>	<u>Indicate</u>
7 GA	1- $\frac{1}{4}$ " x 4" & washer
3 GA	1- $\frac{1}{2}$ " x 5" & washer
0 GA	1- $\frac{1}{4}$ " x 6- $\frac{1}{2}$ " & 2 flat washers & lock washer

[8] Bolt Circle

<u>Pole Gauge Size</u>	<u>Indicate</u>
7 GA	16" Dia.
3 GA	18" Dia.
0 GA	22" Dia.

[9] Connection Bolt Size

<u>Two or three Piece Arm Size</u>	<u>Indicate³</u>
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- $\frac{1}{2}$ " x 5" & washer or 1- $\frac{1}{4}$ " x 6- $\frac{1}{2}$ " & 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- $\frac{1}{2}$ " x 5" & washer, 1- $\frac{1}{4}$ " x 6- $\frac{1}{2}$ " & 2 flat washers & lock washer or 1- $\frac{1}{4}$ " 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.

³Length to be determined by the successful bidder.

**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 earth's 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 millioerstad ($H_{DC}=200$ 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

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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 μ H to 80 μ H. 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.

SPECIAL PROVISIONS

NON INVASIVE, MAGNETO-INDUCTIVE MICROLOOP DETECTOR

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- (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

SIGN LUMINAIRES

DESCRIPTION. Furnish and install 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 with a high CRI. Each sign luminaire shall be designed for a service life of at least 12 years with 50,000 hours of operation based on a 12 hour on, 12 hour off duty cycle.

Sign luminaires shall have a lumen retention of 70 per cent or greater at the end of service life.

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 luminaire shall be UL listed, or in the process of obtaining UL approval.

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 Lumitrak sign lighting system.

The sign luminaire housing and lens/refractor shall be sealed to prevent intrusion of moisture for the full service life. 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 a typical sign 14 foot wide and 14 foot high. For the calculations, three luminaires shall be used. These will be placed with the first luminaire two foot from the left edge of the sign, the second 7 foot from the left edge, and the third 12 foot from the left edge. Each luminaires light center shall be 6 foot out from the sign base, and 1.5 ft below the lower edge of the sign. Calculations shall be provided for a grid with vertical and horizontal spacing of 1 foot. The bottom of the grid will be 0.5 foot above the bottom edge of the sign and left edge 0.5 foot from the left side.

SPECIAL PROVISIONS
SIGN LUMINAIRES

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To be acceptable, the average initial illumination shall be 20 foot candles or greater with a maximum to minimum uniformity ration no greater then 6 to 1.

The engineer may waive the photometric calculations for sign luminaires that have been previously installed and demonstrated there acceptability, or placed on the qualified products list.

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

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. LED Pedestrian Signals and all component parts must meet the latest edition of the National Electrical Manufacturers Association (NEMA) Standards and Underwriters Laboratory (UL), as applicable. In addition, LED Pedestrian Countdown signals must 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 must be certified by the manufacturer to meet or exceed all requirements of that specification over their entire 5-year warranty period. Serial numbers and model numbers, if available, must be permanently engraved on all removable components and hardware. The serial number and model number must 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 must fit into existing 16-inch traffic signal housings built to PTCSI standards without modification to the housing.
- (b) The LED countdown module must be a single, self-contained device, not requiring on-site assembly for installation into existing traffic signal housing.
- (c) The assembly of the LED countdown module must be designed to assure all internal components are adequately supported to withstand mechanical shock and vibration from high winds and other sources.
- (d) The signal module must be protected by a ¼ inch thick non-glare UV treated polycarbonate face lens.
- (e) The signal must have 2 individual sets of wires for electrical connections. One set for the hand/man section and another for the countdown section. Each set must be made of three secured, color coded (blue, red, white), 36 inches long, 600V, 16 AWG jacketed wires, rated for service at +105°C.

Environmental

- (a) The LED countdown module must 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 must conform to the chromaticity requirements of section 8.04 and figure 1 of the PTCSI standard.
- (b) The chromaticity measurements must remain unchanged over the input line voltage range of 80 VAC to 135 VAC.

Display

- (a) The LED countdown signal module must 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 must 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 must be at least 10" high and 6.5" wide and must incorporate sufficient LED's to assure adequate luminous intensity.
- (e) The countdown digits must be at least 9" high and must be made of 2 rows of at least 144 LED's.
- (f) The Portland Orange LED's must be of the latest Alln 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% 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% over the voltage range and shall not be perceptible to the human eye.
- (b) The drive circuitry must 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 must 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 must 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 must not suffer any damage when subjected to defective load switches providing a half wave signal output.
- (h) Typical power consumption of the countdown display must not exceed 5 watts with a power factor greater than 90%.

Countdown Function.

- (a) The countdown module must be compatible with all types of traffic controllers.
- (b) The countdown timer module must have a micro-processor capable of recording its own time when connected to a traffic controller.
- (c) When connected, the module must 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 must remain dark until the beginning of the next countdown.
 - (2) The countdown pedestrian signal must 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.
- (d) 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.
- (e) 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.
- (f) 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.
- (g) 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.

- (h) 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 must always reach 0 at the same time as the flashing hand becomes solid.
- (i) When the flashing hand becomes solid, the module will display "0" for one second and then blank-out.
- (j) The countdown timer must be capable of timing 2 consecutive complete pedestrian cycles outputted by the traffic controller (no steady hand signal between cycles).
- (k) The countdown module must 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.
- (l) 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.
- (m) The LED module shall have a removable plug on the rear of the unit to allow for easy access to dip switches.
- (n) If the pedestrian change interval is interrupted or shortened as a part of a transition into a preemption sequence, the countdown pedestrian signal display must be discontinued and go dark immediately upon activation of the preemption transition.

Housing. Countdown Pedestrian Signals must be 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" W x 18.75" H x 9" 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 must accommodate standard 1.5" (39 mm) pipe brackets. The bottom opening of the case must have a shurlock boss integrally molded into the case. The dimension of the shurlock boss shall be:

- (a) Outside diameter 2.625" (667 mm)
- (b) Inside diameter 1.969" (50 mm)
- (c) Number of teeth 72
- (d) Angle of teeth 90°
- (e) Depth of teeth 5/64" (2 mm) inch.

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 must 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 must be attached to the case with the use of stainless steel spring pins.
 - (3) Latching or unlatching of the door must 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

AUDIBLE 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. Audible/Tactile Pedestrian Pushbutton Station and Signs and all component parts must meet the latest edition of the National Electrical Manufacturers Association (NEMA) Standards and Underwriters Laboratory (UL), as applicable

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, molded, or attached using metallic self-adhesive labels. The use of adhesive backed paper labels is not acceptable.

CONSTRUCTION. Audible/Tactile Pedestrian Pushbutton Station and Signs will be designed 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.

Audible/Tactile Pedestrian Pushbutton Station and Signs shall be designed as follow:

- (1) A single base unit at the traffic control cabinet must be able to control 2 to 12 (maximum of 3 per phase) push button stations.
- (2) Only a single 2 - conductor cable will be required from traffic controller cabinet per each pushbutton to operate all pushbutton features.
- (3) Each station will have a 2-in. button with a tactile raised directional arrow on the button.
 - (a) It shall be possible to change the arrow direction to one of four directions.
 - (b) Arrow/button shall vibrate during the walk period following a push of the button.
- (4) The push button station frame shall be cast aluminum with mounting holes for a 5 in. by 7.75 in. or larger pedestrian sign.

Audible/Tactile Pedestrian Pushbutton Station and Signs will have the following features.

- (1) Locating tone
- (2) 5 walk sound choices that shall be field selectable.
- (3) 3 pedestrian clearance sound choices that shall be field selectable.
- (4) A Direction of Travel message shall be standard with extended push.
- (5) An Information message shall be optional with extended push.

The audible sounds emitted by the Audible/Tactile Pedestrian Pushbutton Station and Signs shall have the following properties

- (1) All audible sounds shall emanate from the push button station.
- (2) All audible sounds for all push button stations shall be synchronized.
- (3) Each audible feature shall have independently-adjustable minimum and maximum volume limits.
- (4) All sounds shall automatically adjust over a 60 dB range to compensate for ambient noise levels.
- (5) 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).
- (6) 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.

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AUDIBLE PEDESTRIAN PUSHBUTTON STATION AND SIGNS

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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

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.

SPECIAL PROVISIONS
COATING NEW GALVANIZED STRUCTURES

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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 the 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.

SPECIAL PROVISIONS
SIGNAL EQUIPMENT TURN ON, PICK UP, REMOVAL
AND MAINTENANCE

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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

SPECIAL PROVISIONS
SIGNAL EQUIPMENT TURN ON, PICK UP, REMOVAL
AND MAINTENANCE

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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

SPECIAL PROVISIONS

SIGNAL EQUIPMENT TURN ON, PICK UP, REMOVAL
AND MAINTENANCE

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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

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.

SPECIAL PROVISIONS
UTILITY CONNECTIONS AND UTILITY STAKEOUT

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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

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

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

SPECIAL PROVISIONS
CATALOG CUTS AND WORKING DRAWINGS

CONTRACT NO. PG7585184
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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:

SPECIAL PROVISIONS
CATALOG CUTS AND WORKING DRAWINGS

CONTRACT NO. PG7585184
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"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.

SPECIAL PROVISIONS
CATALOG CUTS AND WORKING DRAWINGS

CONTRACT NO. PG7585184
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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 _____	
<input type="checkbox"/> ACCEPTED	
<input type="checkbox"/> ACCEPTED AS NOTED	
<input type="checkbox"/> 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.

SPECIAL PROVISIONS
CATALOG CUTS AND WORKING DRAWINGS

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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

SECTION 806 — LUMINAIRES AND LAMPS

806.02 MATERIALS.

628 **ADD:** The following after the first line.

LED Roadway Luminaires QPL

806.03 CONSTRUCTION.

806.03.05 Luminaire Photometric Data and Calculations.

(b) Photometric Calculations.

629 **ADD:** The following after the sixth paragraph, “All calculated lighting...walkways shall not exceed 0.4.”

For Light Emitting Diode (LED) Roadway 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 0.64 for calculations. Provide a luminaire mounting height of 40 ft with light centers directly over the edge line of the roadway. Assume four poles in a straight line, parallel to the roadway, spaced at 180 ft each. Perform calculations for illuminance and luminance based on a R3 class pavement. The calculation grid shall be based on a two lane road with 12 ft lanes and shall be placed between the center two poles. Calculate two lines of points for each lane. The first and the second line of calculation points shall be 4 ft from the left and 4 ft from the right lane lines, respectively. Start each line of calculation points directly under the second luminaire and continue every 20 ft until directly under the third luminaire. Each line shall have 10 points, and a total of 40 points shall be calculated. To be acceptable, the average maintained illuminance of all 40 points shall be 0.9 ft candles or greater with an average to minimum uniformity ratio no greater than 4 to 1.

630 **ADD:** The following after the last sentence in the paragraph for (c) **High Mast Luminaires.**

(d) Fixed Aim LED Luminaires. LED Roadway Luminaires shall be a complete lighting device consisting of a cast aluminum housing, LED arrays, LED drivers, terminal blocks, 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.



SPECIAL PROVISIONS INSERT
806 — LUMINAIRES AND LAMPS

CONTRACT NO. ContNum
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If no distribution type is specified, then the Luminaire must have an IESNA Type III distribution. LED Roadway Luminaires shall 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.

ADD: The following after the last sentence in the paragraph for **Testing**.

The Administration may waive the requirements of section 820.03.02 (d) for illuminance testing.

806.04 MEASUREMENT AND PAYMENT.

630 **ADD:** The following after the first paragraph.

LED Roadway Luminaires will be measured and paid for at the contract unit price per each. The payment will be full compensation for the LED Roadway Luminaire and drivers, mounting hardware, wiring, integral transformer, shorting cap, and all material, labor, equipment, tools, and incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

SECTION 806 — LUMINAIRES AND LAMPS

806.03.05 Luminaire Photometric Data and Calculations.

630 **DELETE:** 806.03.05 (c).

INSERT: The following.

(c) **High Mast Luminaires.** High mast luminaires shall have an IES type 5 distribution pattern or as specified in the Contract Documents. The luminous intensity shall not exceed 100 candelas per 1000 lamp lumens for any point 80 degrees, or higher, above nadir; or exceed 0 candelas per 1000 lamp lumens for any point 90 degrees, or higher, above nadir.

CATEGORY 800
TRAFFIC

SECTION 810 — ELECTRICAL CABLE, WIRE AND CONNECTORS

810.02 MATERIALS.

636 **ADD:** The following.

Cable Duct End Seals shall consist of a one-piece heat shrinkable device designed to provide a waterproof seal around the cable duct and each individual cable. The cable duct end seal shall have separate entranceways for each cable and shall hold the cables apart when applied.

810.03 CONSTRUCTION.

810.03.03 Preassembled Cable Duct.

637 **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 of 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. 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.

823.04 MEASUREMENT AND PAYMENT.

810.04.01.

637 **ADD:** The following after the last sentence in 810.04.01.

There will be no measurement and payment for Preassembled Cable Duct that has not had the required electrical tests performed and reported to the engineer.

SPECIAL PROVISIONS

810 — ELECTRICAL CABLE, WIRE AND CONNECTORS

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810.04.04.

638 **ADD:** The following after 810.04.03.

Cable Duct End Seals shall be measured and paid for at the contract unit price per each.

CATEGORY 800
TRAFFIC

SECTION 813 - SIGNS

640 **813.02 MATERIALS.**

ADD: The following:

Provide and / or install Vandalism / Installation Date (VID) Stickers to the back lower right-hand corner of all installed signs. The Administration will supply VID stickers with all Administration supplied signs.

813.04 MEASUREMENT AND PAYMENT.

ADD:

813.04.04 .Furnish and install or install Vandalism / Installation Date stickers will not be measured but the cost will be incidental to the Contract unit price for furnishing and installing or installing the signs.

CATEGORY 800
TRAFFIC

SECTION 814 — SIGNAL HEADS

814.01 DESCRIPTION.

641 **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 (LED or Incandescent)	COMAR 14.26.03 (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.

643 **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.

SPECIAL PROVISIONS

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822 — REMOVE AND RELOCATE EXISTING SIGNS AND SIGN STRUCTURES 1 of 1

**CATEGORY 800
TRAFFIC**

**SECTION 822 — REMOVE AND RELOCATE
EXISTING SIGNS AND SIGN STRUCTURES**

650 **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, 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**

FOAMED ASPHALT STABILIZED BASE COURSE

Develop a mix consisting of Reclaimed Asphalt Pavement (RAP), Recycled Portland Concrete (RC), aggregate and foamed asphalt binder. Include lime, portland cement, and fly ash as necessary to increase the fines in order to meet the design parameters in Table 1 and Table 2. Select a PG 64-22 asphalt binder that provides the required asphalt foaming characteristics and mix properties. Do not use polymer modified asphalt binders.

**Table 1
 Aggregate Blend Requirements**

GRADATION (T 27)	
Sieve Size	Percent Passing
1 ½ in	100
¾ in	65 – 100
No. 4	25 – 50
No. 200	3 – 8
OTHER	
PI (T 90)	< 10 %

**Table 2
 Foamed Asphalt Stabilized Base Course Mix Requirements**

DESIGN PARAMETERS	VALUE
Aggregate Blend Compaction: T 180D, Max Dry Density, pcf	≥120
Specimen compaction:	
Marshall compaction: T 245 - number of blows per face, or	75
Gyratory compaction: T 312 - number of gyrations	30
Indirect Tensile Strength: modified T 283	
Minimum Wet Tensile Strength, psi	45
Minimum Wet Tensile Strength, psi, for material stockpiled >2 days.	55
Minimum Tensile Strength Ratio (TSR), %	70
Foamed Asphalt Expansion Characteristics @ 160, 170, & 180°C	
Minimum Half-Life of Foamed Expansion, sec ⁽¹⁾	8
Minimum Expansion Ratio ⁽²⁾	10

- (1) Total time for foamed asphalt to settle to half of the maximum foamed volume. See Section A.1.3.4 of the *Wirtgen Cold Recycling Technology Manual* (2010) for the half-life test procedure. Alternate suitable equipment can be substituted for the Wirtgen WLB 10 S laboratory unit.
- (2) Maximum foamed asphalt volume divided by non-foamed asphalt volume. See Section A.1.3.4 of the *Wirtgen Cold Recycling Technology Manual* (2010) for the expansion ratio test procedure. Alternate suitable equipment can be substituted for the Wirtgen WLB 10 S laboratory unit.

Submit job mix formulas for approval at least 30 days prior to production to the Office of Materials Technology, Soils and Aggregate Division. Job mix formulas must meet the requirements of Table 1 and Table 2. Work will not be allowed to commence without approved job mix formulas. Perform the following tests for each job mix formula:

- (a) **Aggregate.** T 2. Sample 50 pounds of material representing the RAP, RC, and aggregate to be used in the job mix formula. Test per 901A and 901B.
- (b) **Performance Graded Asphalt Binder.** M 320. Provide five 4-quart samples of the asphalt binder.
- (c) **Water.** 921.12
- (d) **Lime, Cement and Fly Ash.** Determine the percentage of lime, cement and fly ash required to meet the mix design parameters

Mix Design. Prepare a minimum of 4 Marshall or 4 gyratory compactor specimens at 0.5 percent increments for a range of asphalt contents; with at least one specimen above and one below optimum to determine the job mix formula. The moisture content of the specimens shall be within 1.5% of the optimum moisture content of the aggregate blend. For gyratory specimens, obtain a 2 inch thick test specimen cut from the middle of each compacted cylinder.

Foamed Asphalt Expansion Characteristics. Test the asphalt binder per Table 2 for the following:

- (a) Measure the expansion ratio and foam half-life of the asphalt binder over a range of water contents for the three temperatures.
- (b) Plot expansion ratio and half-life vs. water content. The optimum foaming water content for a given temperature is the average of the two water contents that meet the respective minimum expansion ratio and half-life requirements.

Indirect Tensile Strength (IDT). T 283.

- (a) Place the samples to be soaked in a 77F water bath for 24 hours. Dry the samples to constant mass at 104 +/-2 F.

- (b) Graph IDT strength versus foamed asphalt content for both dry and soaked specimens. Graph TSR versus foamed asphalt content.
- (c) For wet IDT strength vs. foamed asphalt content curves exhibiting a maximum value, select the design foamed asphalt content corresponding to the maximum. Otherwise, select a design foamed asphalt content that meets the wet IDT strength and TSR requirements in Table 2.
- (d) In no case shall the design foamed asphalt content be less than 2% or greater than 3.5%.

Foamed Asphalt Cement Content. Once the foamed asphalt content of the Job Mix Formula has been determined, prepare a minimum of 5 compacted specimens based on the Job Mix Formula. These specimens must meet the design parameters per Table 2. Calculate the mean, standard deviation of the Indirect Tensile Strength results (modified T 283, per Table 2). These values must be reported in the FASBC Mix Design for the Administration's approval.

Additionally, the Contractor must submit 5 bag samples representative of the aggregate blend of the Job Mix Formula and 5 bag samples representative of the Job Mix Formula with the added foamed asphalt as part of the Administration's mix approval process. These sample bags must contain at least 20 pounds of FASBC material. The Administration will test these samples to develop an ignition oven correction factor and a base reference for the foamed asphalt cement content for acceptance purposes.

The Office of Materials Technology will evaluate the suitability of the material and proposed job mix formula. If the job mix formula is not approved, submit a new job mix formula as directed.



CATEGORY 900
MATERIALS

655 **ADD:** The following after the last paragraph of 900.02 TECHNICIAN QUALIFICATION REQUIREMENTS.

900.03 RECYCLED MATERIALS.

900.03.01 CERTIFICATION. All recycled or rehandled material furnished or supplied for use may require testing and certification to ensure compliance with all State and local applicable environmental and EPA regulations. The required testing may include, but not be limited to, the EPA Toxicity Characteristic Leaching Procedure (TCLP) or its successor. Provide testing and certification for all recycled materials at no additional cost to the Administration. Evaluation and interpretation of the test data will be made by an OMT Quality Assurance Manager. The above requirements do not preclude the normal materials acceptance process, and the recycled material shall meet all applicable specifications. EPA regulations governing the use of the material, certified test results, and material safety data sheets shall accompany the source of supply letter and sample submitted for approval.

Only highway demolition materials are to be used in constructing RC stockpiles for Administration projects. The use of building materials is prohibited.

Refer to the Contract Documents for recycled materials not covered by this specification.

900.03.02 RECLAIMED/RECYCLED CONCRETE (RC).

Usage. Use RC for the following with written approval.

- (a) Graded Aggregate Base (GAB).
- (b) Common, Select, or Modified Borrow.
 - (1) At least 2 ft above saturated soil or groundwater conditions, as determined.
 - (2) At least 100 ft from surface waters (streams, creeks, or rivers, ponds and lakes),
 - (3) At least 3 ft from exposed metal surfaces, and,
 - (4) At least 3 ft from geotextile.
 - (5) At least 3 ft from any water discharge locations.



Do not use RC as Capping Borrow nor as aggregate for the following.

- (a) Portland cement concrete.
- (b) Hot mix asphalt.
- (c) Drainage systems.
- (d) Mechanically stabilized earth (MSE) systems.
 - (1) MSE walls.
 - (2) Reinforced soil slopes (RSS).
 - (3) Reinforced earth slopes (RES).
- (e) In embankment construction as follows.

Within 1.5 ft of the top surface of any area to be vegetated.

- (1) Within 2 ft of saturated soil or groundwater conditions, as determined.
- (2) Within 100 ft of any surface water course (streams, creeks, or rivers, ponds and lakes).
- (3) Within 3 ft of any metal pipe or shoring.
- (4) Within 3 ft of any water discharge locations.
- (5) Under permeable or porous surfaces.

Grading Requirements. The grading requirements for the use of RC.

- (a) Table 901 A when used as GAB or for any other application within the pavement structure.
- (b) 204.02 when used in embankment construction.
- (c) 916.01 when used as Borrow material.

RC shall not contain more than 5 percent brick and hot mixed asphalt material by mass except when used as Common Borrow.



pH Requirements. RC pH shall be less than 12.4 for all applications. RC usage shall not cause any outfall and infiltration water leaving the site to exceed a pH of 8.5. Acid sulfate, sulfur or any other environmentally safe organic material may also be used to control the pH.

pH Testing.

- (a) **Plant:** The producer is required to test pH at the plant per T 289 every 1,000 tons shipped or once a day, whichever yields the greater frequency. Plant pH testing shall be recorded as specified and a history shall be kept at the producer's laboratory. The producer may be required to present TCLP and any other tests conducted by an independent laboratory as directed.

The Administration reserves the right to test the producer's RC at the plant for pH. Material delivery may be terminated if the test results repeatedly meet or exceed a pH of 12.4. In case of high pH the producer is required to use shorter stock pile by spreading the material at around the plant or mixing the RC-GAB with the natural GAB to reduce the pH issue.

- (b) **Construction Site:** The OMT representatives will perform QA testing to monitor, test, for the pH levels for any discharge associated with RC placement as directed. This includes monitoring and testing during periods of precipitation or dampness. In cases of high pH, the producer shall provide a reduction control plan for the pH.

Quality Control. The producer shall submit a Quality Control Plan and obtain approval prior to production. The plan shall include, but not be limited to, the operational techniques and procedures proposed to produce the RC product. Quality control includes the sampling, testing and data recording performed to validate the quality of the product during production operations.

Quality Assurance. OMT Quality Assurance personnel will perform quality assurance inspection, sampling, and testing at the RC plant and construction site. Additional inspection, testing and compaction control will be performed by the Project Engineer.

900.03.03 RECYCLED ASPHALT PAVEMENT (RAP).

Usage. Use RAP for Common, Select, Capping, or Modified Borrow.

Do not use RAP as aggregate for the following.

- (a) Graded Aggregate Base (GAB).



(b) Portland cement concrete.

(c) Drainage systems.

(d) Embankment construction.

(1) Within 1 ft of the top surface of any area to be vegetated.

Refer to MSMT 412 and M 323 for the use of RAP in hot mix asphalt mixes.

Grading Requirements. The grading requirements for the use of RAP.

(a) 204.02 when used in embankment construction,

(b) 916.01 when used as Borrow material,

(c) 901.02.01 when used as riprap.

Quality Control. Create a captive stockpile for storing the RAP prior to use. Create a new captive stockpile and take new acceptance samples for gradation approval whenever the source of the RAP changes.

Quality Assurance. OMT Quality Assurance personnel will sample and test the RAP stockpiles to ensure that they meet the above gradation requirements. The completed test results will be reviewed by the OMT Soils and Aggregate Division for approval.

Construction of Control Test Strip. The location, equipment, and methods used to construct the control test strip shall be as directed; prior to approval. The equipment and methods used to construct the control test strip shall be the same as those used in subsequent construction. Place and test the control test strip when the RAP is 32°F or higher to establish the maximum density. RAP is temperature sensitive, which may affect the density.

Construct the control test strip that shall be at least 100 ft long, 12 ft wide and a maximum compacted lift thickness of 6 in. Prepare the subgrade for the control test strip in accordance with 204.03.07. Do not construct the control strip, or perform any subsequent construction, on frozen subgrade.

Compact the RAP for the control test strip with one pass of the roller. Measure the density after one pass with a nuclear density gauge (backscatter method) at the frequency for capping material at five random locations distributed across the length and width of the control test strip, as directed. Record the measurements and mark the locations for future reference.



Compact the RAP for the control test strip with a second pass of the roller. Measure and record the density again at the exact locations previously tested and as described above. Prepare a plot of density versus the number of roller passes. Continue this process until the maximum dry density of the control strip is established.

There should be no drop in average density during construction of the control test strip for each lift. A drop in the average density of greater than 2 pcf during construction of the control test strip is an indication that the material is not properly compacting, and a new test strip shall be constructed.

The Project Engineer may require the Contractor to cut into the control test strip for visual inspection. All material, labor, equipment, tools, and incidentals necessary to provide an approved control test strip shall be at no additional cost to the Administration.

Compaction Control. Use the roller pattern and number of passes determined from the construction of the test strip to compact the RAP for production placement. The density of the RAP compacted for production work shall be at least 97 percent of the maximum density obtained from the control test strip. Recheck the density of the production work if it is less than 97 percent of the maximum density obtained from the control test strip. Construct a new control test strip if the second density does not meet the 97 percent requirement. Construct a new control test strip if the measured density of the compacted RAP for production work exceeds 105 percent.

Establish one rolling pattern to achieve maximum density for each use based on the control test strips. Samples or results produced prior to the construction of any new stockpiles will not be considered.



CATEGORY 900
MATERIALS

SECTION 901 — AGGREGATES

664 **DELETE: 901.05 STONE FOR GABIONS** in its entirety.

INSERT: The following.

901.05 STONE FOR GABIONS. Meet the quality requirements specified in 901.03 except the loss by sodium sulfate shall not be greater than 12 percent:

DEPTH OF BASKET in.	SIZE OF INDIVIDUAL PIECES * in.
6	3 – 6
9	4 – 7
12	4 – 7
18	4 – 7
36	4 – 12

*Size of pieces will be determined visually.



CATEGORY 900
MATERIALS

665 **DELETE:** SECTION 902 — PORTLAND CEMENT CONCRETE AND RELATED PRODUCTS in its entirety.

INSERT: The following.

SECTION 902 — PORTLAND CEMENT CONCRETE AND RELATED PRODUCTS

902.01 STORAGE. Storage of materials shall conform to the Contract Documents and as directed by the Engineer.

902.02 CERTIFICATION OF PORTLAND CEMENT AND BLENDED HYDRAULIC CEMENT. The manufacturer shall furnish certification as specified in TC-1.03. The certification shall also include:

- (a) The mill shall report its quality control procedures, and submit a new report whenever there is a procedural change.
- (b) The mill's control laboratory shall be inspected by the Cement and Concrete Reference Laboratory of the National Institute of Standards and Technology on their regularly scheduled visits. The Engineer shall be provided with copies of the reports of these inspections along with an account of the action taken to correct cited deficiencies.
- (c) Records of data accumulated by the quality control procedures shall be produced upon request.
- (d) A certified document shall accompany each shipment stating that the contents conform to all applicable requirements. Additionally, the document shall show the producer's name, mill location, carrier number, date loaded, weight contained in carrier, silo number, consignee, destination, Contract number, and type of cement. The signature and title of the signer shall be shown on the document.
- (e) The mill shall, upon request, supply certified chemical and physical test values that can be associated with any sample representing cement drawn from a particular silo on a given date.
- (f) Acceptance of cement by certification will be terminated if test results differ from mill results by more than the precision limits given in the test method. The acceptance procedure will then revert to storage testing and approval prior to shipment.

902.03 HYDRAULIC CEMENT.

902.03.01 Portland Cement. M 85, with the fineness and the time of setting determined using T 153 and T 131, respectively.



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902.03.02 Ground Iron Blast Furnace Slag. M 302, Grade 100 or 120. The Contractor may request to substitute a maximum of 50 percent of the weight of cement with ground iron blast furnace slag. When ground iron blast furnace slag is used, the minimum cement factor and water/cement ratio will be determined on the basis of the combined weight of the portland cement and ground iron blast furnace slag. When ground iron blast furnace slag is used to control alkali silica reactivity, see Table 902 B for percentage.

902.04 BLENDED HYDRAULIC CEMENT. M 240, Type I (PM) or a Type IP containing 15 to 25 percent pozzolan by weight of cement. Maximum loss on ignition is 3.0 percent. Do not use ground iron blast furnace slag for blending. The requirement for a manufacturer's written statement of the chemical composition is waived.

902.05 MASONRY CEMENT. C 91, except the water retention and staining tests are waived.

902.06 CONCRETE ADMIXTURES. Do not use concrete admixtures that contribute more than 200 ppm of chlorides based on the cement content when tested per MSMT 610. Use only prequalified admixtures.

Do not use pozzolan and Type I (PM) or Type IP cement in the same mix. Since the strength gains are delayed with these materials, a longer period of time may be required for curing and form removal.

902.06.01 Air Entraining Admixtures. M 154.

902.06.02 Chemical Admixtures. M 194, Type A, D, or nonchloride C.

902.06.03 High Range Water Reducing Admixtures. M 194, except that it shall be a liquid, the water content shall be a maximum of 85 percent of that of the control, and the durability factor shall be a minimum of 90. Use Type F for early strength, which shall produce a minimum compressive strength in 12 hours of 180 percent of that of the control. Use Type G when early strength is not specified. The manufacturer shall furnish certification as specified in TC-1.03. The certification shall include curves indicating the fluid ounces of admixture per 100 lb of cement as related to water reduction and strength gain for 12 hours when used with a minimum cement factor of 700 lb.

902.06.04 Pozzolans. The use of pozzolans may be requested to control alkali silica reactivity or for other reasons. When a pozzolan is used, determine the minimum cement factor and water/cement ratio on the basis of the combined weight cement and pozzolan. See Table 902 B for percentage of fly ash, and microsilica.

(a) **Fly Ash.** M 295, pozzolan Class C or F, except that the maximum permissible moisture content shall be 1.0 percent, and when used in concrete Mix Nos. 3 and 6 the maximum loss on ignition 3.0 percent.

(b) **Microsilica.** C 1240, except that the oversize requirement is waived.



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902.06.05 Corrosion Inhibitors. Corrosion inhibitors shall be calcium nitrite based and contain a minimum of 30 percent active ingredients by mass. The gallonage of corrosion inhibitor used in the concrete mixture shall be included as water when determining the water/cementitious materials ratio.

902.07 PORTLAND CEMENT CONCRETE CURING MATERIALS. Use burlap cloth, sheet materials, liquid membrane forming compounds, or cotton mats.

902.07.01 Burlap. M 182, Class 1, 2, or 3.

902.07.02 Sheet Materials. M 171 with the following exceptions:

- (a) **White Opaque Burlap Polyethylene Sheeting.** Tensile strength and elongation requirements are waived. Use sheeting having a finished product weight of not less than 10 oz/yd².
- (b) **White Opaque Polyethylene Backed Nonwoven Fabric.** 902.07.02(a), with the thickness requirement waived. Use material having a finished product weight of not less than 5 oz/yd².
- (c) **White Opaque Polyethylene Film.** Tensile strength and elongation requirements are waived.

902.07.03 Liquid Membrane. C309. Field control testing of the white pigmented curing compounds is on the basis of weight per gallon. The samples shall not deviate more than ± 0.3 lb/gal from the original source sample.

902.07.04 Cotton Mats. Cotton mats consist of a filling material of cotton bats or bats covered with unsized cloth and tufted or stitched to maintain the shape and stability of the unit under job conditions of handling.

Use coverings of either cotton cloth, burlap or jute having the following properties:

- (a) Cotton cloth covering shall weigh not less than 6.0 oz/yd² and have an average of not less than 32 threads/in. of warp and not less than 28 threads/in. of filling. Use raw cotton, cotton comber waste, cotton card strip waste, or combinations thereof as the raw material used in the manufacture of the cotton cloth.
- (b) Burlap or jute covering for cotton mats shall weigh not less than 6.4 oz/yd² and shall have not less than 8 threads/in. of warp and not less than 8 threads/in. of filling. Use the grade known commercially as "firsts" and they shall be free from avoidable imperfections in manufacture and from defects or blemishes affecting the serviceability.

Use a cotton bat, or bats made of raw cotton, cotton waste, cotton linters, or combinations thereof, as the filling material for the mats. Mats shall weigh not less than 12 oz/yd².



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902.08 FORM RELEASE COMPOUNDS. Use form release compounds that effectively prevent the bond of the concrete to the forms. Form release compounds shall not cause discoloration of the concrete or adversely affect the quality or rate of hardening at the interface of the forms.

The flash point of the form release compound shall not be less than 100 F when tested per T 73.

902.09 PARAFFIN WAX. Use clear paraffin wax for use as a bond breaker for concrete. The flash point shall not be less than 380 F when tested under D 92.

902.10 PORTLAND CEMENT CONCRETE. Section 915 and as specified herein.

902.10.01 Proportioning. Prior to the start of construction, submit to the AME the source and proportions of materials to be used for each concrete mix. The mixture shall meet 902.10.03.

The concrete, with the exception of water and chemical admixtures, shall be proportioned by weight. Water and chemical admixtures may be proportioned by volume or weight. The mix shall be uniform and workable.

902.10.02 Materials.

Coarse Aggregate	901.01
Fine Aggregate	901.01
Cement	902.03 and 902.04
Concrete Admixtures	902.06
Synthetic Fibers	902.15
Water	921.01

902.10.03 Portland Cement Concrete Mixtures.



SPECIAL PROVISIONS INSERT
902-PORTLAND CEMENT CONCRETE

The concrete mixes shall conform to the following:

TABLE 902 A

PORTLAND CEMENT CONCRETE MIXTURES									
MIX NO.	28 DAY SPECIFIED COMPRESSIVE STRENGTH	STANDARD DEVIATION	CRITICAL VALUE	MIN CEMENT FACTOR	COARSE AGGREGATE SIZE	MAX WATER/ CEMENT RATIO	SLUMP RANGE	TOTAL AIR CONTENT	CONCRETE TEMPERATURE
	psi	psi	psi	lb/yd ³	M 43 / M 195	by wt	in.	%	F
1	2500	375	2430	455	57, 67	0.55	2 – 5	5 – 8	70 ± 20
2	3000	450	3010	530	57, 67	0.50	2 – 5	5 – 8	70 ± 20
3	3500	525	3600	580	57, 67	0.50	2 – 5	5 – 8	70 ± 20
4	3500	525	3600	615	57, 67	0.55	4 – 8	N/A	70 ± 20
5	3500	525	3600	580	7	0.50	2 – 5	5 – 8	70 ± 20
6	4500	675	4770	615	57, 67	0.45	2 – 5	5 – 8	65 ± 15
7	4200	630	4420	580	57	0.50	1½ – 3	5 – 8	70 ± 20
8	4000	600	4180	750	7	0.42	2 – 5	5 – 8	65 ± 15
9	3000 (a)	N/A	N/A	800	57, 67	0.45	4 – 8	5 – 8	70 ± 20
10	4500	675	4770	700	¾” – No. 4	0.45	2 – 5	6 – 9	65 ± 15
11	4200	630	4420	—	57, 67	0.45	2 – 5	5 – 8	65 ± 15
12	4200	630	4420	—	¾” – No. 4	0.45	2 – 5	6 – 9	65 ± 15

Note 1: When concrete is exposed to water exceeding 15,000 ppm sodium chloride content, Type II cement shall be used. In lieu of Type II cement, a Type I cement may be used in combined form with an amount of up to 50 percent replacement with ground iron blast furnace slag, or an amount of up to 25 percent replacement with Class F fly ash. The Contractor shall submit to the Engineer the proposed mix proportions and satisfactory test results per C 1012 showing a sulfate resistance expansion not exceeding 0.10 percent at 180 days

Note 2: The temperature of Mix No. 6 when used for other than superstructure work as defined in TC-1.03 shall be 70 ± 20 F.

Note 3: Type A or D admixture shall be added to bridge, box culvert, and retaining wall concrete.

Note 4: Nonchloride Type C admixtures may be used when approved by the Engineer.

Note 5: Other Slump Requirements:

When a high range water reducing admixture Type F or Type G is specified, the slump shall be 4 to 8 in.

When synthetic fibers are specified, the slump shall be 5 in. maximum.

When concrete is to be placed by the slip form method, the slump shall be 2-1/2 in. maximum.

When the absorption of the coarse aggregate is greater than 10 percent, the slump shall be 3 in. maximum.

Note 6: Mix 9 shall contain a Type F high range water reducing admixture.

Note 7: Mix 10 and 12 shall be proportioned as specified in 211.2 of the ACI's Recommended Practices for Selection Proportions for Structural Lightweight Concrete. The maximum average Density of Cured Concrete shall be 118 lb/ft³. Control testing for Density of Cured Concrete shall be two companion cylinders for each 100 yd³, or fraction thereof, as specified in M 195.

Note 8: Mix 11 and 12 shall also conform to all requirements as specified in Table 902 C.

(a) Acceptance will be based on a minimum compressive strength of 3000 psi in 24 hours. Design approval will be given based on trial batch obtaining a minimum compressive strength of 2500 psi in 12 hours. Testing shall conform to 902.10.08 except that cylinders shall remain in the molds until tests are conducted.

Coarse and fine aggregate having an expansion up to 0.10 percent when tested for alkali silica reactivity (ASR) MSMT 212 may be used without restriction. Aggregates having an expansion greater than 0.10 but less than 0.35 percent are considered reactive and may only be used when one of the options in table 902 B are employed. Those having an expansion of 0.35 percent and greater are prohibited.



TABLE 902 B

OPTION	ALKALI CONTENT OF CEMENT % max	REPLACE CEMENT WITH		SPECIFICATION
		MATERIAL	% BY WEIGHT	
1	1.50	Class F Fly Ash	15 – 25	M 295
2	1.50	Ground Iron Blast Furnace Slag	25 – 50	M 302 Grade 100 or 120
3	1.50	Microsilica	5 – 7	C 1240
4	—	Blended Cement (a)	100	M 240
5	0.60 (b)	Low Alkali Cement	100	M 85

(a) Pozzolan content of 15 – 25 percent by weight of cement

(b) For mix 9 used for Portland cement concrete pavement repairs; the maximum allowable percentage of alkalis in Portland cement shall be 0.70.

When reactive aggregate is used, designate which option will be used to control the formation of the ASR gel. If an option other than option 5 in Table 902 B above is chosen, conduct tests per MSMT 212 using the reactive aggregate and the proposed cementitious material. The expansion test results shall not be greater than 0.10 percent. When more than one reactive aggregate is used in a concrete mix, each shall be tested individually and the maximum amount of pozzolan required to reduce the expansion of all the aggregates to 0.10 percent or less shall be used. Submit the aggregate source, test results, and the percent and type of replacement cement to the Engineer. The Engineer may withhold source approval pending verification testing.



TABLE 902 C

MIX PHYSICAL PROPERTIES		
TEST PROPERTY	TEST METHOD	SPECIFICATION LIMITS
Minimum Cementitious Materials Factor, lb/yd ³	—	580
Maximum Content of Portland Cement, lb/yd ³	—	550
Water/Cementitious Materials Ratio by Wt.	—	0.45
Corrosion Inhibitor, gal/yd ³	902.06.05	2.0
Synthetic Fibers, lb/yd ³	902.15	1.5
Permeability of Field Concrete, moving average of three tests, coulombs max	T 277 Modified	2500
Permeability of Field Concrete, individual test, coulombs max	T 277 Modified	3000
Shrinkage at 28 days, microstrains	C 157	400

Note 1: Only Type I or II Portland cement shall be used.

Note 2: Mixes shall contain ground iron blast furnace slag, fly ash or microsilica.

Note 3: The water to cement ratio shall be based upon the total water to cementitious materials ratio. The gallonage of the corrosion inhibitor shall be included in the water/cementitious materials ratio.

Note 4: The permeability test value of field concrete shall be the average of two test specimens representing production concrete. Test specimens shall be molded on the project site in 4 x 8 in. molds conforming to M 205. Test specimens shall be handled under same conditions as compressive strength test specimens in conformance with C 31 for the first seven days. When seven days old, they shall be cured in a 100 F water bath for the remainder of the 28 day curing. The 28 day rapid chloride permeability of the specimens will be determined in conformance with T 277. Test for the geometry of test specimens will be waived.

Note 5: Shrinkage tests will be performed on trial mixes only.

Note 6: High range water reducing admixture may be used except the water reducing requirements will be waived.

Note 7: A sealer conforming to 902.12 shall be used on the finished surface.

902.10.04 Trial Batch. A trial batch shall be prepared to certify that each mix meets 902.10.05 and 902.10.06. Approval will be given when the test results meets the minimum required average strength.

Make arrangements with the AME at least two weeks in advance, to have an authorized representative present during the batching and testing. Each trial batch shall consist of at least 3 yd³ of concrete. Supply all equipment, and labor required to produce the trial batches and conduct the required tests at no additional cost to the Administration.

The AME may waive the requirement for a trial batch when past performance records show that the required average strength requirement has been met.



902.10.05 Design Required Average Strength.

Specified compressive strength, f_c' , psi	Required average compressive strength, f_{cr}' , psi
$f_c' \leq 5000$	Use the larger value computed from Eq. (A-1) and (A-2) $f_{cr}' = f_c' + 1.34s$ (A-1) $f_{cr}' = f_c' + 2.33s - 500$ (A-2)
Over 5000	Use the larger value computed from Eq. (A-1) and (A-3) $f_{cr}' = f_c' + 1.34s$ (A-1) $f_{cr}' = 0.90 f_c' + 2.33s$ (A-3)

where:

- f_c' = the 28 day specified compressive strength.
- s = the standard deviation as specified in 902.10.06.

A test is defined as the average strength of two companion cylinders.

902.10.06 Standard Deviation.

- (a) When past performance records are available, a standard deviation will be established from documented performance records of the producer consisting of a minimum of 15 consecutive 28 day compressive strength tests obtained within the last 12 months.

The standard deviation will be established as the product of the calculated standard deviation and multiplier.

NUMBER OF TESTS	MULTIPLIER FOR STANDARD DEVIATION
15	1.16
20	1.08
25	1.03
30 or more	1.00

Interpolate for intermediate number of tests.



(b) When past performance records are not available, the required average strength shall meet to the following:

Specified compressive strength, f_c' , psi	Required average compressive strength, f_{cr}' , psi
$f_c' < 3000$	$f_{cr}' = f_c' + 1000$
$3000 \leq f_c' \leq 5000$	$f_{cr}' = f_c' + 1200$
$f_c' > 5000$	$f_{cr}' = 1.10 f_c' + 700$

902.10.07 Standard of Control. The average of all sets of three consecutive strength tests shall equal or exceed the critical value as specified in 902.10.03 which shall be computed using the following formula:

$$\text{Critical Value} = f_c' + (1.14 \times S) - 500$$

Failure to conform to this criteria shall be cause for immediate investigation and remedial action up to and including suspension of production. A design standard deviation equal to 15 percent of the specified strength shall be used for calculation until a minimum of 15 test results are obtained.

The actual average strength and standard deviation shall be computed upon the availability of 28 day strength data comprising a minimum of 15 tests. Should this determination indicate an excessive margin of safety, the concrete mix may be modified to produce lower average strength as approved by the Engineer. If these calculations indicate a coefficient of variation greater than 15, the quality of the concrete and testing will be evaluated.



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902.10.08 Testing. Sampling per T 141. Testing as follows:

TEST	METHOD	MINIMUM TEST FREQUENCY	RESPONSIBILITY
Temperature (e)	T 309	1 per 50 yd ³ (or fraction thereof)	Project Engineer
Slump (a)(e)	T 119	1 per 50 yd ³ (or fraction thereof)	Project Engineer
Air Content (a)(e)	T 152 T 196	1 per 50 yd ³ (or fraction thereof)	Project Engineer
Compression (b)(c)(d)	T 23	1 per 50 yd ³ (or fraction thereof)	Project Engineer
Compression (b)(c)(d) Mix No. 7 Only	T 23	3 per Day	Project Engineer

- (a) A second test will be made when the first slump or air content test fails. Acceptance or rejection will be based on the results of the second test.
- (b) Compressive strength tests are defined as the average of two companion cylinders.
- (c) The Contractor shall be responsible for the making of all early break cylinders and furnishing the molds, stripping, curing/delivery of all cylinders, including 28 day cylinders, to the testing laboratory.
- (d) The Project Engineer will be responsible for making, numbering and signing the 28 day cylinders.
- (e) When constructing plain and reinforced concrete pavements, the testing frequency for slump, air content, and temperature shall be 1 per 100 yd³ or fraction thereof.

902.10.09 Acceptance. Concrete will be acceptable if both of the following requirements are met:

- (a) The average of all sets of three consecutive strength tests equal or exceed the specified design strength.
- (b) No individual strength test (average of two companion cylinders) falls below the specified design strength by more than 500 psi.

902.10.10 Price Adjustment. A price adjustment will be based on the Contract unit price per cubic yard of concrete. If the unit is a lump sum item, the price per cubic yard for the concrete will be determined by dividing the cubic yards into the Contract lump sum price.

- (a) **Test Results More Than 500 psi Below the Specified Design Strength.** Failing strength tests will be considered individually with a price adjustment being applied on the percentage basis as shown below.

(Price per yd³) X (quantity of yd³ represented by the failing concrete strength) X (percent of failure).

Example:

$$\$400.00 \text{ per yd}^3 \times 50 \text{ yd}^3 \times [1 - (3600 / 4500 \text{ psi})] = \$4,000.00$$



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No payment will be allowed when the test results fall below 50 percent of the specified design strength for structural concrete or 40 percent for incidental concrete.

The Engineer will determine when the strength of the concrete represented by the failing tests is sufficient to remain in place or whether it must be removed and replaced with Specification concrete.

- (b) Test Results 500 psi or Less than the Specified Design Strength.** Strength failures 500 psi or less than the specified design strength will be averaged with the next two consecutive tests. If those two tests include a failure greater than 500 psi, those tests will be evaluated as in 902.10.10(a) and replaced with the next consecutive test. If the resulting average falls below the specified design strength, a price adjustment will be applied as specified in the table below. Any failure will only be included in one grouping.

STRENGTH BELOW THE SPECIFIED (avg of 3 tests) DESIGN LEVEL, psi	ADJUSTMENT FACTOR
MIX NO. 1 THRU MIX NO. 7	
1 – 100	0.005
101 – 200	0.01
201 – 300	0.02
301 – 400	0.04
401 – 500	0.08

Adjustment price equals (price per yd³) X (quantity of yd³ represented by the failing cylinders) X (the adjustment factor).

Example:

$$\$400.00 \text{ per yd}^3 \times 50 \text{ yd}^3 \times 0.01 = \$200.00$$

902.11 MORTAR FOR GROUT. Mortar used for grouting anchor bolts, pipe, handrail posts, and miscellaneous items shall be composed in accordance with one of the following:

- (a) One part Portland cement or blended hydraulic cement and one part mortar sand by dry loose volume.
- (b) Prepared bag mixes consisting of Portland cement or blended hydraulic cement and mortar sand. The prepared mixes shall produce a mortar meeting the strength requirements specified in the Contract Documents.
- (c) Use nonshrink grout when specified. The grout shall have a minimum compressive strength of 5000 psi in seven days when tested as specified per T 106, except that the cube molds shall remain intact with a top firmly attached throughout the curing period. The nonshrink grout shall have a minimum expansion of 0.0 percent after seven days when tested as specified per T 160.



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- (d) Epoxy grout shall consist of sand and epoxy mixed by volume in per the manufacturer's recommendations. The grout shall be capable of developing a minimum compressive strength of 6500 psi in 72 hours when tested per MSMT 501. Sand for epoxy grout as specified in 901.01.
- (e) An epoxy or polyester anchoring system may be used when approved by the Engineer in accordance with the manufacturer's recommendations. Strength values shall be as specified in the Contract Documents.

902.12 LINSEED OIL. Shall consist of a 50-50 mixture (by volume) of boiled linseed oil meeting Federal Specification TT-L-190 and kerosene per D 3699.

902.13 LATEX MODIFIED CONCRETE. Portland cement concrete containing prequalified Laboratory approved styrene butadiene latex emulsion is defined as Latex Modified Concrete (LMC).

Latex emulsion shall have a minimum of 90 percent of the nonvolatiles as styrene butadiene polymers. The latex emulsion as specified in Table 902.13 A. The material shall be stored in suitable containers and be protected from freezing and exposure to temperatures in excess of 85 F.

LMC shall be proportioned using volumetric mixing and designed as follows:

LATEX MODIFIED CONCRETE	
MATERIAL	SPECIFICATION LIMITS
Portland Cement, CWT/yd ³ , min	6.6
Latex Emulsion/Cement Ratio	0.31 – 0.34
Water/Cement Ratio, max	0.22
Entrained Air, %	6.0 ± 3
Slump, in.	5 ± 1

The physical properties of LMC shall conform to Table 902.13 B. The Contractor shall furnish the necessary 3 X 6 in. molds per M 205 to be used for the fabrication of compressive strength cylinders.

Control and Acceptance Sampling.

- (a) Submit a two qt minimum sample, of the styrene butadiene latex emulsion to the AME daily for each lot of material used in a day's production.
- (b) A batch for LMC is defined as the capacity of the equipment being used on the project. Slump and air samples will be taken and tested before the placement of a batch is permitted. The slump shall be measured four to five minutes after discharge from the mixer. The test material shall be deposited off the deck and not be disturbed during this



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waiting period. One additional sample for slump and air will be taken randomly during the placement of each batch. For seven day compressive strength, two tests each per batch are required. A test is defined as consisting of two companion cylinders. The samples for these tests will be taken at random while the placement is in progress.

TABLE 902.13 A

REQUIREMENTS FOR CHEMICAL PROPERTIES OF LATEX EMULSION MATERIALS				
PROPERTY	SPECIFICATIONS		QUALITY ASSURANCE TESTS	
	LIMITS	TOLERANCE	PREQUALIFICATION TESTS	CONTROL AND ACCEPTANCE
Color	White	—	X	X
pH	9.0 – 11.0	—	X	X
Weight, lb/gal	8.40 – 8.47	—	X	X
Solids Content, %	46 – 53	—	X	X
*Butadiene Content, % of polymer	30 – 40	—	—	—
Viscosity @ 10 rpm-cps	Match Original	± 20	X	X
*Surface Tension, dynes/cm max	50	—	—	—
*Mean Particle Size, polymer – Å	1400 – 2500	—	—	—
Coagulum, % max	0.10	—	X	X
*Freeze-Thaw Stability, coagulum, % max	0.10	—	X	X
Infrared Spectra of Latex Film	Match Original	—	X	X
Infrared of Alcohol, Soluble Portion of Latex	Match Original	—	X	X
Shelf Life, min	1 yr	—	X	—

Note 1: Quality assurance tests shall be conducted as specified in MSMT 612 except those denoted by an * shall be conducted as specified in FHWA RD – 78-35.

Note 2: The original or prequalification sample shall be accompanied by the producer's certification on all of the tests and properties noted above and as specified in TC-1.03. The certification shall contain actual test values of the product and the infrared spectrograph.

Note 3: A separate certification is required for each lot of material. The certification shall note the date of manufacture, lot size, and whether or not the material is identical to the formulation of the original sample.



TABLE 902.13 B

LATEX MODIFIED CONCRETE PHYSICAL PROPERTIES			
TEST PROPERTY	TEST VALUES	QUALITY ASSURANCE TESTS	
		PREQUALIFIED TESTS	CONTROL AND ACCEPTANCE
7 Day Compressive Strength, psi min	3000	X	X
28 Day Compressive Strength, psi min	3500	X	—
42 Day Compressive Strength, psi min	3500	X	—
7 Day Flexural Strength, psi min	550	X	—
28 Day Flexural Strength, psi min	650	X	—
42 Day Shear Bond Strength, psi min	2000	X	—
Durability Factor, 300 cycles, % min	85	X	—
Chloride Permeability, Ppm max	510	X	—
Scaling Resistance, 50 cycles, max	3	X	—

Note 1: Quality assurance tests shall be conducted as specified in MSMT 721.

Note 2: Seven Day Compressive Strength Test will be used for Control & Acceptance of the material. The minimum specified design strength is 3000 psi at seven days. The mix design approval and acceptance will be based on a coefficient of variation of 10 percent with a probability of 1 in 10 tests falling below the specified strength. Only test values 80% or greater than the specified strength will be accepted

902.14 RAPID HARDENING CEMENTITIOUS MATERIALS FOR CONCRETE PAVEMENT REPAIRS. Materials shall be a dry, packaged cementitious mortar having less than 5 percent by weight of aggregate retained on the 3/8 in. sieve and meet the following requirements:

Classification.

- Class I — For use at ambient temperatures below 50 F.
- Class II — For use at ambient temperatures of 50 to 90 F.
- Class III — For use at ambient temperatures above 90 F.

Chemical Requirements. C 928 except that no organic compounds such as epoxy resins or polyesters as the principal binder.



Physical Requirements. Meet the following when tested per MSMT 725:

COMPRESSIVE STRENGTH, psi min				
CLASSIFICATION	< 2 hr	2-6 hr	6 hr	28 days
Type I — Slow	—	—	2000	4500
Type II — Rapid	—	2000	—	4500
Type III — Very Rapid	2500	—	—	4500

TEST RESULTS	
TEST PROPERTY	LIMITS
Bond Strength, 7 days, psi min	2000
Length Change, increase after 28 days in water, based on length at 3 hr, % max	+ 0.15
Length Change, decrease after 28 days, % max	- 0.15
Freeze Thaw, loss after 25 cycles in 10% CaCl ₂ solution, % max	8
Initial Setting Time, minutes min	10

Marking. All packages delivered to the project shall be marked with the following information:

- (a) Date material was packaged.
- (b) Approximate setting time.
- (c) Recommended dosage of water or liquid component.
- (d) Mixing instructions.
- (e) Class or temperature range.

Certification. The manufacturer shall furnish certification as specified in TC-1.03 showing the actual test results for each class and type of material submitted to the Laboratory.

902.15 SYNTHETIC FIBERS. When synthetic fibers are specified in the Contract Documents, the fibers shall be 1/2 to 1-1/2 in. long and conform to C 1116, Type III. The manufacturer shall furnish certification as specified in TC-1.03. The quantity of fibers used and their point of introduction into the mix shall conform to the fiber manufacturer's recommendations.

902.16 CONTROLLED LOW STRENGTH MATERIAL.

902.16.01 Usage. Controlled Low Strength Material (CLSM) shall consist of the types described below:

TYPE A – Used where future excavation of the CLSM may be necessary (e.g. utility trenches, pipe trenches, bridge abutments, and around box culverts).

TYPE B – Used where future excavation of the CLSM is not anticipated (e.g. filling abandoned conduits, pipes, tunnels, mines, etc. and replacing unsuitable soils below roadway and structure foundations where extra strength is required).

902.16.02 Materials.

Coarse Aggregate	901.01*
Fine Aggregate	901.01
Cement	902.03 and 902.04
Concrete Admixtures	902.06
Fly Ash	902.06.04
Water	921.01

*maximum size of 3/4 in.

Produce CLSM in conformance with the applicable portions of Section 915 and the following:

902.16.03 Proportioning. Submit the sources and proportions of materials, and test data for each CLSM mixture prior to construction. CLSM shall be proportioned, on the basis of field experience and/or laboratory trial mixtures, to produce a flowable and self-compacting mixture meeting the requirements of 902.16.04.

CLSM shall be proportioned by weight; with the exception of water and chemical admixtures. Water and chemical admixtures may be proportioned by volume or weight.

902.16.04 CLSM Mixtures. Proportion CLSM with sufficient amounts of Portland cement, fly ash, or ground granulated blast furnace slag; individually or in combination, to produce a cohesive, non-segregating mixture that conforms to the physical properties in the following table:

CLSM Mix	28 Day Compressive Strength, (psi) ASTM D4832	Flow Consistency, (in.) ASTM D6103
Type A	50 - 200	8 min.
Type B	500 min.	8 min.



**CATEGORY 900
MATERIALS**

**SECTION 904 – PERFORMANCE GRADED
ASPHALT BINDERS AND HOT MIX ASPHALT**

684 **DELETE:** 904.04.02 Mix Design in its entirety.

INSERT: The following.

904.04.02 Mix Design. Develop asphalt mix designs in conformance with MSMT 416 and M323, except replace “Table 6, Superpave HMA Design Requirements” with the following:

DESIGN LEVEL	20-Year Design ESALs	N_{design}
1	<300,000	50
2	300,000 to <3,000,000	65
3	3,000,000 to <10,000,000	80
4	10,000,000 to <30,000,000	80
5	≥30,000,000	100

Design asphalt mixes to the Design Level specified in the Contract Documents.

Asphalt mixes designed with Reclaimed Asphalt Pavement (RAP) and/or Reclaimed Asphalt Shingles (RAS) shall conform to MSMT 412.



**CATEGORY 900
MATERIALS**

SECTION 905 – PIPE

694 **DELETE:** Sections 905.01 and 905.02 in their entirety.

INSERT: The following.

905.01 CERTIFICATION. Furnish certification for pipe as specified in TC-1.03.

MATERIAL	SPECIFICATION	REMARKS
Nonreinforced Concrete Pipe	M 86, Class 3	–
Reinforced Concrete Pipe	M 170, Class 4 and 5	60 in. and smaller diameter, Load bearing option. Larger than 60 in. diameter, Material option.
Reinforced Concrete Elliptical Pipe	M 207, Class 4, Horizontal installation only	60 in. and smaller equivalent diameter, Load bearing option. Larger than 60 in. equivalent diameter, Material option.
Concrete End Sections	M 170	Class 3 pipe reinforcement required
Reinforced Concrete Arch Culvert	M 206	–
Concrete Drain Tile	M 178	–
Non-Asbestos Fiber-Cement Storm Drain Pipe	C 1450	–
Reinforced Concrete Low-Head Pressure Pipe	C 361	–
Corrugated Polyethylene Pipe	M 294	–
Corrugated Polyethylene Drainage Pipe	M 252	Perforated underdrain and underdrain outlet pipe.
Corrugated Polypropylene Drainage Pipe	MP 21	–
Polyvinyl Chloride (PVC) Profile Wall Pipe	M 304	–
Polyvinyl Chloride (PVC) Pipe	M 278	Underdrain outlet pipe
	M 278 (a)	Perforated underdrain
Joints for Concrete Pipe and Manholes Using Rubber Gaskets	C 443	–
Joints for Concrete Pipe, Manholes and Precast Box Sections Using Preformed Flexible Joint Sealants	C 990	Not for use with circular pipe
Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals	D 3212	–
Corrugated Steel Pipe, Pipe Arches and Underdrain	M 36 (b), (c)	End finish shall be annular corrugations
Corrugated Aluminum Alloy Pipe	M 196 (b)	End finish shall be annular corrugations
Structural Plate for Pipe, Pipe Arches and Arches	M 167	–
Copper Pipe	Fed Spec WW – T-799, Type K	–
Polyethylene (PE) Precoated Corrugated Steel Pipe	M 245 and M 246	Minimum thickness 10 mil on each of the surfaces.

- (a) Perforations shall conform to the requirements of F 758.
- (b) Bands with dimples are prohibited.



(c) All Corrugated Steel Pipe shall be aluminum-coated Type 2 conforming to M 274 unless otherwise specified.

905.02 CERTIFIED REINFORCED CONCRETE PIPE PLANTS. Reinforced concrete pipe (RCP) will be accepted on certification based on TC-1.03 and the requirements outlined below. This includes the sampling, testing, documentation, and certification of the product by the manufacturer in combination with an Administration monitoring program.

Annual Inspections. Plants producing material for SHA, or an SHA inspected contract, for the first time or after a break in production longer than one calendar year will be subject to a comprehensive inspection of its production, testing, storage facilities, materials used and applicable documentation prior to production. Each plant will be subject to another comprehensive inspection at the beginning of each calendar year thereafter. The Administration will determine whether plant equipment and personnel conform to all applicable specifications and that suitable testing facilities are available. Submit a Quality Control Plan (QCP) for review and approval prior to inspection. The producer is responsible for ensuring timely delivery of the QCP. The QCP shall include the following:

- (a) The manner in which the materials will be handled including.
 - (1) Locations of stockpiles.
 - (2) Methods of weighing and batching material into mixers.
 - (3) Sources of materials and certifications that those materials meet these Specifications.
 - (4) Methods to be used to heat or cool materials during periods of extreme temperature.
- (b) The following Quality Control (QC) procedures.
 - (1) The names, qualifications, responsibilities and a unique identification number for each of the QC personnel and the designation of a QC manager.
 - (2) Sampling and testing methods and frequencies.
 - (3) Method used for inspecting reinforcement cages prior to and during production.
 - (4) Method of curing.
 - (5) Method of maintaining accurate QC records.
 - (6) Samples of forms approved by the Administration.
 - (7) Patching procedure.



(8) Method of preparation of units for shipping.

(9) Method of identification of each unit as tested and approved.

Certification by a Professional Engineer registered in the State of Maryland attesting the plant's facilities conform to all applicable specifications will be accepted in lieu of Administration inspection. However, final determination of conformance will be as determined.

905.02.01 Responsibilities of the Concrete Pipe Producer. Perform Quality Control operations at the plant to ensure that the material conforms to specifications. The QC process will be subject to unannounced periodic Quality Assurance (QA) verification and the plant's QC personnel shall fully participate in the verification process. Submit any change in personnel, production, testing facility and policy as a supplement to the QCP in writing within 10 days.

905.02.02 Lot Size. A pipe lot is defined as a maximum 14-day production run of concrete pipe of like size, material, strength designation, and manufacturing process. The 14 days need not be consecutive, as long as they occur within a period of 30 consecutive days and the manufacturing process is not altered in any way between production days. Lot size may include up to 1000 pieces for 12 to 36 in. pipe and 18 to 36 in. equivalent elliptical diameter pipe, or 500 pieces for 42 in. and larger pipe and 42 in. and larger equivalent elliptical diameter pipe.

905.02.03 Acceptance Testing. Perform a three-edge bearing test to produce a 0.01 in. crack for each lot in conformance with M 170, section 5.1.1 except as modified for pipe diameter per Table 905. Pipe that have been tested only to the formation of a 0.01 in. crack and that meet the 0.01 in. or lesser load requirement will be considered acceptable for use.

905.02.03 Quality Control Testing. Perform one three-edge bearing test to ultimate load at least once every twelve months in conformance with M 170, Section 5.1.1 for each size and class of pipe shipped to SHA inspected contracts. Also, perform an absorption test on each size and class of pipe manufactured and shipped to Administration projects at least once every twelve months. Specify in the QCP the method selected to test the lots for ultimate load and absorption.

905.02.04 Test Facilities. The producer's facilities, equipment, and quality control personnel shall be capable of conducting the tests specified in T 280 and will be approved as part of the Annual Inspection. Identify all QC personnel in accordance with 905.02 (b) (1) with a unique number used for testing and stamping or stenciling pipe for shipping. Record that number in the QCP and include the individual's printed name and signature. Maintain yearly calibration certificates on all equipment used for testing. The



producer may elect to use the services of an independent commercial testing laboratory as approved in lieu of conducting their own tests.

905.02.05 Shipment. Pipe may be shipped to Administration projects only after the required testing for all pipe in the lot have been completed with acceptable results and all pipe to be shipped is at least the age of the test specimens at testing. Visual inspection of the pipe and the accompanying documentation will be made when pipe is received on the project to verify compliance with certification requirements.

Prior to shipping, mark the following information on the inside of each pipe.

- (a) Plant name.
- (b) Plant location.
- (c) Size of pipe.
- (d) Class of pipe.
- (e) Date of manufacture.
- (f) Quality control stamp.
- (g) Quality control personnel number.

905.02.06 Certification. Manufacturer's certification shall accompany each shipment of pipe. Deliver a copy of the certification to the Engineer, the Administration's laboratory, the Contractor, and maintain a copy at the plant. Certification shall include the following:

- (a) The plant name, address, and location.
- (b) Size and class of the pipe.
- (c) Date of manufacture and shipment.
- (d) Number of pieces.
- (e) Administration Contract number.
- (f) Statement of Specification compliance.
- (g) Signature and number of the quality control personnel that inspected the shipment.



905.02.07 Records. Maintain all testing and inspection documents at the production plant for at least three years from the manufacture date and make available upon request. Collect and maintain conformance certificates and mill test reports for aggregates, cement, fly ash, joint material, reinforcing steel, and other materials intended for use in products used on Administration projects.

905.02.08 Quality Control Forms. Maintain an Administration approved quality control form for all pipe produced for use on Administration projects. Include the following on the forms for each lot:

GENERAL INFORMATION	PIPE DIMENSIONS	REINFORCEMENT	TESTS
Plant Name Lot Identification Production Dates Pipe Class Units Per Lot Technician Signature <u>Material Sources</u> Cement Fine Aggregate Reinforcement	Diameter	Size Spacing Area: Specification and Test Results	Visual Inspection
	Length		Adequacy and Quality of Welds and Splices
	Wall Thickness	THREE EDGE BEARING	
	Joint Style	0.01 in. Crack Strength: Specification and Test Results	
			Ultimate Strength: Specification and Test Results: Once per year

905.02.09 Responsibilities of the Administration. The Administration will notify each plant when to present its Quality Control Plan. Thirty days will be provided to make arrangements for delivery after the Administration is notified of the plan's completion. Verification of certification by Quality Assurance Audit will be performed a minimum of once per year, as determined.

The Administration reserves the right to discontinue acceptance of RCP if the verification process indicates that materials, test procedures, or finished pipe do not conform to the specifications, Contract Documents or QCP. Producers will be notified of any type of non-compliance revealed during Quality Assurance Audits and provided with a resolution procedure to resolve any deficiencies.



CATEGORY 900
MATERIALS

SECTION 908 — REINFORCEMENT STEEL

703 **DELETE:** 908.07 thru .10 in their entireties.

INSERT: The following.

908.07 FABRICATED STEEL BAR MATS. Steel shall meet A 184.

908.08 WIRE FABRIC FOR PNEUMATICALLY APPLIED MORTAR AND CONCRETE ENCASEMENT. Fabric shall meet A 185 and be galvanized as specified in 906.01.01. Fabricate from size W1.4 wire on 3 in. centers in each direction or from W0.9 wire on 2 in. centers in each direction.

908.09 COLD DRAWN STEEL WIRE. Concrete reinforcement shall meet M 32.

908.10 TIE DEVICES FOR CONCRETE PAVEMENT. Tie device sizes shall be as specified and produce a frictional force of at least 160 lb/ft per foot of spacing when tested per MSMT 512.

908.11 STEEL STRAND. M 203, Grade 270, Low Relaxation Strand.



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CATEGORY 900
MATERIALS

SECTION 914 — CHAIN LINK FENCE

725 **DELETE:** 914.03 POSTS, BRACES, FITTINGS, AND HARDWARE in its entirety.

INSERT: The following.

914.03 POSTS, BRACES, FITTINGS, AND HARDWARE. M 181. When PVC coating is specified, PVC shall be thermally fused and bonded. The PVC thickness shall be 10 to 15 mil except that bolts, nuts, and washers shall be metallic coated steel. Polyester powder coating material for galvanized metal meeting 465.03.02(b) may be used in lieu of PVC.

Round posts shall meet industry standards for Class 1 or 2.



**CATEGORY 900
MATERIALS**

740 **DELETE:** SECTION 916 — SOIL AND SOIL-AGGREGATE BORROW in its entirety.

INSERT: The following.

**SECTION 916 — SOIL AND SOIL-AGGREGATE
BORROW**

916.01 BORROW EXCAVATION. A soil or soil aggregate mixture meeting the following:

Maximum dry density and optimum moisture content of the material per T 180, Method C unless the material has more than 35 percent retained on the No. 4 sieve, in which case Method D shall be used. Material with a maximum dry density of less than 100 lb/ft³ is unsatisfactory and shall not be used in embankments. Potentially expansive materials, such as steel slag, are prohibited.

Refer to the Recycled Materials Special Provisions located elsewhere in the Contract Documents.

BORROW REQUIREMENTS						
Class Borrow	Max Dry Density Minimum P.C.F. T 180	LL Maximum T 89	PI Maximum T 90	Gradation Requirements T 88	Reference MSMT Soil Classification	Reference AASHTO Classification
Select Borrow	105	34	7	30% max passing No. 200 sieve	A-2,A-3, A-2-4	A-1-a, A-1-b, A-3, A-2-4
Capping Borrow	105	34	7	30% max passing No. 200 sieve*	A-2,A-3, A-2-4	A-1-a, A-1-b, A-3, A-2-4
Modified Borrow	125	30	9	50% min.retained on No. 4 sieve	Any material except A-5	A-2-4, A-4**
Common Borrow	100	N/A	N/A	N/A	N/A	N/A
<p>* When material has no liquid and plastic limit, and the amount of material that passes the No. 4 sieve and retained on the No. 10 sieve is less than 10 percent of the total sample mass, the material shall have at least 15 percent passing the No. 200 sieve.</p> <p>** When A-4, the material has to be a manufactured product.</p>						



**CATEGORY 900
MATERIALS**

741 **DELETE**: SECTION 917 — EPOXY PROTECTIVE COATINGS in its entirety.

INSERT: The following.

**SECTION 917 — MISCELLANEOUS PROTECTIVE
COATINGS**

917.01 EPOXY PROTECTIVE COATINGS FOR CONCRETE. Protective coatings shall be two component epoxy systems for use in conjunction with concrete. One component shall be a clear or pigmented condensation product of the reaction of epichlorohydrin with bisphenol A, the resin of which shall be composed of 100 percent reactive constituents. The other component shall be a clear polyamide hardener.

The producer shall submit a sample of each component for laboratory analysis. The sample shall be coded as the original sample. The original and all subsequent samples shall conform to the following:

TEST PROPERTY	TEST METHOD	SPECIFICATION LIMITS
Pot Life, hr min	Fed. Spec TT-C-535	8
Color	Fed. Std. 595	Gray No. 26440
Dry Film Thickness 1st coat, mil min 2nd coat, mil min	D 1005	2 3
Sagging	D 4400	Must pass test for Recommended film Thickness
Flexibility	Federal Spec TT-P-115	Must not crack, check or delaminate
Infrared Spectrogram	Equipment Manufacturer's Procedure	Each component shall match original sample
Tensile Strength, psi min	MSMT 609	400

917.02 FUSION BONDED EPOXY POWDER COATINGS FOR STEEL. M 284. The epoxy protective coating shall be a one-coat, heat curable, thermosetting powdered coating that is electrostatically applied on metal surfaces as specified. For reinforcement steel, the color shall be bright, in order to contrast with the normal color of reinforcement and rust (e.g. orange, red, green, yellow etc. and not brown or any color in the rust family). Reinforcement steel coated before fabrication shall have all hairline cracks and minor damage on fabrication bends patched,



SPECIAL PROVISIONS INSERT
917 — MISCELLANEOUS PROTECTIVE COATING

even if there is no bond loss. Select epoxy coating material from the Qualified Products List (QPL) maintained by the Office of Materials Technology (OMT).

917.02.01 Touch Up System. Material used for the touch up system shall be a two part epoxy system designated and color matched for patching the epoxy coating used.

Patching material shall be available through the manufacturer of the epoxy powder. The patching material shall be fully cured one hour after application at 35 F ambient.

917.02.02 Certification. The manufacturer shall furnish certification as specified in TC-1.03.

917.03 FUSION BONDED POLYESTER POWDER.

917.03.01 Materials. The polyester powder shall be super durable TGIC (Triglycidyl Isocyanurate) polyester conforming to 917.03.03. The polyester powder shall be selected from the QPL maintained by OMT.

917.03.02 Polyester Qualification Requirements. The following physical tests will only be required to qualify the polyester, and will not be required for certification:

TEST PROPERTY	TEST METHOD	SPECIFICATION LIMITS
Abrasion Resistance	Taber Abraser CS-10, 1000 gm load, 1000 cycles, D 1044	100 mg max weight loss
Adhesion	D 3359, Method A (Bonderite 1000 panel)	Rating 5A
Gloss	D 525, 60° initial	30 - 45 per Fed. Std 595
Hardness	D 3363	Min 2H - No gouge
Impact	D 2794	Pass 80 in.·lb
Salt Spray Resistance	B 117, D 1654 1000 hr (Bonderite 1000 panel)	Table 2, Rating 7
Thickness	G 12	7 ± 2 mils
Color	E 1331 or E 1338	As specified in the Contract Documents from Fed. Std. 595 Color No. 20040
Infrared Spectrogram	Equipment manufacture's procedures	Manufacturer's IR
Weather Resistance	D 4587, test condition D Test shall be conducted with a UVA lamp (340 nm peak) for 1000 hr	50 % min gloss retention
Specific Gravity	D 5965	Manufacturer's result
Chloride Permeability	D775, A 1.3.4	<0.0001M



917.03.03 Certification. The polyester powder manufacturer shall furnish production batch certification as specified in TC-1.03 showing conformance to the following:

TEST PROPERTY	TEST METHOD	SPECIFICATION LIMITS
Infrared Spectrogram	D 2621	Match Qualification sample
Taber Abrasion Resistance, mg loss, max	D 4060	100
Specific Gravity	D 5965 (Method A)	Qualification sample \pm 0.02
Color	E 1331 or E 1338	Match Fed. Std. 595 color no. specified in Contract Documents

917.03.04 Acceptance. Acceptance will be based on the quality control test results required on the manufacturer's certification. The coating applicator shall be responsible for reviewing certifications to ensure conformance to TC-1.03. The coating applicator shall also maintain a file of all reviewed certifications.



CATEGORY 900
MATERIALS

SECTION 918 — TRAFFIC BARRIERS

747 **DELETE: 918.01 TRAFFIC BARRIER W BEAM** in its entirety.

INSERT: The following.

918.01 TRAFFIC BARRIER W BEAM/THRIE-BEAM. M 180, Type II for rail elements and end treatments. Coat galvanized rail and end treatment elements designated for fusion bonded polyester powder coating in accordance with 465. Galvanized rail and end treatments to be fusion bonded powder coated shall be fabricated and have holes punched prior to being hot dipped galvanized.

DELETE: 918.02 TRAFFIC BARRIER POSTS in its entirety.

INSERT: The following.

918.02 TRAFFIC BARRIER POSTS. A36 for steel and M 111 for galvanized coating. Coat galvanized post elements designated for fusion bonded polyester powder coating in accordance with Section 465. Galvanized posts to be fusion bonded powder coated shall be fabricated and have holes punched prior to being hot dipped galvanized.

CATEGORY 900
MATERIALS

SECTION 920 — LANDSCAPING MATERIALS

748 **DELETE:** Section 920 — Landscaping Materials, in its entirety.

INSERT: The following.

SECTION 920 — LANDSCAPING MATERIALS

920.01 SOILS. Topsoil, Subsoil, and Bioretention Soil Mix shall conform to requirements of this section. Soils shall be sampled, tested and approved per specifications of MSMT 356 by the Soils and Aggregates Technology Division of the Office of Materials Technology, or by other approved tests or laboratories. Soils shall be amended as specified by the Nutrient Management Plan (NMP).

920.01.01 Existing Topsoil and Salvaged Topsoil.

- (a) **Existing Topsoil.** Existing topsoil is the surface material of existing landscaped areas on SHA property that will be used for seeding or other landscape construction without excavation or significant grading.
- (b) **Salvaged Topsoil.** Salvaged topsoil is the surface material of existing landscaped areas on SHA property that will be used for seeding or other landscape construction after being excavated, stockpiled, and placed in designated areas.
- (c) **Composition.** Existing topsoil and salvaged topsoil shall conform to the following.

COMPOSITION - EXISTING TOPSOIL & SALVAGED TOPSOIL					
TEST PROPERTY	TEST¹ METHOD	TEST VALUE AND AMENDMENT			
Prohibited Weeds	—	Free of live stems or roots of Shattercane, Johnsongrass, Canada Thistle, Bull Thistle, Plumeless Thistle, Musk Thistle, and Common Reed when inspected before transportation.			
Debris	—	1.0 % or less by weight of cement, concrete, asphalt, crushed gravel or construction debris when inspected.			
Grading Analysis	MSMT 356	Sieve Size		Passing by Weight Minimum %	
		2 in.		100	
		No. 4		90	
		No. 10		80	
Textural Analysis	MSMT 356	Particle		% Passing by Weight	
		Size	mm	Minimum	Maximum
		Sand	2.0 – 0.050	15	77
		Silt	0.050 – 0.002	Combined Silt and Clay 23	80
Clay	less than 0.002	30			

SPECIAL PROVISIONS
920 — LANDSCAPING MATERIALS

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Soil pH	MSMT 356	pH of 4.8 to 7.6. Apply limestone to topsoil with pH 4.8 to 6.1 per NMP. Apply sulfur to topsoil with pH 7.1 to 7.6 per NMP.
Organic Matter	MSMT 356	1.0 to 8.0 % OM by weight. Apply compost to topsoil with 1.0 to 1.7% OM per NMP.
Nutrient Content	MSMT 356	Administration will assess. Apply fertilizer per NMP for nitrogen requirement and optimum fertility index values (FIV) for phosphorus and potassium.
Soluble Salts	MSMT 356	800 ppm (1.25 mmhos/cm) or less. Apply gypsum to topsoil with 500 to 800 ppm (0.78 to 1.25 mhos/cm) per NMP.
Harmful Materials	—	Topsoil shall not contain substances in concentrations that are harmful to human health, water quality, or plant growth. Industrial waste such as ash, slag, raw sludge, dredge spoil, or similar materials shall not be soil components.
Note:		
¹ Materials Standards and Materials Testing 356 (MSMT 356) published by the Administration defines the approved test methods; other materials shall be approved by visual inspection or methods defined by the Landscape Operations Division.		

920.01.02 Furnished Topsoil. A natural, friable, surface soil that is uniform in color and texture, and not derived from the project. Producers shall be included in the Qualified Products List maintained by the Administration for Furnished Topsoil.

(a) Composition. Furnished topsoil shall conform to the following.

COMPOSITION - FURNISHED TOPSOIL					
TEST PROPERTY	TEST¹ METHOD	TEST VALUE AND AMENDMENT			
Prohibited Weeds	—	Free of live stems and roots of species in 920.01.01 as well as live stems and roots of Bermudagrass, Quackgrass, and Yellow Nutsedge.			
Debris	—	920.01.01			
Grading Analysis	MSMT 356	920.01.01			
Textural Analysis	MSMT 356	Particle		% Passing by Weight	
		Size	mm	Minimum	Maximum
		Sand	2.0 – 0.050	20	75
		Silt	0.050 – 0.002	Combined Silt and Clay 25	75
Clay	less than 0.002	20			
Soil pH	MSMT 356	pH of 5.2 to 7.6. Apply limestone to topsoil with pH 5.2 to 6.1 per NMP. Apply sulfur to topsoil with pH 7.1 to 7.6 per NMP.			
Organic Matter	MSMT 356	920.01.01			
Nutrient Content	MSMT 356	920.01.01			
Soluble Salts	MSMT 356	500 ppm (1.25 mmhos/cm) or less.			
Harmful Materials	—	920.01.01			
Note:					
¹ Materials Standards and Materials Testing 356 (MSMT) published by the Administration defines the approved test methods; other materials shall be approved by visual inspection or methods defined by the Landscape Operations Division.					

- (b) Storage.** Furnished topsoil shall be a homogenous mixture stored at a specific, identifiable site in a stockpile constructed as specified in 308.03.28 and 701.03.02(c).
- (c) Approval.** Tests shall be completed and approval will be granted before furnished topsoil is delivered. Ensure that Form 27B has been completed and that a source of supply letter for the furnished topsoil soil has been submitted and approved.
- (d) Delivery.** Certification shall be submitted that the furnished topsoil is delivered from an approved stockpile. A bill of lading or other acceptable documentation that identifies the approved source of supply shall be submitted when furnished topsoil is delivered.

920.01.03 Salvaged Subsoil. Salvaged subsoil is the subsurface material of existing areas that will be used for landscape construction after being excavated, stockpiled, and placed in designated areas.

- (a) Composition.** Salvaged topsoil shall conform to the following.

COMPOSITION - SALVAGED SUBSOIL					
TEST PROPERTY	TEST¹ METHOD	TEST VALUE AND AMENDMENT			
Prohibited Weeds	—	920.01.01			
Debris	—	5.0 % or less by weight of any combination of cement, concrete, asphalt, or other construction debris when inspected.			
Grading Analysis	MSMT 356	Sieve Size		Passing by Weight Minimum %	
		2 in.		90	
		No. 4		85	
		No. 10		60	
Textural Analysis	MSMT 356	Particle		% Passing by Weight	
		Size	mm	Minimum	Maximum
		Sand	2.0 – 0.050	10	85
		Silt	0.050 – 0.002	10	85
		Clay	less than 0.002	5	40
Soil pH	MSMT 356	pH of 4.5 to 7.8.			
Organic Matter	MSMT 356	0.1 to 5.0 % by weight.			
Soluble Salts	MSMT 356	1000 ppm (1.56 mmhos/cm) or less.			
Harmful Materials	—	920.01.01			
Note: ¹ Materials Standards and Materials Testing 356 (MSMT) published by the Administration defines the approved test methods; other materials shall be approved by visual inspection or methods defined by the Landscape Operations Division.					

920.01.04 Furnished Subsoil. A natural subsurface soil that is uniform in texture and not derived from the project. Furnished subsoil shall conform to the following.

(a) Composition. Furnished subsoil shall conform to the following.

COMPOSITION - FURNISHED SUBSOIL		
TEST PROPERTY	TEST¹ METHOD	TEST VALUE AND AMENDMENT
Prohibited Weeds	—	920.01.01
Debris	—	920.01.03
Grading Analysis	MSMT 356	920.01.03
Textural Analysis	MSMT 356	920.01.03
Soil pH	MSMT 356	920.01.03
Organic Matter	MSMT 356	920.01.03
Soluble Salts	MSMT 356	700 ppm (1.09 mmhos/cm) or less
Harmful Materials	—	920.01.01
Note:		
¹ Materials Standards and Materials Testing 356 (MSMT) published by the Administration defines the approved test methods; other materials shall be approved by visual inspection or methods defined by the Landscape Operations Division.		

(b) Storage. 920.01.02(b).

(c) Approval. 920.01.02(c).

(d) Certification and Delivery. 920.01.02(d).

920.01.05 Bioretention Soil Mix (BSM). BSM shall be a homogenous mixture as follows.

(a) Components. BSM shall be composed of Sand, Furnished Topsoil, and Hardwood Mulch. BSM may include approved soil amendments. No other components shall be used.

(1) Sand. Sand shall be washed silica sand that conforms to ASTM C-33 or ASTM M-6 with less than 1percent by weight of any combination of diabase, greystone, calcareous, or dolomitic sand.

(2) Furnished Topsoil. 920.01.02.

- (3) Hardwood Mulch.** Hardwood Mulch shall be the bark and wood of hardwood trees that is milled and screened to a uniform particle size of 2 in. or less. Hardwood Mulch shall be composted and aged for 6 months or longer, with negligible quantity of sawdust and no foreign materials.
- (4) Amendments.** 920.02. Limestone, Sulfur, and Iron Sulfate may be used to adjust pH of BSM. No other amendments shall be used.

(b) Composition. BSM shall conform to the following.

COMPOSITION- BIORETENTION SOIL MIX (BSM)					
TEST PROPERTY		TEST VALUE			
Weeds		Free of seed and viable plant parts of species in 920.06.02(a)(b)(c) when inspected.			
Debris		No observable content of cement, concrete, asphalt, crushed gravel or construction debris.			
Hardwood Mulch		20% of the loose volume of BSM when inspected.			
Textural Analysis		Particle		% Passing by Weight	
		Size	mm	Minimum	Maximum
		Sand	2.0 – 0.050	55	85
		Silt	0.050 – 0.002	1	20
Clay		less than 0.002	1	8	
Soil pH		pH of 5.7 to 7.4.			
Organic Matter		Minimum 1.5 % by weight.			
Soluble Salts		500 ppm (1.25 mmhos/cm) or less.			
Harmful Materials		920.01.01(a).			

- (d) Storage.** 920.01.02(b).
- (e) Approval.** 920.01.02(c).
- (f) Certification and Delivery.** 920.01.02(d).

920.02 SOIL AMENDMENTS.

920.02.01 Limestone. Limestone shall be an agricultural product manufactured and labeled for sale in Maryland for increasing soil pH. Limestone shall contain at least 85 percent calcium and magnesium carbonates. Dolomitic limestone shall contain at least 10 percent magnesium as magnesium oxide and 85 percent calcium and magnesium carbonates.

Limestone shall be supplied as a fine powder, or as pellets produced from fine powder, that conforms to the following.

LIMESTONE GRADING ANALYSIS	
SIEVE Size Number	PASSING BY WEIGHT Minimum %
10	100
20	98
100	50

920.02.02 Sulfur. Sulfur shall be an agricultural product manufactured and labeled for sale in Maryland for reducing soil pH. Sulfur labeled as a fertilizer may also be used to supply sulfur as a plant nutrient. Sulfur shall be supplied as a fine powder or pelletized powder with a minimum purity of 90 percent elemental sulfur.

920.02.03 Iron Sulfate. Iron sulfate shall be an agricultural product manufactured and labeled for sale in Maryland for reducing soil pH. Iron sulfate labeled as a fertilizer may also be used to supply sulfur or iron as a plant nutrient. Iron sulfate shall be supplied as a fine powder or pelletized powder with a minimum purity of 15 percent water soluble iron derived from ferrous sulfate.

920.02.04 Gypsum. Gypsum shall be an agricultural product manufactured and labeled for sale in Maryland as an aid for improving soil structure and removing soil soluble salts, or as a fertilizer to supply calcium and sulfate. Gypsum shall be supplied as a fine powder or pelletized powder with a minimum purity of 68 percent calcium sulfate dihydrate.

920.02.05 Compost.

- (a) **Compost Types.** Compost shall be an agricultural product of biosolids or source-separated materials manufactured and labeled for sale in Maryland.
- (b) **Stability.** Compost shall be biologically mature and no longer able to reheat to thermophilic temperatures.
- (c) **pH.** Compost shall have a pH of 6.0 to 7.5.
- (d) **Soluble Salts.** Compost shall have a soluble salt concentration less than 10.0 mmhos/cm.
- (e) **Moisture.** Compost shall have a moisture content of 30 to 55 percent. When delivered, compost shall have a weight of 1400 lb per CY or less.
- (f) **Particle Size and Grading.** Compost shall be screened so that it has a uniform particle size of 0.5 in. or less, with grading analysis as follows.

COMPOST GRADING ANALYSIS	
SIEVE SIZE mm	PASSING BY VOLUME Maximum %
4.75	90
0.425	25
0.75	2.2

920.02.06 Peat Moss. A milled sphagnum peat moss with negligible woody substances.

920.02.07 Aged Pine Bark Fines. Derived from the bark of pine trees that have been composted and milled to a fineness approved for use by the Landscape Operations Division.

920.02.08 Water Absorbent Gel. A cross linked polyacrylamide agricultural product used to maintain moisture around bare root plants and as a soil conditioner. Formulas used shall conform to the manufacturer's recommendations.

920.03 FERTILIZERS.

920.03.01 Composition. Standard Fertilizers and Special Fertilizers shall be commercial grade products labeled for sale and use as agricultural fertilizer, and shall conform to Federal and Maryland State regulations and the Standards of the Association of Official Analytical Chemists. All analyses are subject to approval by the Landscape Operations Division prior to application.

(a) Standard Fertilizer. Standard fertilizers shall be produced of ingredients, analysis, and composition as follows.

(1) Ingredients. Standard fertilizers shall include one or more of the following.

FERTILIZER INGREDIENTS	
ammonium nitrate	polymer coated urea
ammonium sulfate	potassium chloride
biosolids	potassium nitrate
calcium nitrate	potassium sulfate (SOP)
diammonium phosphate (DAP)	sulfur coated urea
isobutylidene diurea	triple super phosphate
methylene urea	urea
monoammonium phosphate (MAP)	ureaform (UF)

(2) Analysis and Composition. Standard fertilizers shall contain nitrogen (N), phosphorus (P), potassium (K), and sulfate (SO₄) derived from ingredients above.

STANDARD FERTILIZER ANALYSIS AND COMPOSITION	
FERTILIZER	USE
0-0-50 SOP ^a	Source of phosphorus (P) and sulfate (SO ₄) fertilizer
11-52-0 MAP ^a	Source of nitrogen (N) and phosphorus (P) fertilizer
38-0-0 UF ^a	Source of slow-release nitrogen (N) fertilizer
20-16-12 (83% UF with MAP & SOP)	Turfgrass Establishment and other seeding and refertilizing
15-30-15 ^b	Temporary Seed
Notes:	
^a Purity shall be at least 98% UF, MAP, or SOP as indicated.	
^b Mixture of ingredients in 920.03.01(a)(1) with no more than 2% of any combination of other materials.	
^c Mixture of UF, MAP, and SOP with no more than 2% of any combination of other materials.	

(b) Special Fertilizers. Special fertilizers shall be of ingredients, analysis, and composition as follows.

(1) Ingredients. Special fertilizers shall provide label analysis guaranteeing nitrogen, phosphorus, and potassium from ingredients in 920.03.01(a) and also include plant micronutrients, coatings, or materials to augment their performance.

(2) Analysis and Composition. As follows.

SPECIAL FERTILIZER ANALYSIS AND COMPOSITION	
FERTILIZER ^a	USE
14-14-14 Polymer-coated fertilizer with minor nutrients	Slow-release fertilizer used to install trees, shrubs, perennials and other plant materials.
14-14-14 Granular fertilizer with minor nutrients	Slow-release fertilizer used to install trees, shrubs, perennials and other plant materials.
20-10-5 21 to 23 grams per fertilizer tablet. 13% water insoluble and 7% water soluble N, with minor nutrients	Slow release fertilizer tablet used to install trees, shrubs, perennials and other plant materials.
20-20-20 Water soluble powder fertilizer with minor nutrients	Fertilizer solution used to refertilize trees, shrubs, perennials and other plant materials
Note:	
^a Shall be a mixture of any ingredients listed in 920.03.01(a)(1) and (b)(1) with no more than 5% by weight of any combination of other materials.	

920.04 MULCHES. Materials used as mulch shall have a uniform texture and be free from foreign materials or concentrations of metals, chemicals, or other substances that are harmful to human health, water quality, or plant growth.

920.04.01 Straw Mulch. Shall consist of thoroughly threshed stems and leaves of barley, oats, rye, and wheat. Straw mulch shall be in an air-dry condition suitable for application with a mulch blower or other equipment. Straw mulch shall be visually inspected to ensure it is free of objectionable quantities of mold, foreign substances, and weed seeds.

920.04.02 Wood Cellulose Fiber Mulch. A uniformly processed wood product that is able to form a homogenous slurry with seed, fertilizer, and other materials under agitation with water.

The fiber shall perform satisfactorily in hydraulic seeding equipment without clogging or damaging the system. The slurry shall contain a green dye to provide easy visual inspection for uniformity of application.

The manufacturer shall furnish certification as specified in TC-1.03 of the Technical Association of Pulp and Paper Industry (TAPPI) in conformance with the following.

WOOD CELLULOSE FIBER	
TEST PROPERTY	TEST VALUE
Particle Length	Approx. 0.5 in.
Particle Thickness	Approx. 0.063 in.
Net Dry Weight Content	Minimum as stated on bag
pH, TAPPI Standard T 509	4.0 – 8.5
Ash Content, TAPPI Standard T 413	7.0% maximum
Water Holding Capacity	90% minimum

The material shall be delivered in packages of uniform weight, which shall not exceed 75 lb net weight and shall bear the name of the manufacturer, the net weight, and a supplemental statement of the net weight content.

920.04.03 Shredded Hardwood Bark (SHB) Mulch. Shall consist of natural bark derived from hardwood trees that has been milled and screened to a maximum 4 in. particle size. SHB mulch shall contain negligible quantities of sawdust or other non-bark woody materials.

920.04.04 Composted Wood Chip (CWC) Mulch. Shall consist of natural wood mechanically reduced to a maximum size of 2 x 2 x 0.5 in. by a chipping machine before being composted. Grading analysis of CWC mulch shall be as follows.

COMPOSTED WOOD CHIP MULCH	
SIEVE SIZE in.	PASSING BY VOLUME Maximum %
2	100
1	30
0.5	10

920.05 SOIL STABILIZATION MATTING.

920.05.01 Soil Stabilization Matting (SSM). SSM products shall be selected from the Office of Materials Technology’s Qualified Products List (QPL) for Soil Stabilization Matting Manufacturers.

SSM shall consist of machine-produced matting of uniform thickness, weave, or distribution of fibers, supplied in rolls at least 40 in. wide. SSM shall be smolder resistant.

The chemical components shall be nonleaching, nontoxic to vegetation and germinating seed, and noninjurious to the skin.

- (a) **Type A.** Degradable; excelsior or nonwoven coconut fibers with degradable, synthetic netting on top and bottom; netting shall not be permanent or quick break down. Type A soil stabilization matting products shall be listed in the current AASHTO National Transportation Product Evaluation Program (NTPEP) Report for Erosion Control Products. Large scale results shall be obtained by a Geosynthetic Institute Accredited or other approved laboratory for Criteria marked *.

COMPOSITION - TYPE A SSM		
CRITERIA	METHOD	MEASUREMENT
Thickness	D 6525	At least 0.25 in.
Weight	D 6475	At least 7.9 oz per yd ²
Tensile Strength – MD	D 6818	At least 6.25 lb per in.
Tensile Strength – TD	D 6818	At least 4.7 lb per in.
Light Penetration	D 6567	At least 5%
Slope Erosion – C Factor*	D 6459	No more than 0.2
Shear for 0.5 in Soil Loss*	D 6460	At least 1.75 lb per ft ²
Netting Opening		No more than 2.0 x 1.0 in.
Thread		Degradable
Stitching and Spacing		No more than 4.0 in apart

- (b) **Type B.** Permanent; non-woven, nondegradable, UV stabilized, synthetic fibers; with non-degradable, UV stabilized, synthetic netting on top and bottom. Type B soil stabilization matting products shall be listed in the current AASHTO National Transportation Product Evaluation Program (NTPEP) Report for Erosion Control Products. Large scale results shall be obtained by a Geosynthetic Institute Accredited or other approved laboratory for Criteria marked *.

COMPOSITION - TYPE B SSM		
CRITERIA	METHOD	MEASUREMENT
Thickness	D 6525	At least 0.3 in.
Weight	D 6655	At least 10.0 oz per yd ²
Tensile Strength – MD	D 6818	At least 12.5 lb per in.
Tensile Strength – TD	D 6818	At least 12.5 lb per in.
Tensile Strength > 500 hr. exp.	D 4355	At least 80 % of original
Light Penetration	D 6567	At least 10 %
Slope Erosion – C Factor*	D 6459	No more than 0.2
Shear for 0.5 in Soil Loss*	D 6460	At least 2.25 lb per ft ²
Netting Opening		No more than 1.0 x 0.75 in.
Thread		Nondegradable, UV stabilized, synthetic
Stitching and Spacing		No more than 4.0 in. apart

(c) **Type C.** Permanent; nondegradable, synthetic lattice; and easily filled with soil.

COMPOSITION - TYPE C SSM		
CRITERIA	METHOD	MEASUREMENT
Thickness	D 6525	At least 0.4 in.
Weight	D 6655	At least 7.0 oz per yd ²
Tensile Strength – MD	D 6818	At least 12.5 lb per in.
Tensile Strength – TD	D 6818	At least 9.5 lb per in.
Tensile Strength > 500 hr. exp.	D 4355	At least 80 % of original
Porosity or Open Area		At least 80 %

(d) **Type D.** Degradable; woven coir.

COMPOSITION - TYPE D SSM		
CRITERIA	METHOD	MEASUREMENT
Thickness	D 6525	At least 0.30 in.
Weight	D 6475	At least 19.0 oz per yd ²
Porosity or Open Area		At least 35 %

(e) **Type E.** Degradable; excelsior, straw, or straw/coconut blend fibers; with degradable, synthetic netting on top and bottom; netting shall not be permanent or quick break down. Type E soil stabilization matting products shall be listed in the current AASHTO National Transportation Product Evaluation Program (NTPEP) Report for Erosion Control Products. Large scale results shall be obtained by a Geosynthetic Institute Accredited or other approved laboratory for Criteria marked *.

COMPOSITION - TYPE E SSM		
CRITERIA	METHOD	MEASUREMENT
Thickness	D 6525	At least 0.25 in.
Weight	D 6475	Excelsior: 6.0 to 7.9 oz per yd ²
		Straw; Straw & Coconut: At least 6.0 oz per yd ²
Tensile Strength – MD	D 6818	At least 6.25 lb per in.
Tensile Strength – TD	D 6818	At least 2.5 lb per in.
Light Penetration	D 6567	At least 5 %
Slope Erosion – C Factor *	D 6459	No more than 0.2
Shear for 0.5 in Soil Loss *	D 6460	At least 1.5 lb per ft ²
Netting Opening		Excelsior: 2.0 x 1.0 in. or less
		Straw; Straw & Coconut: 0.75 x 0.75 in. or less
Thread		Degradable
Stitching and Spacing		Excelsior: 4.0 in. apart or less
		Straw, or Straw & Coconut: 2.0 in apart or less

920.05.02 Fasteners for Soil Stabilization Matting and Turfgrass Sod. Fasteners shall selected per 709.03.06 and conform to the following:

- (a) **Wood Peg.** Wood, biodegradable, Untreated; single leg is driven into the soil so that wider top is flush with turfgrass sod and SSM.

6 Inch. Approx. 6 in. long, 3/8 in. thick; top 1 in. wide, tapered to base.

- (b) **T-Head Pin.** Molded plastic; biodegradable. Single leg with barbs is driven into the soil so that molded T-Head top is flush with turfgrass sod and SSM.

6 Inch. Approx. 6 in. long, 3/8 in. thick; head 1 in. wide.

8 Inch. Approx. 8 in. long, 3/8 in. thick; head 1 in. wide.

- (c) **Circle-Top Pin.** Steel wire; single leg is driven into the soil so that coil or loop top is flush with turfgrass sod and SSM.

6 Inch. 11 gauge; leg 6 in long.

8 Inch. 11 gauge; leg 8 in. long.

- (d) **Round-Head Pin.** Molded plastic; biodegradable. Single leg with barbs is driven into the soil so that molded disk top is flush with turfgrass sod and SSM.

6 Inch. Approx. 6 in long; head 1 in. diameter.

8 Inch. Approx. 8 in long; head 1 in. diameter.

- (e) **U-Shape Staple.** Steel wire; two main legs are driven into the soil so that top of staple is flush with turfgrass sod and SSM.

6 Inch. 11 gauge bent into U shape; legs 6 in. long; top 1 to 1-1/2 in. wide.

8 Inch. 8 gauge bent into U shape; legs 8 in. long; top 1 to 1-1/2 in. wide.

12 Inch. 8 gauge bent into U shape; legs 12 in. long; top 1 to 1-1/2 in. wide

- (f) **Fabric Pin.** Steel nail; single leg is driven into the soil so that steel washer top is flush with SSM.

12 Inch. 11 gauge approx. 12 in. long.

18 Inch. 3/16 in. approx 18 in. long.

920.06 SEED AND TURFGRASS SOD STANDARDS.

920.06.01 Names and Naming. The authority for common and scientific names shall be the USDA NRCS The Plants Database website at <http://plants.usda.gov>. Cultivar names shall be those of the registered cultivar.

Plant and seed identification, tags, and labels shall correspond to the common name and scientific name of the species in The Plants Database. Any conflict in names or naming shall be resolved by the Engineer in consultation with the Landscape Operations Division.

920.06.02 Prohibited Weeds.

(a) **Weeds Prohibited in Turfgrass Sod and SHA Seed Mixtures.** Turfgrass Sod, SHA Turfgrass Seed Mix, SHA Temporary Seed Mix, and Additive Seed shall be free from seed or viable parts of the following species.

WEEDS PROHIBITED IN TURFGRASS SOD & SHA SEED MIXTURES	
COMMON NAME	SCIENTIFIC NAME
Annual Bluegrass	<i>Poa annua</i> L.
Balloonvine	<i>Cardiospermum halicacabum</i> L.
Bermudagrass	<i>Cynodon dactylon</i> (L.) Pers. (approved for Bermudagrass sod)
Canada Thistle	<i>Cirsium arvense</i> (L.) Scop.
Carolina Horsenettle	<i>Solanum carolinense</i> L.
Common Corncockle	<i>Agrostemma githago</i> L.
Common Reed = Phragmites	<i>Phragmites australis</i> (Cav.) Trin. ex Steud.
Crested Anoda = Spurred Anoda	<i>Anoda cristata</i> (L.) Schltld.
Dodder	<i>Cuscuta spp.</i> L.
Field Bindweed	<i>Convolvulus arvensis</i> L.
Japanese Bristlegrass = Giant Foxtail	<i>Setaria faberi</i> Herrm.
Java-Bean = Sicklepod	<i>Senna obtusifolia</i> (L.) Irwin and Barneby
Johnsongrass	<i>Sorghum halepense</i> (L.) Pers. and hybrids
Meadow Garlic = Wild Onion	<i>Allium canadense</i> L.
Plumeless Thistle, Musk Thistle	<i>Carduus</i> L.
Quackgrass	<i>Elytrigia repens</i> (L.) Gould
Rough Cocklebur	<i>Xanthium strumarium</i> L.
Serrated Tussock	<i>Nassella trichotoma</i> (Nees) Hack.
Wild Garlic	<i>Allium vineale</i> L.
Yellow Nutsedge	<i>Cyperus esculentus</i> L.

(b) Weeds Prohibited in Meadow and Wildflower Seed. Meadow and Wildflower Seed shall be free of species listed in (a) and the following species.

WEEDS PROHIBITED IN MEADOW & WILDFLOWER SEED	
COMMON NAME	SCIENTIFIC NAME
Asiatic Tearthumb = Mile-a-Minute	<i>Polygonum perfoliatum</i> L.
Burdock and related species	<i>Arctium</i> L.
Canarygrass = Reed Canarygrass and related spp.	<i>Phalaris</i> L.
Common Wormwood = Mugwort	<i>Artemisia vulgaris</i> L. var. <i>vulgaris</i>
Dogbane and related spp.	<i>Apocynum</i> L.
Eastern Poison Ivy	<i>Toxicodendron radicans</i> (L.) Kuntze
Fig Buttercup = Lesser Celandine	<i>Ranunculus ficaria</i> L. var. <i>bulbifera</i> Marsden-Jones
Garlic Mustard	<i>Alliaria petiolata</i> (M. Bieb.) Cavara and Grande
Giant Hogweed	<i>Heracleum mantegazzianum</i> Sommier and Levier
Japanese Honeysuckle, Tatarian Honeysuckle, related spp.	<i>Lonicera</i> L.
Japanese Knotweed	<i>Polygonum cuspidatum</i> Siebold and Zucc.
Lesser Knapweed = Spotted Knapweed	<i>Centaurea nigra</i> L.
Multiflora Rose	<i>Rosa multiflora</i> Thunb.
Nepalese Browntop = Japanese Stiltgrass	<i>Microstegium vimineum</i> (Trin.) A. Camus
Poison Hemlock	<i>Conium maculatum</i> L.
Purple Loosestrife and related spp.	<i>Lythrum</i> L.
Silvergrass and related spp.	<i>Miscanthus</i> Andersson
Thistle and related spp.	<i>Cirsium</i> Mill., <i>Onopordum</i> L.

(c) Weeds Prohibited in Shrub Seed. Shrub Seed shall be free of species listed in (a) and (b) and the following species.

WEEDS PROHIBITED IN SHRUB SEED	
COMMON NAME	SCIENTIFIC NAME
Burningbush	<i>Euonymus alatus</i> (Thunb.) Siebold
Common Buckthorn	<i>Rhamnus cathartica</i> L.
Japanese Barberry	<i>Berberis thunbergii</i> DC.
Oriental Bittersweet	<i>Celastrus orbiculatus</i> Thunb.
Oleaster; Russian Olive, Autumn Olive, and related spp.	<i>Elaeagnus</i> L.
Privet, and related species	<i>Ligustrum</i> L.
Tree of Heaven	<i>Ailanthus altissima</i> (Mill.) Swingle

920.06.03 Turfgrass Sod. Turfgrass sod shall be Maryland Certified Tall Fescue Sod unless Bermudagrass Sod or Zoysiagrass Sod is specified.

Sod shall be field grown in the State of Maryland in compliance with the Maryland Turfgrass Law and Regulations of the State of Maryland. Each load of tall fescue sod shall bear a Maryland State Certified Label.

Sod shall be sufficiently knitted when harvested to resist breakage under normal handling and be in good health at the time of delivery. Sod shall be machine cut in strips at least 14 in. wide. Tall Fescue Sod shall be uniform thickness of 0.75 to 1.25 in., excluding top growth, with thatch thickness less than 3/8 in.

Prior to harvest, Tall Fescue Sod shall be mowed to a height of 2.0 to 3.5 in. Bermudagrass Sod and Zoysiagrass Sod shall be mowed to a height of 0.75 to 3.0 in.

920.06.04 Approved Cultivars. Refer to 'University of Maryland Turfgrass Technical Update TT-77 Recommended Turfgrass Cultivars for Certified Sod Production and Seed Mixtures in Maryland'. Only cultivars included in TT-77 may be used. When no cultivar is specified, any common type cultivar of the species may be used.

920.06.05 Seed Testing and Sampling. Seed shall comply with the Maryland Seed Law and Regulations of the State of Maryland. Seed suppliers shall assume charges for seed inspections and testing.

- (a) **Certified Seed.** Component cultivars of SHA Turfgrass Seed Mix, SHA Special Purpose Seed Mix, SHA Temporary Seed Mix, and any seed used as additives for these mixes, shall be certified and carry the tags of their state of origin that show the percent purity, percent germination, percent weed seed, and types and content of noxious weed seed.
- (b) **SHA Seed Mixtures.** Turfgrass Seed Mix, SHA Special Purpose Seed Mix, and SHA Temporary Seed Mix shall be sampled and tested by an inspector of the Maryland Department of Agriculture, Turf and Seed Section (MDA) for percent purity, percent germination, percent weed seed, and types and content of noxious weed seed. These seed mixtures shall conform to MDA Standards for Maryland Certified Seed and carry the certified tag of the State of Maryland.
- (c) **Unmixed Seed.** Seed supplied for use as Meadow Seed, Wildflower Seed, and Shrub Seed shall be supplied in containers of a single species, unmixed. Each species shall be tested by the producer or supplier and carry a tag that shows the percent purity, percent germination, percent weed seed; and types and content of noxious weed seed.

920.06.06 Standards for Seed Species. Seed supplied in lots of individual species or used to produce mixes shall conform to the requirements of this section for minimum percent germination, minimum purity, and maximum percent of weed seed.

Meadow seed, wildflower seed, and shrub seed that does not conform to these standards may be used after review and approval by the Engineer in consultation with the Landscape Operations Division. The seed will be subject to use at increased seeding rates or measures to compensate for substandard seed purity, germination, weed content.

- (a) **SHA Turfgrass Seed Mix and SHA Special Purpose Seed Mix.** Species included in SHA Turfgrass Seed Mix and SHA Special Purpose Seed Mix shall be MDA Certified Seed of approved cultivars and conform to the following requirements for minimum percent purity, maximum percent weed seed, and minimum percent germination.

TURFGRASS SEED SPECIES			
COMMON NAME, and SCIENTIFIC NAME	PURITY Min %	WEED Max %	GERM Min %
Chewings Fescue <i>Festuca rubra</i> L. ssp. <i>fallax</i> (Thuill.) Nyman	98	0.5	85
Red Fescue <i>Festuca rubra</i> L. ssp. <i>rubra</i>	98	0.5	85
Hard Fescue <i>Festuca brevipila</i> Tracey	98	0.5	85
Kentucky Bluegrass <i>Poa pratensis</i> L. ssp. <i>pratensis</i>	95	0.4	80
Sheep Fescue <i>Festuca ovina</i> L.	98	0.5	85
Tall Fescue <i>Schedonorus phoenix</i> (Scop.) Holub = <i>Festuca elatior</i> L.	98	0.5	85

- (b) **Temporary and Grass Additive Seed.** Species included in SHA Temporary Seed Mix, or used as Additive Seed with SHA Turfgrass Seed Mix or SHA Special Purpose Seed Mix shall conform to the following requirements for minimum percent purity, maximum percent weed seed, and minimum percent germination.

TEMPORARY AND GRASS ADDITIVE SEED SPECIES			
COMMON NAME, and SCIENTIFIC NAME	PURITY Min %	WEED Max %	GERM Min %
Cereal Rye <i>Secale cereale</i> L.	98	0.1	85
Common Barley, winter type <i>Hordeum vulgare</i> L.	98	0.3	85
Common Oat, winter type <i>Avena sativa</i> L.	98	0.5	85
Common Wheat, winter type <i>Triticum aestivum</i> L.	98	0.1	85
Foxtail Bristlegrass = Foxtail Millet <i>Setaria italica</i> (L.) P. Beauv.	99	0.1	80
Perennial Ryegrass <i>Lolium perenne</i> L. ssp. <i>perenne</i>	97	0.5	85

(c) **Meadow Forb Seed.** Seed shall be supplied in lots of individual species, unmixed, labeled with common name and scientific name in conformance with the following.

(1) **Purity.** Weed and/or other crop seed content shall be 2.5 percent or less by weight. Seed that does not conform to this specification may be used after approval by the Engineer in consultation with the Landscape Operations Division at increased seeding rates, or with measures to compensate for increased weed or crop seed content.

(2) **Origin.** Seed shall either be collected from native sources in USDA Hardiness Zone 5b, 6a, 6b and 7a in the States of Maryland, Pennsylvania, New York, New Jersey, Delaware, Virginia, West Virginia, or North Carolina, or shall be grown and produced from seed certified to have been collected from sites in the USDA Hardiness Zones of those States.

Seed that does not conform to origin requirements may be used after review and approval by the Engineer in consultation with the Landscape Operations Division.

(3) **Species.** Seed shall conform to the following species, subspecies and varieties.

MEADOW FORB SEED SPECIES	
COMMON NAME	SCIENTIFIC NAME
Allegheny Monkeyflower = Square Stem Monkeyflower	<i>Mimulus ringens</i> L. var. <i>ringens</i>
Bearded Beggarticks = Showy Tickseed	<i>Bidens aristosa</i> (Michx.) Britton
Blackeyed Susan	<i>Rudbeckia hirta</i> L. var. <i>hirta</i> <i>Rudbeckia hirta</i> L. var. <i>pulcherrima</i> Farw.
Browneyed Susan	<i>Rudbeckia triloba</i> L. var. <i>triloba</i> <i>Rudbeckia triloba</i> L. var. <i>pinnatifida</i> Torr. and A. Gray
Common Boneset	<i>Eupatorium perfoliatum</i> L. var. <i>perfoliatum</i>
Common Evening Primrose	<i>Oenothera biennis</i> L.
Crimson-eyed Rose Mallow	<i>Hibiscus moscheutos</i> L.
Eastern Purple Coneflower	<i>Echinacea purpurea</i> (L.) Moench
Flat-top Goldenrod = Grass-Leaved Goldenrod	<i>Euthamia graminifolia</i> (L.) Nutt. <i>Euthamia graminifolia</i> (L.) Nutt. var. <i>graminifolia</i> <i>Euthamia graminifolia</i> (L.) Nutt. var. <i>hirtipes</i> (Fernald) C.E.S. Taylor and R.J. Taylor
Gray Goldenrod	<i>Solidago nemoralis</i> Aiton var. <i>nemoralis</i>
King of the Meadow = Tall Meadow Rue	<i>Thalictrum pubescens</i> Pursh
Lanceleaf Tickseed = Lanceleaf Coreopsis	<i>Coreopsis lanceolata</i> L.
Maryland Senna	<i>Senna marilandica</i> (L.) Link
Maximilian Sunflower	<i>Helianthus maximiliani</i> Schrad.
New England Aster	<i>Symphotrichum novae-angliae</i> (L.) G.L. Nesom
New York Aster	<i>Symphotrichum novi-belgii</i> (L.) G.L. Nesom var. <i>elodes</i> (Torr. and A. Gray) G.L. Nesom <i>Symphotrichum novi-belgii</i> (L.) G.L. Nesom var.

	<i>novi-belgii</i> <i>Symphotrichum novi-belgii</i> (L.) G.L. Nesom var. <i>villicaule</i> (A. Gray) J. Labrecque and L. Brouillet
New York Ironweed	<i>Vernonia noveboracensis</i> (L.) Michx.
Partridge Pea	<i>Chamaecrista fasciculata</i> (Michx.) Greene <i>Chamaecrista fasciculata</i> (Michx.) Greene var. <i>fasciculata</i> <i>Chamaecrista fasciculata</i> (Michx.) Greene var. <i>macrosperma</i> (Fernald) C.F. Reed
Seedbox	<i>Ludwigia alternifolia</i> L.
Smooth Blue Aster	<i>Symphotrichum laeve</i> (L.) A. Löve and D. Löve var. <i>laeve</i> <i>Symphotrichum laeve</i> (L.) A. Löve and D. Löve var. <i>concinnum</i> (Willd.) G.L. Nesom
Smooth Oxeye = Ox-eye Sunflower	<i>Heliopsis helianthoides</i> (L.) Sweet var. <i>helianthoides</i> <i>Heliopsis helianthoides</i> (L.) Sweet var. <i>scabra</i> (Dunal) Fernald
Spotted Trumpetweed = Spotted Joe Pye Weed	<i>Eupatoriadelphus maculatus</i> (L.) King and H. Rob. var. <i>maculatus</i>
Stiff Goldenrod	<i>Oligoneuron rigidum</i> (L.) Small var. <i>rigidum</i>
Sundial Lupine = Wild Blue Lupine	<i>Lupinus perennis</i> L. ssp. <i>perennis</i> <i>Lupinus perennis</i> L. ssp. <i>perennis</i> var. <i>perennis</i> <i>Lupinus perennis</i> L. ssp. <i>perennis</i> var. <i>occidentalis</i> S. Watson
Swamp Milkweed	<i>Asclepias incarnata</i> L. <i>Asclepias incarnata</i> L. ssp. <i>incarnata</i> <i>Asclepias incarnata</i> L. ssp. <i>pulchra</i> (Ehrh. ex Willd.) Woodson
Swamp Sunflower = Narrow-Leaved Sunflower	<i>Helianthus angustifolius</i> L.
Swamp Verbena = Blue Vervain	<i>Verbena hastata</i> L. var. <i>hastata</i>
Talus Slope Penstemon = Tall White Beardtongue	<i>Penstemon digitalis</i> Nutt. ex Sims
Trumpetweed = Joe Pye Weed	<i>Eupatoriadelphus fistulosus</i> (Barratt) King and H. Rob.
Wild Bergamot	<i>Monarda fistulosa</i> L. ssp. <i>fistulosa</i> <i>Monarda fistulosa</i> L. ssp. <i>fistulosa</i> var. <i>mollis</i> (L.) Benth. <i>Monarda fistulosa</i> L. ssp. <i>fistulosa</i> var. <i>rubra</i> A. Gray <i>Monarda fistulosa</i> L. ssp. <i>brevis</i> (Fosberg and Artz) Scora, ined.

(d) Meadow Grass, Sedge, and Rush Seed. Seed shall be supplied in lots of individual species, unmixed, labeled with common name, scientific name, and cultivar in conformance with the following.

(1) Purity. Refer to 920.06.06(d)(1). Grasses with awns shall be debarbed or deawned.

(2) Origin. Refer to 920.06.06(d)(2). Cultivars may be produced in any state east of the Mississippi River.

(3) Species. Seed shall conform to the following species, subspecies, varieties, and cultivars.

MEADOW GRASS, SEDGE AND RUSH SEED SPECIES	
COMMON NAME and CULTIVARS	SCIENTIFIC NAME
Big Bluestem cv. Niagara	<i>Andropogon gerardii</i> Vitman
Broomsedge Bluestem = Broomsedge	<i>Andropogon virginicus</i> L. <i>Andropogon virginicus</i> L. var. <i>virginicus</i> <i>Andropogon virginicus</i> L. var. <i>decipiens</i> C.S. Campbell
Common Rush = Soft Rush = Lamp Rush	<i>Juncus effusus</i> L. var. <i>conglomeratus</i> (L.) Engelm. <i>Juncus effusus</i> L. var. <i>decipiens</i> Buchenau <i>Juncus effusus</i> L. var. <i>pylaei</i> (Laharpe) Fernald and Wiegand <i>Juncus effusus</i> L. var. <i>solutus</i> Fernald and Wiegand
Deertongue cv. 'Tioga'	<i>Dichanthelium clandestinum</i> (L.) Gould
Fowl Bluegrass	<i>Poa palustris</i> L.
Fox Sedge	<i>Carex vulpinoidea</i> Michx. var. <i>vulpinoidea</i>
Gamagrass cv. 'Meadowcrest', 'Pete'	<i>Tripsacum dactyloides</i> (L.) L.
Indiangrass cv. 'Rumsey'	<i>Sorghastrum nutans</i> (L.) Nash
Little Bluestem cv. 'Aldous'	<i>Schizachyrium scoparium</i> (Michx.) Nash var. <i>scoparium</i> <i>Schizachyrium scoparium</i> (Michx.) Nash var. <i>divergens</i> (Hack.) Gould
Longhair Sedge = Bristly Sedge	<i>Carex comosa</i> Boott
Rattlesnake Mannagrass	<i>Glyceria canadensis</i> (Michx.) Trin.
Shallow Sedge = Lurid Sedge	<i>Carex lurida</i> Wahlenb.
Switchgrass cv. 'Blackwell', 'Shelter'	<i>Panicum virgatum</i> L. var. <i>virgatum</i> <i>Panicum virgatum</i> L. var. <i>spissum</i> Linder
Virginia Wildrye	<i>Elymus virginicus</i> L., <i>Elymus virginicus</i> L. var. <i>halophilus</i> (E.P. Bicknell) Wiegand
Woolgrass	<i>Scirpus cyperinus</i> (L.) Kunth

(e) Wildflower Seed. Seed shall be supplied in lots of individual species, unmixed, labeled with common name, scientific name, and cultivar in conformance with the following.

(1) Purity. Species shall be 98 percent purity or greater, with 75 percent germination or greater, and with weed and/or other crop seed content of 2.5 percent or less by weight. Seed that does not conform to purity requirements may be used after approval by the Engineer in consultation with the Landscape Operation Division at increased seeding rates, or with measures to compensate for increased weed or crop seed content.

(2) Origin. Any State of the United States.

(3) Species. Seed shall conform to the following species, subspecies, varieties, and cultivars.

WILDFLOWER SEED SPECIES	
COMMON NAME and CULTIVARS	SCIENTIFIC NAME
Blackeyed Susan	<i>Rudbeckia hirta</i> L. var. <i>hirta</i> <i>Rudbeckia hirta</i> L. var. <i>pulcherrima</i> Farw.
Calendula	<i>Calendula officinalis</i> L.
Common Sunflower cv. 'Autumn Beauty'	<i>Helianthus annuus</i> L.
Doubtful Knight's-spur = Rocket Larkspur	<i>Consolida ajacis</i> (L.) Schur
Firewheel = Annual Gaillardia	<i>Gaillardia pulchella</i> Foug. <i>Gaillardia pulchella</i> Foug. var. <i>pulchella</i>
Garden Cornflower = Bachelors Button	<i>Centaurea cyanus</i> L.
Garden Cosmos = Pink Cosmos, cv. 'Sensation'	<i>Cosmos bipinnatus</i> Cav.
Lemon Beebalm	<i>Monarda citriodora</i> Cerv. ex Lag.
Moroccan Toadflax = Spurred Snapdragon	<i>Linaria maroccana</i> Hook. f.
Siberian Wallflower	<i>Erysimum xmarshallii</i> (Henfr.) Bois
Sulphur Cosmos = Yellow Cosmos, cv. 'Bright Lights'	<i>Cosmos sulphureus</i> Cav.

(f) **Shrub Seed.** Seed shall be supplied in lots of individual species, unmixed, labeled with common name and scientific name in conformance with the following.

(1) **Purity.** Weed and/or other crop seed content shall be 0.5 percent or less by weight. Minimum purity and minimum germination shall conform to the requirements of (3), below.

(2) **Origin.** Refer to 920.06.06(d)(2).

(3) **Species.** Seed shall conform to the following species, subspecies, and varieties.

SHRUB SEED SPECIES		
SPECIES Including Subspecies and Variety	PURITY Min %	GERM Min %
American Black Elderberry <i>Sambucus nigra</i> L. ssp. <i>canadensis</i> (L.) R. Bolli	98	60
American Cranberrybush <i>Viburnum opulus</i> L. var. <i>americanum</i> Aiton	99	70
Black Chokeberry <i>Photinia melanocarpa</i> (Michx.) K.R. Robertson and Phipps	99	70
Bristly Locust <i>Robinia hispida</i> L. var. <i>fertilis</i> (Ashe) R.T. Clausen <i>Robinia hispida</i> L. var. <i>hispida</i>	99	90
Chokecherry <i>Prunus virginiana</i> L. var. <i>viginiana</i>	99	70
Common Buttonbush <i>Cephalanthus occidentalis</i>	98	60
Common Ninebark <i>Physocarpus opulifolius</i> (L.) Maxim., orth. cons.	99	75
Common Winterberry <i>Ilex verticillata</i> (L.) A. Gray	99	60

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Desert False Indigo <i>Amorpha fruticosa</i> L.	98	70
Fragrant Sumac <i>Rhus aromatica</i> var. <i>aromatica</i>	99	85
Gray Dogwood <i>Cornus racemosa</i> Lam.	99	70
Inkberry <i>Ilex glabra</i> (L.) A. Gray	98	60
Mapleleaf Viburnum <i>Viburnum acerifolium</i> L.	99	70
Maryland Senna <i>Senna marilandica</i> (L.) Link	99	70
Nannyberry <i>Viburnum lentago</i> L.	99	75
Red Chokeberry <i>Photinia pyrifolia</i> (Lam.) K.R. Robertson and Phipps	85	60
Red Elderberry <i>Sambucus racemosa</i> L. var. <i>racemosa</i>	95	70
Redosier Dogwood <i>Cornus sericea</i> L. ssp. <i>sericea</i>	99	70
Silky Dogwood <i>Cornus amomum</i> Mill.	98	70
Smooth Sumac <i>Rhus glabra</i> L.	99	80
Southern Arrowwood <i>Viburnum dentatum</i> L. var. <i>dentatum</i> <i>Viburnum dentatum</i> L. var. <i>venosum</i> (Britton) Gleason <i>Viburnum recognitum</i> Fernald	99	70
Spicebush <i>Lindera benzoin</i> (L.) Blume var. <i>benzoin</i>	95	60
Staghorn Sumac <i>Rhus typhina</i> L.	99	85
Steeplebush <i>Spiraea tomentosa</i> L.	85	70
Swamp Rose <i>Rosa palustris</i> Marsh.	99	65
Witch Hazel <i>Hamamelis virginiana</i> L.	99	70

920.06.07 Seed Mixes. Refer to 920.06.01 thru .06 and the document ‘Specifications for Seed and Seed Mixes’ maintained by the Landscape Operations Division, which includes lists of approved cultivars.

(a) SHA Turfgrass Seed Mix.

SHA TURFGRASS SEED MIX		
MIX %	SPECIES	
	Common Name	Scientific Name
95	Tall Fescue	<i>Schedonorus phoenix</i> (Scop.) Holub
5	Kentucky Bluegrass	<i>Poa pratensis</i> L. ssp. <i>pratensis</i>

(b) SHA Special Purpose Seed Mix.

SHA SPECIAL PURPOSE SEED MIX		
MIX %	SPECIES	
	Common Name	Scientific Name
75	Hard Fescue	<i>Festuca brevipila</i> Tracey
25	Chewings Fescue	<i>Festuca rubra</i> L. ssp. <i>fallax</i> (Thuill.) Nyman

Note: When pre-mixed seed is not available, a small quantity exception will allow the mix to be performed at the seeding location using Certified seed of the required species.

(c) SHA Temporary Seed Mix.

SHA TEMPORARY SEED MIX		
MIX %	SPECIES	
	Common Name	Scientific Name
95	One or more of the following: Common Wheat, winter type Common Barley, winter type Common Oat, winter type Cereal Rye, winter type	<i>Triticum aestivum</i> L. <i>Hordeum vulgare</i> L. <i>Avena sativa</i> L. <i>Secale cereale</i> L.
5	Foxtail Bristlegrass = Foxtail Millet	<i>Setaria italica</i> (L.) P. Beauv.

920.07 PLANT MATERIALS.

920.07.01 Certificate and Licenses. Sellers, distributors, installers or producers of nursery stock shall possess the Plant Dealer License, Plant Broker License, or Nursery Inspection Certificate of the Maryland Department of Agriculture, or substitute a similar certificate or licenses from another State where they do business.

920.07.02 Plant Material Inspection. Plant material will be inspected for conformance with 920.07.03 thru .05, and tagged with Administration Plant Material Inspection Seals (Seals) as follows.

- (a) Inspection.** The Plant Material Inspection will be conducted in Maryland at the nursery where the plant material is grown, or at the brokerage where the plant material is sold. When plant material is produced by a nursery outside Maryland, the Inspection will be conducted at the Contractor’s holding area, or at the project site before planting, unless otherwise specified in the Contract Documents.

The Contractor shall ensure that the plant material is present for inspection on the scheduled date, and that it meets the requirements of 920.07. The condition and identity of plant material will be subject to re-inspection for the duration of the Contract.

- (b) **Scheduling.** The Inspection will be scheduled by the Engineer in consultation with the Landscape Operations Division. At least 14 days notice to schedule an Inspection within Maryland, and at least 45 days notice to schedule an Inspection outside Maryland.
- (c) **Seals.** The Administration will determine which plants, if any, will be tagged with Seals. When Seals are placed upon representative plants within a block of plant material, the plant material delivered for installation shall be similar in size, shape and character to the plant material that received Seals. Plant material that is delivered with broken or missing Seals, or that is not similar to the plant material within the block that was tagged with Seals will be rejected.
- (d) **Rejected Plants.** Plant materials which do not meet these requirements will be rejected. Plant material rejected at the nursery or holding area shall not be delivered to the project; if delivered, it shall immediately be removed. Plants shall not be installed until the Plant Material Inspection has been completed and satisfactory identification has been provided.

920.07.03 Plant Material Standards. Plant material shall be grown, identified, graded, and delivered in good condition as specified in this section.

- (a) **Hardiness Zones and Origin.** Trees, shrubs, perennials and ornamental grasses shall be nursery grown within plant hardiness zones 5, 6, or 7 according to the 'USDA Plant Hardiness Zone Map' in the following states, unless specified otherwise: Maryland, Ohio, Pennsylvania, New York, New Jersey, Delaware, Virginia, West Virginia, North Carolina, Tennessee, Kentucky, Georgia. Annuals and bulbs shall be nursery grown.
- (b) **Names and Identification.** Refer to 920.06.01. Plant material shall be clearly and correctly identified by the grower or distributor. Plant materials that are misidentified, or not satisfactorily tagged or labeled, or do not conform to the accepted characteristics of the species or cultivar, will be rejected.
- (c) **ANSI Standards.** Plant material shall conform to 'American Standard for Nursery Stock (ANSI Z60.1) of the American Nursery and Landscape Association. Plant grades shall be those established in ANSI Z60.1, and shall include plants from that size up to but not including the next larger grade size. When specimen plants are specified by the Contract documents, the specimen requirement shall also be met. Plant material which does not meet the standards of this section shall be rejected.
- (d) **Health and Sanitation.** Plant material shall be dug and transported in conformance ANSI Z60.1. Bare root deciduous plants shall be delivered in a dormant condition. Roots shall be adequately protected and kept moist.

Plant material shall be in good health and be declared and certified free from disease and insects as required by law for transportation, and shall be free from pest-related stress and pest damage.

Plants shall be healthy, free from physical defects and stresses, and have well-developed branches and a vigorous root system. Plants that exhibit wilt, shriveling, insufficient root mass, broken or loose root balls, or inadequate protection will be rejected.

Container grown plants shall be well rooted, vigorous and established in the size pot specified, shall have well balanced tops for their pot size, and shall not be root bound. Plants grown in fields or containers which include Ailanthus, Canada Thistle, Johnsongrass, or Yellow Nutsedge will be rejected.

- (e) **Shade and Flowering Trees.** Shade and flowering trees shall be symmetrically balanced. Major branch unions shall not have ‘V’ shaped crotches, bark inclusion or unions derived from water sprouts (epicormic growth) capable of causing structural weakness.

Trees shall be free of unhealed branch removal wounds greater than 1 in. diameter, or wounds or scars caused by staking, wire or ties, or any other defect which could cause structural failure or disfigurement.

Shade trees and central leader flowering trees shall have a single main trunk. Trunk height to the lowest branch shall conform to the following.

HEIGHT TO LOWEST BRANCH	
CALIPER in.	HEIGHT ft
1-1/2 and 1-3/4	4
2 to 2-1/2	5
3	6

- (f) **Unacceptable Plants.** Plant material that becomes unacceptable after installation shall be rejected as specified in 710.03.18.

920.07.04 American Holly (*Ilex opaca* Aiton). Unless other cultivars or ratios are specified in the Contract document, each lot of plants shall include 90 percent female plants and 10 percent male plants of cultivars selected from the following list, unless specified otherwise.

AMERICAN HOLLY CULTIVARS		
FEMALE		MALE
Angelica	Miss Helen	David
Arlene Leach	Old Heavy Berry	Jersey Knight
B and O	Patterson	Leather Leaf
Dan Fenton	Satyr Hill	Nelson West
Jersey Princess	Wyetta	North Wind

920.07.05 Plant Storage and Handling. Adequate facilities shall be provided for plant storage. Plants shall be handled with care to avoid damage.

- (a) **Bulbs.** Bulbs shall be stored under appropriate climate control.
- (b) **Perennials, Ornamental Grasses, Plug Plans and Annuals.** Perennials, ornamental grasses, plug plans and annuals shall be kept moist.
- (c) **Bare Root Plants and Live Stakes.** Bare root plants and live stakes shall be kept moist and heeled into moist soil or other suitable material until installed. During transport, the roots shall be covered with canvas, burlap or straw.
- (d) **Balled and Burlapped and Container Grown Plants.** Balled and burlapped plants and container grown plants shall be kept moist and installed within seven days of delivery, or the root balls or containers shall be covered with mulch or straw until removed for installation.

920.08 MARKING AND STAKING MATERIALS.

920.08.01 Outline Stakes. Outline stakes shall be full cut 1.75 x 1.75 in. sound hardwood, 48 in. long, as approved.

920.08.02 Stakes. Stakes for supporting trees shall be rough sawn, straight grain hardwood reasonably free from bark, knot holes, excessive warping, or other imperfections. Stakes shall be full cut 2.0 x 2.0 in. thickness.

920.08.03 Wire. Wire shall be No. 12 and 14 gauge new annealed galvanized wire.

920.08.04 Wire Rope. Wire rope shall be 0.25 in. zinc coated steel wire seven strand as commonly used for guying large trees.

920.08.05 Cable Clamps. Cable clamps shall be zinc galvanized steel.

920.08.06 Hose. Hose shall be 5/8 in. inside diameter corded synthetic rubber hose.

920.08.07 Turnbuckles. Turnbuckles shall be zinc galvanized with 4.5 in. openings and 5/16 in. threaded ends with screw eyes.

920.08.08 Anchors. Tree anchors shall be earth anchors of a type commonly used for anchoring large trees.

920.09 WATER, PESTICIDES, AND ADJUVANTS.

920.09.01 Water. Water used for the installation and establishment of vegetation shall not contain concentrations of substances that are harmful to plant growth. Water derived from public and municipal water systems in Maryland shall be acceptable for irrigation, fertilization, or mixing with pesticides. Water derived from wells or other sources may be used when it has soluble salts concentration less than 500 ppm, sodium less than 50 percent of total salts, and pH between 5.0 to 7.8.

920.09.02 Seed Carrier. Seed carrier shall be one or more inert, horticultural-grade materials used to improve seed mixing and distribution through a spreader or drill. Seed carriers shall be free flowing, easily mixable with seed, and nontoxic to seed, plants, humans, and wildlife. Seed carrier shall include one or more of the following.

- (a) **Calcined Clay.** Calcined clay shall be a furnace-baked clay product.
- (b) **Cocoa Shell.** Cocoa shell shall be processed cocoa seeds.
- (c) **Oyster Shell.** Oyster shell shall be crushed shells of oyster or other mollusk.
- (d) **Vermiculite.** Vermiculite shall be heat-expanded mineral mica.
- (e) **Perlite.** Perlite shall be heat-expanded mineral perlite.

920.09.03 Pesticides. Pesticides shall be EPA-approved and registered for use in Maryland to control plants, fungi, insects or other pests. Pesticides shall be approved for use, and acceptable application rates established by the Landscape Operations Division as follows.

- (a) **Herbicide.** Herbicide shall control or prevent regrowth of plants or vegetation.
- (b) **Insecticide.** Insecticide shall control or protect against insect or other arthropod pests.
- (c) **Fungicide.** Fungicide shall control or protect against fungal or bacterial pests.
- (d) **Other Pesticides.** Other pesticides shall control or protect against other pests such as deer, beaver, etc.

920.09.04 Marking Dye. Marking dyes shall be used to color spray solutions, be nonphytotoxic, oil or water soluble, and compatible with the pesticide products they are applied with. Marking dye products and application rates shall be approved by the Landscape Operations Division.

920.09.05 Spray Adjuvant and Wetting Agent. Spray adjuvant and wetting agents shall be compatible with the pesticides or other products they are applied with.

920.09.06 Antidesiccant. Antidesiccant and antitranspirant products shall be materials that provide a film over plant surfaces to limit water loss. These products and application rates shall be approved by the Landscape Operations Division.



**CATEGORY 900
MATERIALS**

SECTION 921 — MISCELLANEOUS

784 **DELETE:** SECTION 921.09.01 — GEOTEXTILES in its entirety.

INSERT: The following.

921.09.01 Geotextile Requirements. Geotextiles used on Administration projects shall participate in the National Transportation Product Evaluation Program (NTPEP) and conform to the Contract Documents and MSMT 732. Geotextiles shall be manufactured from fibers consisting of long chain synthetic polymers, composed of a minimum 95 percent by weight of polyolefins or polyesters, and formed into a stable network so the filaments or yarns retain their dimensional stability relative to each other, including selvages. Geotextiles used on Administration projects shall conform to the following:

MARYLAND APPLICATION CLASS		TYPE OF GEOTEXTILE	GRAB STRENGTH lb	PUNCTURE STRENGTH lb	PERMITTIVITY sec ⁻¹	APPARENT OPENING SIZE, MAX mm	TRAPEZOID TEAR STRENGTH (MD***) lb
			D 4632	D 6241	D4491	D 4751	D 4533
SD	TYPE I	NONWOVEN	160	310	0.50	0.43	55
		WOVEN, MONOFILAMENT	250	495	0.50	0.43	90
	TYPE II	NONWOVEN	160	310	0.20	0.25	55
		WOVEN, MONOFILAMENT	250	495	0.20	0.25	90
PE	TYPE I	NONWOVEN	200	430	0.70	0.43	80
		WOVEN, MONOFILAMENT	250	620	0.70	0.43	90
	TYPE II	NONWOVEN	200	310	0.20	0.25	55
		WOVEN, MONOFILAMENT	250	495	0.20	0.25	90
	TYPE III	NONWOVEN	200	220	0.10	0.22	40
		WOVEN, MONOFILAMENT	250	370	0.10	0.22	70
SE	NONWOVEN	160	310	0.20	0.30	80	
	WOVEN	250	495	0.20	0.30	90	
ST	WOVEN	300*	600	0.05	0.15**	110	
F	WOVEN	200	450	0.05	0.60	75	
E	NONWOVEN	200	450	1.1	0.21	80	
	WOVEN, MONOFILAMENT	370	900	0.28	0.21	100	



SPECIAL PROVISIONS INSERT
921 — MISCELLANEOUS

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Note 1: All property values in the above table are based on minimum average roll values in the weakest principal direction except for apparent opening size.

Note 2: The ultraviolet stability shall be 50 percent after 500 hrs of exposure for all classes, except Class F, which shall be 70 percent (D 4355).

* 15% elongation for silt fence and monofilament woven geotextile in Machine Direction

** This is a MINIMUM apparent opening size, not a maximum.

***Machine Direction

Contact the Office of Materials Technology's Soils and Aggregate Technology Division for approval of geotextiles used for reinforcement applications.

921.09.02 Seam and Overlap. D 4884. Geotextiles joined by sewing shall conform to the following:

- (a) Either "J" or "Butterfly" type seams joined with a lock stitch.
- (b) Tensile strength requirements when tested across the seam.
- (c) Thread used for seaming shall be of equal or greater durability than the geotextile itself.

921.09.03 Securing Pins or Staples. Minimum 10 in. length and designed to securely hold the geotextile in place during construction.



786 **ADD:** The following after 921.11.

921.12 CONCRETE STAIN.

The material shall conform to the following requirements:

TEST PROPERTY	TEST METHOD	SPECIFICATION LIMITS
Accelerated Weathering	G7	Passing results
Mildew Resistance/fungus growth	Fed. Test Method STD.141, Method 6271	Resistance
Weatherometer, 1000 hours minimum	ASTM G26	No crazing, cracking, chipping, or flaking. Light chalk and color change. No other deterioration.
Total Non Volatile Vehicle, %	D2369	Mfr. Stated Value +/- 2%
Viscosity, Krebs Units, 77 deg. F	D562	Mfr. Stated value +/- 10 KU
Drying time (to touch)	D1640	1 hour minimum
Recoat dry time	D1640	Able to recoat within 24 hours
Infrared Spectrogram	D2621	n/a
Color	Fed. Std. 595	As specified in contract documents
Weight/gallon, lb.gal	D1475	Mfr. State value +/- 0.3 lb/gal
Shelf life		6 months minimum

Material more than six months old shall be retested. Material must be VOC compliant for Maryland.



SPECIAL PROVISIONS INSERT
925 — DETECTABLE WARNING SURFACES

CATEGORY 900
MATERIALS

789 **DELETE:** SECTION 925 — DETECTABLE WARNING SURFACES in its entirety.

INSERT: The following.

SECTION 925 — DETECTABLE WARNING SURFACES

925.01 GENERAL. Detectable warning surfaces shall conform to the current accessibility guidelines of the Americans with Disabilities Act (ADA). The Office of Materials Technology (OMT) maintains a Qualified Products List (QPL). Manufacturers seeking inclusion of their product on the QPL shall submit certified test results showing conformance to the properties in 925.07, as well as installation instructions and the types of adhesives and sealants required.

925.02 COMPOSITION. Warning surfaces shall be either flexible or rigid. If there is a change in the composition of a qualified product, the manufacturer shall notify OMT and submit new test results showing conformance with 925.07.

925.02.01 Pavers. Type III Brick Pavers shall conform to the requirements of C 902, Class SX, Type 1, and Application PX. The pavers shall be 2-1/4 x 4 x 8 in. with square edges and a surface meeting 925.03.

925.03 CONFIGURATION AND DIMENSIONS. The warning surface shall consist of a system of truncated domes having a base diameter of 0.9 in. to 1.4 in., a top diameter 50 to 65 percent of the base diameter, and a height of 0.2 in. The domes shall be arranged in a square grid with center-to-center spacing of 1.66 to 2.35 in.

925.04 COLOR. The color shall be homogeneous across the surface of the material and contrast with adjoining surfaces.

925.05 IDENTIFICATION. The top surface shall have an identifier that uniquely distinguishes the manufacturer. Brick pavers are excluded.

925.06 REQUIREMENTS.

TYPE	DESCRIPTION	PHYSICAL TEST REQUIREMENTS
Type I	Cast in Place	A, B, C, D, E, G
Type IIa	Surface Mount, Rigid	A, B, C, D, E, G
Type IIb	Surface Mount, Flexible	A, B, C, D, F, G
Type III	Brick Pavers	925.02.01
Type IV	Prefilled Pavers	A, B, C, D, G



SPECIAL PROVISIONS INSERT
925 — DETECTABLE WARNING SURFACES

925.07 PHYSICAL PROPERTIES.

	PROPERTY	TEST METHOD	SPECIFICATION LIMIT
A	Slip Resistance Coefficient	C 1028 (dry method)	0.80 minimum
B	Abrasive Wear, index	C 501	150 minimum
C	Fade (UV) Resistance/Color Retention	D 4587	Fade or Change in color after 2000 hours less than $\Delta E = 5^*$
D	Freeze/Thaw Resistance	C 1026	No disintegration
E	Adhesion/Bond Strength, pull off	C 482/C 882(as appropriate)	No adhesion failure
F	Adhesion/Bond Strength, peel	D 903/D 429 (modified as appropriate)	No adhesion failure
G	Contrast	Contrast percentage formula** using E 1349 to determine cap Y brightness/light reflectance values (LRV)	Current ADA requirement***

* Chromaticity coordinates (L*a*b* system) checked in conformance with D 2244, before and after test.

** Contrast % = $[(B_1 - B_2)/B_1] \times 100$,

where B_1 = (LRV) of the lighter area, and B_2 = (LRV) of the darker area.

*** For the purpose of determining whether a material meets acceptable contrast criteria, use actual cap Y brightness of detectable warning surface, and assume a value of 15 for the cap Y brightness of cured concrete, or a value of 3 for asphalt wearing surfaces to determine percentage difference. Detectable warning surfaces to be installed on other materials are required to undergo additional testing.



**CATEGORY 900
MATERIALS**

SECTION 950 — TRAFFIC MATERIALS

792 **DELETE**: 950.03 REFLECTORIZATION OF SIGNS AND CHANNELIZING DEVICES in its entirety.

INSERT: The following.

950.03 REFLECTORIZATION OF SIGNS AND CHANNELIZING DEVICES.

Provide retroreflective sheeting that meets the requirements of the latest version of ASTM D 4956 and is selected from the Administration's QPL. The type of sheeting to be used for different classifications of signs shall be as specified in the QPL and as described below.

Provide fluorescent colors, when yellow, orange or pink sheeting is specified. Color coordinates and values shall be as described in the MDMUTCD and 23 CFR Part 655, Subpart F, Appendix.

Provide non-reflective sheeting, when black sheeting is specified.

All sheeting for legend and backgrounds shall be from the same manufacturer and be a matched component system intended to be used together.

Use ASTM Type IV or VIII construction sheeting with a Class 1 backing for drums for maintenance of traffic. The sheeting must be reboundable as defined in the supplementary requirements of ASTM D 4956, latest version.

Use ASTM Type IV, V or VIII for delineators, and lane separator systems. Use ASTM Type IV, VI or VIII sheeting for cones for maintenance of traffic. The sheeting must be reboundable as defined in the supplementary requirements of ASTM D 4956, latest version.

Use ASTM Type VI sheeting with a Class 5 backing for Roll up signs for Maintenance of Traffic.

Use ASTM Type VIII, IX or XI sheeting for rigid temporary traffic signs.

Use ASTM Type IX or XI sheeting for Guide Signs, Exit Gore Signs, General Information Signs, School Signs, Warning Signs and Red Regulatory Signs.

Use ASTM Type IV, VIII, IX or XI sheeting for all other Regulatory Signs and for Route Markers.

Use ASTM Type I or higher sheeting for No Trespassing Signs, signs directed at Pedestrian



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State Highway Administration

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950.03— REFLECTORIZATION OF SIGNS AND CHANNELIZING DEVICES

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Traffic, signs directed at Bicycle Traffic, R7 series Parking signs, R8 series Parking signs and supplemental panels for R7 and R8 series signs.



CATEGORY 900
MATERIALS

SECTION 950 — TRAFFIC MATERIALS

950.12 LUMINAIRES AND LAMPS

796 **ADD**: The following after the last sentence of the first paragraph.

A Light Emitting Diode (LED) Roadway 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. Each LED Roadway Luminaire shall have a NEMA 3-prong twist lock photo control receptacle and shall be furnished with a shorting cap.

950.12.01 Luminaire Construction.

797 **ADD**: The following after the last sentence of the last paragraph in (c).

(d) Design LED bracket arm mounted 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 Roadway luminaires must be rated for the full service life without maintenance.

Provide LED Roadway luminaires that use no more than 280 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 Roadway 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 Roadway luminaire shall be UL approved. The LED Roadway 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.

Provide LED Roadway luminaire drivers that are Solid State (electronic) type with an input voltage range from 120-277VAC (± 10 percent), maximum rated output current of 530mA (± 5 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.

LED Roadway 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 luminaires 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 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 Roadway Luminaire to mount on a standard tenon mount. No field adjustment, except for leveling, shall be required for installation. All hardware shall be stainless steel.

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

798 **ADD**: The following after the last sentence of the first paragraph.

Refer to section 950.12.01 (d) for required lamp wattages and rated lamp life for LED Roadway Luminaires.

**CATEGORY 900
MATERIALS**

SECTION 951 — PAVEMENT MARKING MATERIALS

951.01 NONTOXIC LEAD FREE WATERBORNE PAVEMENT MARKINGS

All nontoxic lead free waterborne pavement marking materials shall be ready-mixed, pigmented binder, emulsified in water, and capable of anchoring reflective beads that are applied separately.

The pavement marking material shall not contain any hazardous material listed in the Environmental Protection Agency Code of Federal Regulations (CFR) 40, Section 261.24, Table 1.

951.01.01 Waterborne Physical Requirements. The nontoxic lead free waterborne pavement marking material shall conform to the manufacturer's formulations as initially approved for use by the Administration and shall be controlled from batch to batch. All paint shall be evaluated in conformance to the requirements listed below.

Production batch samples will be subject to random tests, such as but not limited to, X-ray spectroscopy, infrared spectroscopy, ultraviolet spectral analysis, and atomic absorption spectroscopy.

The combined total of lead, cadmium, mercury, and hexavalent chromium shall not exceed 100 ppm, when tested by X-ray fluorescence spectroscopy, or other method capable of detection at this level.

For each production batch, the Contractor shall provide the Administration with the manufacturer's certified analysis conforming to TC-1.03 of the Standard Specifications.

- (a) **Viscosity.** The viscosity shall be 85 ± 10 KU when tested in conformance with D 562.
- (b) **Pigment For Yellow Pavement Marking Material.** The colorants used to attain the color of the yellow product shall be one or more of the following, along with titanium dioxide: Pigment Yellow 65, Pigment Yellow 75, and opaque Pigment Yellow 74.
- (c) **Color and Appearance.** Color and appearance shall be evaluated using the following: CIE 1976 $L^*a^*b^*$, illuminant D 65, and standard observer angle 1931 CIE 2 degrees. The geometry shall be 45/0 or 0/45, or d/8, excluding specular gloss. Measurements shall be taken from samples applied to an opacity chart, e.g., Leneta Form 2A, at a wet film thickness of 15 mils \pm 1 mil. The applied sample shall have been allowed to dry for at least 12 hours before measurements are taken. The evaluation shall be as follows:
 - (1) **Production:** The color of the dry paint film of the production sample shall match the $L^*a^*b^*$ values provided, under the specified conditions. For white material the values are: $L^* = 94.80$, $a^* = -2.35$, $b^* = 3.20$. For yellow material the values are: $L^* = 80.70$, $a^* = 19.40$, $b^* = 88.65$. The colors shall match when compared instrumentally.

SPECIAL PROVISIONS

951.01 — NONTOXIC WATERBORNE PAVEMENT MARKINGS

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- (2) **Control.** The maximum permissible variation from the specified $L^*a^*b^*$ values shall be $2.0 \Delta E_{cmc}$. The measurements shall be taken from a sample applied over the black portion of an opacity chart.

The Administration will approve or disapprove any batch based on a laboratory visual evaluation for blemishes and irregularities in the test specimen (i.e. cracks, flaking, surface depressions, pooling, etc.) that would interfere with the measurement of color and appearance on the opacity chart. The Administration will make the final decision.

- (3) **Reflectance.** The reflectance, without beads, and using CIE XYZ Y_{xy} , shall be a minimum Y of 80 percent for white production batches; and a minimum of 50 percent for yellow production batches with a maximum of 60 percent. The measurement shall be taken from a sample applied over the black portion of an opacity chart.
- (4) **Color Difference over Black and White.** For any production batch the measured color difference between readings taken over the black portion of the opacity chart from those taken over the white portion shall be a maximum value of $1.0 \Delta E_{cmc}$ for white products and $1.3 \Delta E_{cmc}$ for yellow products.
- (5) **Yellowness Index.** The yellowness index of the white material, when determined according to E 313, Using Equation 1 and the coefficients for CIE D 65 illumination, 1931 from Table 1 in that standard, shall not exceed 8.0.

- (d) **Flexibility.** The pigmented binder shall not display cracking or flaking when subjected to the flexibility test of Federal Test Method TT-P 1952D, with the exception that the panels shall be 35 to 31 gauge (0.0078 to 0.0112 in.) tin plate approximately 3 x 6 in. The tin plates shall be lightly buffed with steel wool and thoroughly cleaned with solvent and dried before being used for the test.

- (e) **Weight per Gallon.** The weight per gallon for a production batch, when determined according to D 1475, shall be within ± 0.3 lb/gal of the value obtained by The National Transportation Product Evaluation Program (NTPEP), and reported on a NTPEP deck designated "north". When the Administration waives the NTPEP requirements, another target value will be stipulated.

951.01.03 Glass Bead Physical Requirements. Each lot of glass beads shall be sampled in conformance with the Administration's Frequency Guide and shall be submitted to the Administration's Office of Materials and Technology for testing and approval prior to use.

Glass beads shall be colorless, clean, transparent, and free of milkiness and excessive air bubbles.

Reflective glass beads shall conform to M 247, except that the gradation shall conform to the following:

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951.01 — NONTOXIC WATERBORNE PAVEMENT MARKINGS

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PERCENT PASSING			
SIEVE SIZE	Standard Beads	Large Beads	Maryland Blend
12 (1.70 mm)	—	100	100
14 (1.40 mm)	—	95 – 100	98 – 100
16 (1.18 mm)	—	80 – 95	88 – 97
18 (1.00 mm)	—	10 – 40	48 – 70
20 (0.85 mm)	100	0 – 5	28 – 50
30 (0.60 mm)	75 – 95	—	—
50 (0.30 mm)	15 – 35	—	5 – 25
80 (0.18 mm)	—	—	0 – 5
100 (0.15 mm)	0 – 5	—	—

Moisture resistance and flotation test are not required.

- (a) **Refractive Index.** The refractive index shall be 1.50 minimum, when tested in conformance with MSMT 211.
- (b) **Roundness.** Glass beads shall be smooth, spherical in shape, free of sharp angular scars, scratches, or pits, and shall contain a minimum of 60 percent silica. Beads shall have a minimum average roundness of 75 percent when tested in conformance with D 1155.

951.01.04 Qualification. Pavement marking material manufacturers desiring to have their material formulations approved under this Special Provision shall have their formulations evaluated on a NTPEP North Test Deck unless waived by the Administration. Only NTPEP evaluated formulations will be considered candidates for selection, unless the requirement is waived.

951.01.05 Field testing. Materials conforming to this specification shall be field evaluated for performance on a NTPEP North Test Deck. Materials performing satisfactorily throughout the test period will be placed on the Administration's Qualified Products List. All marking materials supplied under the Contract Documents shall be identical in composition to the materials submitted for initial NTPEP testing. The Office of Materials and Technology will determine conformity with these requirements.

951.01.06 Material Acceptance. Only Administration approved and stamped materials conforming to these Specifications shall be used.

Prior to the shipment of any pavement marking material batch, the manufacturer shall provide access for the Administration's representative to collect samples of the material from each production batch. The samples shall be sent to the Administration laboratory for QA testing. Each sample shall be accompanied by a certified analysis conforming to TC 1.03, showing compliance with the physical and chemical requirements of this Specification, and a statement certifying that any marking material supplied under the Contract Documents is identical in composition to the material submitted for initial NTPEP testing. The Administration will

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951.01 — NONTOXIC WATERBORNE PAVEMENT MARKINGS

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determine conformity with these requirements. Administration authorization shall be required before a batch or a portion of a batch is shipped.

Paints shall be compatible with cleaning solvents used in equipment cleaning.

Nontoxic waterborne pavement markings shall not skin, curdle, settle or be unusable or difficult to apply within 12 months of the date of manufacture. The supplier, at the Administration's request, shall replace containers of marking material exhibiting an unacceptable level of settling, skinning, or curdling, as determined by the Administration. Marking material from a production batch shall not be used beyond 12 months after the date of manufacture.

951.01.07 Certification. The manufacturer shall explicitly certify in writing that any marking material supplied under the Contract Documents conforms to the formulation identified by the same product code or name placed on the NTPEP test deck from which it was approved. The same code or name as used in the published report from that test deck must identify the product. Failure to certify will be considered grounds for product batch rejection.

The manufacturer shall, in accordance with TC-1.03, explicitly certify, in writing, of any paint batch supplied under the Contract Documents that it complies with all applicable specifications. Failure to so certify will be considered grounds for product batch rejection. Certification for yellow nontoxic lead free waterborne pavement markings shall include, for the purpose of showing compliance with this specification, the name or the type of colorant used to achieve the yellow color. The Administration will keep the paint composition and chemical analysis information confidential.

The Certification shall also, contain the following:

- (a) Manufacturer's name.
- (b) Place (address) of manufacture.
- (c) Color of material.
- (d) Date of manufacture (month-day-year).
- (e) Lot or batch identification.
- (f) Size of lot/batch.
- (g) The recommended paint temperature at the spray gun.
- (h) Material Safety Data Sheets for all materials submitted for testing and application.

The Contractor shall furnish a copy of this certification to the Administration's representative before applying the paint batch it represents.

951.01.08 Production Facility.

- (a) The producer shall have a facility, presently in operation, capable of producing the traffic paint in the quantity and quality required by the Administration. This facility will be subject to the Administration's approval.
- (b) The producer shall have a laboratory, subject to the Administration's approval, that is capable of performing the required tests.

SPECIAL PROVISIONS

951.02 — LEAD FREE THERMOPLASTIC MARKINGS

**CATEGORY 900
MATERIALS**

SECTION 951 — PAVEMENT MARKING MATERIALS

951.02 LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS. All materials composing the reflective thermoplastic material shall be lead free. Reflective thermoplastic material shall be homogeneously composed of pigment, filler, resins and glass beads and shall conform to the following.

951.02.01 Reflective Thermoplastic Components.

(a) Composition.

COMPONENT	TEST METHOD	COLOR	
		WHITE	YELLOW
Binder, % min	Certified	18.0	18.0
Premixed Reflective Beads, % min	MSMT 614	30.0	30.0
Titanium Dioxide, % min	X-Ray Fluorescence	10.0	N/A
Calcium Carbonate Inert fillers, % max	D 34	42.0	*
Yellow Pigment, %	—	N/A	*

* Amount of yellow pigment, calcium carbonate and filler shall be at the option of the manufacturer, provided all other requirements are in conformance.

Restrictions. The combined total of lead, cadmium, mercury and hexavalent chromium shall not exceed 100 ppm when tested by X-Ray Fluorescence, ICP, or comparable method capable of this level of detection. Diarylide type pigments shall only be used when the manufacturer or pavement marking material application temperature does not exceed 392 F.

(b) Binders. The binder shall be alkyd consisting of maleic modified glycerolester of resin and other plasticisers.

(c) Titanium Dioxide. The titanium dioxide shall be rutile type.

SPECIAL PROVISIONS

951.02 — LEAD FREE THERMOPLASTIC MARKINGS

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951.02.02 Reflective Thermoplastic.**(a) Physical Properties.**

TEST PROPERTY	TEST METHOD	SPECIFICATION LIMITS
Bond Strength, psi min.	MSMT 614	180
Softening Point, F		215 ± 15
Low Temperature Stress Resistance	T 250	No Cracks

(b) Specific Gravity. The specific gravity of the white and yellow pavement marking material shall be 1.7 to 2.2 when tested in conformance with D 153, Method A at 77 F.

(c) Color. After heating for 4 ± 0.5 hours at 425 ± 3 F, the thermoplastic shall be as specified in E 1347 and the following:

(1) Production. The color of the cured thermoplastic material film of the production sample shall match the Federal Standard 595 Color chips specified when compared by instrumental measurement.

(2) Control. Control color matching determinations will be made using a Pacific Scientific Color Machine, and an observation angle of 2° , and the CIE Chromaticity Coordinate Color Matching System under light source Illuminate C, with the following tolerances permitted between the standard chip and the cured thermoplastic film sample:

	WHITE Color No. 17886		YELLOW Color No. 13538	
	X	Y	X	Y
Standard Chip	0.310	0.330	0.480	0.450
Delta Tolerance	± 0.020	± 0.020	± 0.030	± 0.030

(3) Reflectance.

COLOR	TEST METHOD	DAYLIGHT REFLECTANCE at Degree	PERCENT MIN
White	Fed Std 595 No. 17886	45 - 0	80
Yellow	Fed Std 595 No. 13538	45 - 0	50

SPECIAL PROVISIONS

951.02 — LEAD FREE THERMOPLASTIC MARKINGS

(d) **Yellowing Index.** The yellowing index of the white material shall not exceed 8 prior to QUV and 15 after QUV when tested in accordance with E 313.

951.02.03 Glass Beads Physical Requirements. The glass beads shall conform to M 247 and the following:

GRADATION SIEVE SIZE	PERCENT PASSING
	STANDARD BEADS
0.85 mm (No. 20)	100
0.60 mm (No. 30)	75 - 95
0.30 mm (No. 50)	15 - 35
0.15 mm (No. 100)	0 - 5

Glass beads shall be colorless, clean, transparent, and free of milkiness, excessive air bubbles, and essentially free of sharp angular scarring or scratching. The beads shall be spherical in shape and shall contain a minimum of 60 percent silica. Roundness shall be 75 percent minimum when tested as specified in D 1155, Procedure A.

Glass beads shall have a 1.50 minimum refractive index when tested in conformance with MSMT 211.

Glass beads shall not absorb moisture in storage and shall remain free of clusters or lumps.

951.02.04 Field Testing. Materials conforming to this specification shall be field evaluated at the National Transportation Product Evaluation Program (NTPEP) Northeast test deck for performance. Materials performing satisfactorily throughout the test period will be placed on the Administration’s Prequalified Materials List. All marking materials supplied during the Contract shall be identical in composition to the materials submitted for initial testing. Conformity with these requirements will be determined by the Office of Materials and Technology (OMT).

951.02.05 Sampling for Preapproval. Sources supplying thermoplastic material and glass beads shall be submitted by the Contractor to the Engineer for approval in conformance with the Contract Documents.

Each lot of thermoplastic material will be sampled at the source and tested by the Administration over two construction seasons. If 95 percent of the lots tested conform to Specifications, source samples will no longer be required and the manufacturer may ship directly to the project. All shipments shall be accompanied by a manufacturer’s certification in conformance with TC-1.03 and shall include the following:

- (a) Manufacturer’s name.
- (b) Place of manufacture.

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951.02 — LEAD FREE THERMOPLASTIC MARKINGS

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- (c) Material color.
- (d) Date of manufacture (month-year).
- (e) Lot identification.
- (f) Size/quantity of lot represented.

Random samples will be taken on the project in conformance with the MSMT Sample Frequency Guide and tested for conformance with these specifications. Nonconformance may result in the suspension from the certification program until conformance is reestablished. To reestablish conformance, the manufacturer shall achieve a 95 percent approval level from samples taken at the manufacturer's facility and tested by the Administration prior to shipment to Administration projects.

Each lot of glass beads shall be sampled in conformance with the MSMT Sample Frequency Guide and shall be submitted to the OMT for testing and approval prior to use.

Sampling will be by batch or lot which is defined as a maximum of 44 000 lbs of material.

951.02.06 Certification. The Contractor shall furnish notarized certification as specified in TC-1.03. The manufacturer shall certify that any reflective thermoplastic materials supplied during the Contract conforms to the identical formulation as the samples submitted for evaluation on the NTPEP Northeast test deck, and identify the formulas by referring to the code used on the deck. Reflective thermoplastic materials which 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, presently in operation, capable of producing the reflective thermoplastic materials in the quantity and quality required by the Administration.
- (c) A laboratory subject to the Administration's approval which is capable of performing the required tests.

**CATEGORY 900
MATERIALS****SECTION 951 — PAVEMENT MARKING MATERIALS**

951.04 REMOVABLE PAVEMENT MARKING TAPE. Removable pavement marking tape shall remain in place on the pavement surface without being displaced by traffic, or affected by weather conditions. The material shall be capable of being removed without the use of heat, solvents, grinding, or sand blasting and shall not leave an objectionable residue.

The material shall be of good appearance and free from cracks. Edges shall be true, straight and unbroken. Line marking material shall be in rolls having no more than three splices per 150 ft of length. All marking materials shall be packaged in conformance with accepted commercial standards and shall have a minimum shelf life of one year.

Performance Requirements. When applied in conformance with the manufacturer's recommendations, the material shall provide a neat, durable marking that will not flow or distort due to temperature if the pavement surface or underlying markings remain stable. The material shall be weather resistant and, through normal traffic wear, shall show no lifting or shrinkage that will significantly impair the intended usage of the tape throughout its useful life, and shall show no significant tearing while in place, or other signs of poor adhesion. The material shall be capable of easy removal without tearing into small pieces.

951.04.01 White and Yellow. Removable preformed pavement marking materials shall conform to the requirements of the MdMUTCD and the following:

- (a) **Composition.** The marking material shall consist of a mixture of polymeric materials, pigment, and glass beads distributed uniformly throughout the surface.
- (b) **Color.** The color of the marking materials shall match Federal Test Standard No. 595 for the following color numbers:

White - 37925

Yellow - 38907

- (c) **Glass Beads.** Glass beads shall conform to the General Requirements of M 247 and have a minimum refractive index of 1.90 when tested as specified in MSMT 211.
- (d) **Frictional Resistance.** The British Pendulum Number shall be a minimum of 50 when tested as specified in E 303.
- (e) **Certification.** Samples submitted to the Office of Materials Technology (OMT) for testing shall be accompanied by the manufacturer's certified analysis in conformance with TC-1.03.

Any material supplied for a Contract shall be identical in composition to the material originally submitted for testing. Conformity will be determined by OMT.

- (f) **Field Testing.** Line marking materials conforming to the Contract Documents will be field tested by The National Transportation Product Evaluation Program (NTPEP) and over 180 day period as specified in MSMT 723 for conformance with the following:

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- (1) Ease of Application - satisfactory.
- (2) Removability - a minimum rating of 2.
- (3) Residue Remaining at Time of Removal (day and night) - minimum rating of 2.
- (4) Durability, Appearance, and Night Visibility - minimum weighted rating of 4.
- (5) Loss or Movement - minimum rating of 2.

Upon satisfactory completion of the field testing, the marking materials will be placed on OMT's Qualified Products List. The material shall conform to all criteria for a minimum period of 120 days to be considered satisfactory.

951.04.02 Black. Removable preformed pavement marking materials shall conform to the requirements of the MdMUTCD and the following:

- (a) **Composition.** The non-reflective blackout tape shall not contain metallic foil and shall consist of a mixture of high quality polymeric materials, pigments, and inorganic fillers distributed throughout its cross-sectional area, with a matte black non-reflective surface. The film shall be pre-coated with a pressure sensitive adhesive. A nonmetallic medium shall be incorporated to facilitate removal.

For patterned materials, a minimum of 20 percent of the total surface area shall be raised and coated with nonskid particles. The channels between the raised areas shall be substantially free of particles.

- (b) **Color.** The color of the blackout material shall match Federal Test Standard No. 595 for the following color numbers:

Black - 37038 (or as approved by the Engineer)

- (c) **Frictional Resistance.** The British Pendulum Number shall be a minimum of 50 when tested as specified in E 303.
- (d) **Certification.** Samples submitted to OMT for testing shall be accompanied by the manufacturer's certified analysis in conformance with TC-1.03.

Any material supplied for a Contract shall be identical in composition to the material originally submitted for testing. Conformity will be determined by OMT.

- (e) **Field Testing.** Line marking materials conforming to the Contract Documents will be field tested by The National Transportation Product Evaluation Program (NTPEP) and over a 180 day period as specified in MSMT 723 for conformance with the following:

- (1) Ease of Application - satisfactory.
- (2) Removability - a minimum rating of 2. The manufacturer shall show that the blackout tape can be manually removed after its intended use, intact or in large pieces, at temperatures above 40 F without the use of heat, solvents, grinding, or sand or water blasting. The blackout tape shall remove cleanly from existing markings that are adequately adhered to the pavement surface.

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- (3) Residue Remaining at Time of Removal (day and night) - minimum rating of 2.
- (4) Durability, Adhesion, Appearance, and Night Visibility - minimum weighted rating of 4.
The manufacturer shall demonstrate that the properly applied blackout tape adheres to the roadway and existing stable roadway markings under climatic and traffic conditions normally encountered in the construction work zone.
- (5) Loss or Movement - minimum rating of 2.

Upon satisfactory completion of the field testing, the marking materials will be placed on OMT's Qualified Products List. The material shall conform to all criteria for a minimum period of 180 days to be considered satisfactory.

951.04.03 Packaging. Preformed pavement markings shipping package shall conform to the manufacturer's shipping requirements to prevent damage during delivery and unloading of all shipments. The shipping package shall be marked with the following information placed on each container:

- (a) Description of item.
- (b) Date of manufacture.
- (c) Successful Bidder's Name.
- (d) Purchase Order Number.
- (e) Lot Number.
- (f) Color.
- (g) Installation instructions.

SPECIAL PROVISIONS

CONTRACT NO. PG7585184

**951.05 — SNOWPLOWABLE RAISED PAVEMENT MARKERS and
RECESSED PAVEMENT MARKERS**

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**CATEGORY 900
MATERIALS****SECTION 951 — PAVEMENT MARKING MATERIALS****951.05 SNOWPLOWABLE RAISED PAVEMENT MARKERS (SPRPM) and RECESSED PAVEMENT MARKERS (RPM).**

Pavement Marker Reflector Lenses. Pavement marker reflector lenses shall conform to the requirements of D 4383 and shall be comprised of materials with adequate chemical, water and UV resistance for the intended use. 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 an elastomeric pad to permit its attachment to the surface of the casting using the manufacturer's recommended adhesive. The lens faces shall provide extremely hard and durable abrasion resistant surfaces.

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 1.7 in.². The outer surface of the shell shall be smooth except in identification areas.

The pavement marker reflector lens shall be imprinted with the model number and the manufacturer's name.

SPRPM Casting. Both ends of the casting shall be shaped to deflect a snow plow blade. The bottom of the casting shall incorporate two parallel keels and an arcuately shaped web designed to fit into a grooved surface. 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. The installed height shall not exceed 0.25 in. above the road surface.

The casting shall be nodular iron conforming to A 536, Grade 80-55-06, hardened to 51 to 55 R_C. The surface of the keel and web shall be free of scale, dirt, oil, grease or any other contaminant, which may reduce its bond to the epoxy adhesive.

The casting shall be imprinted with the model number and the manufacturer's name.

Recessed Pavement Marker Adhesive. The adhesive used to fasten the pavement marker lens to the pavement surface shall conform to D 4383-05 Table X1.4.2.3 M 237 Type II. Rapid Set Type adhesives shall not be used.

Casting Adhesive. The epoxy adhesive used to fasten the castings to the pavement surface shall conform to D 4383-05 Table X1.1.

Reflector Lens Adhesive in Casting. The adhesive used to fasten the reflector lens to the casting shall conform to the manufacturers' recommendations.

SPECIAL PROVISIONS

CONTRACT NO. PG7585184

**951.05 — SNOWPLOWABLE RAISED PAVEMENT MARKERS and
RECESSED PAVEMENT MARKERS**

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951.05.01 Field Testing. Materials conforming to SPRPM Specification shall be field evaluated at the National Transportation Product Evaluation Program (NTPEP) Northeast test deck for performance. Materials conforming to recessed pavement marker specification shall be field evaluated at any (NTPEP) test deck for performance. Materials performing satisfactorily throughout the test period will be placed on the Administrations Prequalified Materials List. All marking materials supplied during the Contract shall be identical in composition to the materials submitted for initial testing. Random sampling will be performed on projects sites. Conformity with these requirements will be determined by the Office of Materials Technology (OMT).

951.05.02 Facility Sampling. Random testing of samples will be performed by the Administration as Quality Assurance and certification verification. Materials will be periodically sampled at the manufacturer's facility by the Administration. Each sample shall be accompanied by a certification showing compliance with the physical requirements of this Specification. Materials supplied during the Contract shall be identical in composition to the materials submitted for initial testing. Conformity with these requirements will be determined by OMT.

Sources supplying materials shall be submitted by the Contractor to the Engineer for approval in conformance with the Contract Documents.

The material manufacturer shall reimburse the Administration for the cost of sampling and shipment of the samples when sampled by the Administration.

Material Shipment. The components shall be shipped in containers sealed by the manufacturer. The label on each container shall include the following information:

- (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.

951.05.03 Certification. The Contractor shall furnish notarized certification as specified in TC-1.03.

The manufacturer shall certify that any SPRPM materials supplied during the Contract conforms to the identical composition of the samples submitted for evaluation on the NTPEP Northeast Test Deck, and identify the SPRPM materials by referring to the code used on the deck. PRPM materials which fail to conform will be rejected.

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951.05 — SNOWPLOWABLE RAISED PAVEMENT MARKERS and
RECESSED PAVEMENT MARKERS

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The manufacturer shall certify that any recessed pavement marker materials supplied during the Contract conforms to the identical composition of the samples submitted for evaluation on any NTPEP Test Deck, and identify the recessed pavement marker materials by referring to the code used on the deck. Recessed pavement marker materials which 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, in operation, capable of producing the materials in the quantity and quality required by the Administration.
- (c) A laboratory capable of performing the required tests. This laboratory will be subject to the Administration's approval.

**CATEGORY 900
MATERIALS****SECTION 951 — PAVEMENT MARKING MATERIALS**

951.06 HEAT APPLIED PERMANENT PREFORMED THERMOPLASTIC PAVEMENT MARKING MATERIAL. The material shall be highly durable retroreflective polymeric materials designed for use as transverse lines, numbers, legends, symbols and arrow markings subjected to high traffic volumes and severe wear conditions such as shear action from crossover or encroachment.

The applied material shall adhere to hot mix asphalt (HMA), open-grade friction courses (OGFC), stone matrix asphalt (SMA), portland cement concrete (PCC), and any existing pavement markings when applied using normal heat from a propane fueled heat gun in conformance with manufacturer's recommendations.

The applied material shall be capable of conforming to pavement contours, breaks and faults, shall not be affected by weather conditions, and shall remain in place on pavement surfaces without being displaced by traffic.

The material shall have a minimum shelf life of one year.

The material shall conform to the requirements of the MdMUTCD and the following:

(a) Composition. The material shall consist of polymeric materials, pigments, binders and glass beads distributed throughout the entire cross-sectional area. The thermoplastic material shall conform to M 249 with the exception of the relevant differences for the material being supplied in the preformed state.

Restrictions. The combined total of lead, cadmium, mercury and hexavalent chromium shall not exceed 100 ppm when tested by X-ray diffraction, ICP, or comparable method capable of this level of detection. Nonleachable lead based pigments will not be permitted. Diarylide type pigments shall only be used when the manufacture or pavement marking material application temperature does not exceed 392 F.

(b) Color. Preformed markings shall consist of film with pigments selected and blended to match Federal Standard 595 color chip Nos. 17886 and 13538 for white and yellow respectively.

(c) Frictional Resistance. The surface of the applied material shall provide a minimum average skid resistance value of 50 BPN when tested in conformance with E 303.

SPECIAL PROVISIONS

951.06 — HEAT APPLIED THERMOPLASTIC MATERIALS

CONTRACT NO. PG7585184

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- (d) **Patchability.** The material shall be capable of use for patching worn areas of the same type in conformance with manufacturer's recommendations.
- (e) **Thickness.** The minimum thickness, without adhesive, shall be 120 mils.
- (f) **Adhesion.** The material shall retain a minimum of 65 percent adhesive bond after 100 cycles of freeze-thaw when tested in conformance with C 666, Method B.
- (g) **Beads.**
- (1) **Index of Refraction.** All beads shall meet the general requirements of M 247, Type I, and shall have a minimum index of refraction of 1.50 when tested using the liquid oil immersion method specified in MSMT 211.
 - (2) **Acid Resistance.** A maximum of 15 percent of the beads shall show a formation of a distinct opaque white layer on the entire surface after exposure to a 1 percent solution (by weight) of sulfuric acid in conformance with MSMT 211.

Field Testing. Materials conforming to this Specification shall be field tested at AASHTO regional test facilities, such as National Transportation Product Evaluation Program (NTPEP), for performance.

Materials performing satisfactorily throughout the test period, including exhibiting a minimum retained reflectance of $100 \text{ mcd/m}^2/\text{lux}$ at the completion of the testing, will be placed on the Prequalified Materials List maintained by the Office of Materials and Technology.

Certification. Any marking material supplied during the Contract shall be identical in composition to the material submitted for initial testing. Samples submitted for testing shall be accompanied by the manufacturer's certified analysis in conformance with TC-1.03.

**CATEGORY 900
MATERIALS****SECTION 951 — PAVEMENT MARKING MATERIALS**

951.07 PERMANENT PREFORMED PATTERNED REFLECTIVE PAVEMENT (PPRP) MARKING MATERIAL. The material shall be capable of adhering to hot mix asphalt and portland cement concrete surfaces, and to any existing pavement markings in accordance with manufacturer's recommendations by a pre-coated pressure sensitive adhesive. A primer shall be used to precondition the surface if recommended by the manufacturer. The markings shall be capable of being inlaid in new hot mix asphalt surfaces during the paving operation.

The material shall be highly durable and retroreflective and shall be fabricated of a polymeric material designed for longitudinal and legend/symbol markings subjected to high traffic volumes and severe wear conditions, such as shear action from crossover or encroachment on typical longitudinal configurations, and where high levels of reflectivity are required to ensure the safety of the motoring public.

The material shall be of good appearance and free from cracks. Edges shall be true, straight and unbroken. Line marking material shall be in rolls having no more than three splices per 150 ft of length. All marking materials shall be packaged in conformance with accepted commercial standards and shall have a minimum shelf life of one year.

The material shall remain in place on the pavement surface without being displaced by traffic, and shall not be affected by weather conditions.

951.07.01 Permanent Preformed Patterned Reflective Pavement Marking Material Components.

Composition. The material shall consist of a mixture of polymeric materials, pigments and reflective spheres distributed throughout the base cross-sectional area and reflective spheres bonded to the topcoat surface to provide immediate and continuing retroreflection.

Restrictions. The combined total of lead, cadmium, mercury and hexavalent chromium shall not exceed 100 ppm. Diarylide based pigments and non-leachable lead pigmentation are not acceptable. The presence of these compounds shall be tested for compliance to the specification by X-ray diffraction, ICP, or another comparable method, capable of this level of detection.

951.07.02 Permanent Preformed Patterned Reflective Pavement Marking Material Physical Requirements.

- (a) **Reflectance.** The manufacturer shall certify that the white and yellow materials shall have the minimum initial retroreflectance values of 350 mcd/L/m² for white and 250 mcd/L/m² for yellow markings in any 528 ft section. Reflectance shall be measured using a reflectometer with CEN 30-meter geometry (88.76 degree entrance angle and 1.05 degree observation angle).
- (b) **Color.** The color of preformed markings shall essentially match the 37886, 33538 or 37038 color chips for white, yellow or black respectively as shown in Federal Standard 595A.

SPECIAL PROVISIONS

CONTRACT NO. PG7585184

951.07 — PREFORMED PATTERNED REFLECTIVE MATERIAL

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- (c) **Frictional Resistance.** The surface of the retroreflective pliant polymer shall provide a minimum initial average skid resistance value of 45 BPN when tested according to ASTM E 303.

951.07.03 Field Testing. Materials conforming to this specification shall be field evaluated at the National Transportation Product Evaluation Program (NTPEP) Northeast test deck for performance. Materials performing satisfactorily throughout the test period will be placed on the Administration's Prequalified Materials List. All marking materials supplied during the Contract shall be identical in composition to the materials submitted for initial testing. Conformity with these requirements will be determined by the Office of Materials and Technology.

951.07.04 Prequalification. Samples shall be taken by Administration for testing. The manufacturer shall submit any data from AASHTO NTPEP Northeast Test Deck which support material performance. Materials conforming to this Specification will be placed on the Administration's Prequalified List of Patterned Tapes.

951.07.05 Certification. The Contractor shall furnish notarized certification as specified in TC-1.03. The manufacturer shall certify that any reflective thermoplastic materials supplied during the Contract conforms to the identical formulation as the samples submitted for evaluation on the NTPEP Northeast test deck, and identify the formulas by referring to the code used on the deck. Reflective thermoplastic materials which 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, presently in operation, capable of producing the reflective thermoplastic materials in the quantity and quality required by the Administration.
- (c) A laboratory subject to the Administration's approval which is capable of performing the required tests.

CATEGORY 900
MATERIALS

SECTION 951 — PAVEMENT MARKING MATERIALS

951.08 LEAD FREE TWO COMPONENT EPOXY PAVEMENT MARKING MATERIALS.

The white and yellow lead free epoxy pavement marking material shall consist of a 100 percent solid two-part system with glass beads embedded homogeneously throughout the depth of the film and the surface. All of these materials shall be lead free as defined herein.

951.08.01 Epoxy Physical Components.

(a) Composition.

COMPONENT A	PERCENT BY WEIGHT	
	WHITE	YELLOW
Epoxy Resin	75 - 82	75 - 79
Titanium Dioxide	18 - 25	14 - 17
Organic Yellow	—	7 - 8

The entirety of the pigment of Component A white shall consist of D 476, Type II Rutile Titanium Dioxide. No extender pigments are permitted. Yellow pigments and tinting colors shall be added in proportions which will produce a color equal to the yellow color depicted in the color box described herein. Any Titanium Dioxide used shall conform to D 476, Type II Rutile.

The epoxy system shall contain no volatile solvents. The cured film shall be no less than 99.5 percent of the wet film thickness of the panel at the time it was prepared for test.

Restrictions. The manufacturer shall certify that the combined total of lead, cadmium, mercury, and hexavalent chromium shall not exceed 100 ppm when tested by X-ray diffraction, ICP, Atomic Absorption Spectroscopy, or a comparable method capable of this level of detection.

(b) Epoxide Number. The weight per epoxy equivalent (WPE) as determined by D 1652 for both white and yellow of Component A, on a pigment free basis, shall conform to a target value ± 50 provided by the manufacturer and approved by the Engineer.

(c) Amine Number. The amine value of the curing agent (component B) shall consist entirely of stable amines and shall be determined as specified in D 2074. The total amine value shall conform to a target value ± 50 provided by the manufacturer and approved by the Engineer.

951.08.02 Mixed Composition.

(a) **Mixing Ratio.** The mixing ratio for the epoxy pavement marking material shall be proportioned according to the manufacturer's recommendations. The ratio shall not vary more than 2.5 percent during any operation conducted in conjunction with these materials.

(b) **Color (White and Yellow).**

(1) **Production.** The color of the cured epoxy material film of the production sample shall essentially match the specified color chips conforming to Federal Standard 595 when visually compared or by instrumental measurement.

(2) **Control.** Control color matching determinations will be made using a Pacific Scientific Color Machine at an observation angle of 2 degrees, and the C.I.E. Chromatically Coordinate Color Matching System under light source Illuminate C, with the following tolerances permitted between the standard chip and the cured epoxy film sample:

	WHITE Color No. 17886		YELLOW Color No. 13538	
	X	Y	X	Y
Standard Chip	0.310	0.330	0.480	0.450
Delta Tolerance	± 0.020	± 0.020	± 0.030	± 0.030

(c) **Yellowing Index.** After curing for 72 hours, the yellowing index of the white material when tested in conformance with E 313, using the C.I.E. Scale Illuminate C and 45/2 degrees geometry, shall not exceed 8.0 preceding QUV, and shall not exceed 15.0 after 72 hours in QUV.

(d) **Toxicity.** After heating to the application temperature, the material shall not exude fumes which are toxic or injurious to persons or property.

(e) **Directional Reflectance.** The directional reflectance when tested in conformance with E 1347 after QUV using the C.I.E. Scale Illuminate C and 45/2 degrees geometry, shall be minimums of 80 for white and 50 for yellow.

(f) **Abrasion Resistance.** Abrasion Resistance of the mixed material without glass beads shall be 80 mg maximum loss when tested as specified in C 501 with a 1000 g load, 1000 cycles, CS-17 wheel and a 15 ± 0.5 mil wet film thickness on a S-16 plain steel plate.

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951.08 — LEAD FREE EPOXY MARKING MATERIALS

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- (g) **Hardness.** The Type D Durometer Hardness of the material shall be a minimum of 75 when tested in conformance with D 2240. Test films shall be cast on a suitable substrate at 20 ± 1 mil wet film thickness. The film shall be cured 24 to 72 hours at 75 ± 2 F prior to testing.
- (h) **Tensile Strength.** The average tensile strength shall be a minimum of 6000 psi when tested in conformance with D 638, Type IV molded specimens. Specimens shall be cured 24 to 72 hours at 75 ± 2 F with a relative humidity of 50 ± 3 percent prior to testing.
- (i) **Compressive Strength.** The compressive strength of the catalyzed epoxy marking material shall be a minimum of 12 000 psi when tested in conformance with D 695. The test specimen shall be cured 72 hours at 75 ± 2 F with a relative humidity of 50 ± 3 percent prior to testing.
- (j) **Adhesion to Concrete.** The catalyzed epoxy paint pavement marking materials, when tested in conformance with ACI Method 503, shall have a 4000 psi minimum adhesion to the specified concrete surface with 100 percent concrete failure in the performance of this test. The prepared specimens shall be conditioned for 24 to 72 hours at 75 ± 2 F prior to the performance of the tests.
- (k) **Infrared Spectroscopy.** Both component A and component B shall be analyzed to verify for control purposes that materials submitted for use are of an identical formulation as originally approved. Deviations as determined by comparison with the original sample shall be cause for rejection.
- (l) **Curing.** The epoxy material shall be fully cured at a surface temperature of 35 F or above. The pavement marking material shall exhibit a no-tracking time of less than 10 minutes, when mixed in the proper ratio and applied at 20 ± 1.0 mil film thickness at 75 ± 2 F and with the proper saturation of beads when tested in conformance with D 711. The manufacturer shall furnish a table depicting typical no-track time versus various temperatures in the recommended application temperature range.

951.08.03 Glass Beads Physical Requirements. Glass beads shall be colorless, clean, transparent and free of milkiness or excessive air bubbles and essentially clean from surface scarring or scratching. The beads shall be spherical in shape, and shall contain a minimum of 60 percent silica. Roundness shall be 75 percent minimum when tested in conformance with D 1155, Procedure A.

The beads shall have a minimum refractive index of 1.50 (Standard) and 1.90 (Large) when tested in conformance with MSMT 211.

Glass beads shall not absorb moisture in storage and shall remain free of clusters or lumps.

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951.08 — LEAD FREE EPOXY MARKING MATERIALS

Glass beads shall conform to all the requirements of M 247, except that the moisture resistance and flotation tests shall not be required, and the following:

GRADATION SIEVE SIZE	PERCENT PASSING	
	Standard Beads	Large Beads
12 (1.70 mm)		100
14 (1.40 mm)		95 - 100
16 (1.18 mm)		80 - 95
18 (1.00 mm)		10 - 40
20 (0.85 mm)	100	0 - 5
30 (0.60 mm)	75 - 95	
50 (0.30 mm)	15 - 35	
100 (0.15 mm)	0 - 5	

951.08.04 Field Testing. Materials conforming to this Specification shall be field evaluated at the National Transportation Product Evaluation Program (NTPEP) Northeast test deck for performance. Materials performing satisfactorily throughout the test period will be placed on the Administrations Prequalified Materials List. All marking materials supplied during the Contract shall be identical in composition to the materials submitted for initial testing. Conformity with these requirements will be determined by the Office of Materials and Technology (OMT).

951.08.05 Sampling. Random testing of samples will be performed by the Administration as Quality Assurance and certification verification. Samples of each batch will be procured at the manufacturer’s facility by the Administration. Each sample shall be accompanied by a certified analysis showing compliance with the physical requirements of this Specification, the recommended epoxy resin material temperature at the spray gun, and certification that any epoxy resin material supplied during the Contract period shall be identical in composition to the material submitted for initial testing. Conformity to these requirements will be determined by OMT.

Sources supplying epoxy resin materials and glass beads shall be submitted by the Contractor to the Engineer for approval in conformance with the Contract Documents.

The epoxy resin material manufacturer shall reimburse the Administration for the cost of sampling and shipment of the samples if sampled by the Administration.

(a) Epoxy Resin Components. The epoxy resin components shall be shipped in containers sealed by the manufacturer. The label on each container shall include the following information:

SPECIAL PROVISIONS

CONTRACT NO. PG7585184

951.08 — LEAD FREE EPOXY MARKING MATERIALS

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- (1) Manufacturer's Name,
- (2) Place of Manufacture,
- (3) Color of Material and Component Type,
- (4) Date of Manufacture (month-year),
- (5) Batch or Lot Identification Number, and
- (6) Size/quantity of lot represented.

(b) **Glass Beads.** The glass beads shall be shipped in 50 lb, moisture resistant bags with complete identification information imprinted on the outside.

The Contractor shall furnish samples of the glass beads and epoxy resin materials to the Administration's Central Laboratory. Physical testing will be performed every four months.

951.08.06 Certification. The Contractor shall furnish notarized certification as specified in TC-1.03. The manufacturer shall certify that any epoxy resin materials supplied during the Contract conforms to the identical formulation as the samples submitted for evaluation on the NTPEP Northeast test deck, and identify the formulas by referring to the code used on the deck. Epoxy resin materials which 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, in operation, capable of producing the epoxy resin materials in the quantity and quality required by the Administration.
- (c) A laboratory capable of performing the required tests. This laboratory will be subject to the Administration's approval.



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 4 from Forestville Road to MD 458 (Silver Hill Road) located in, Prince George's County, Maryland, for which Price Proposals will be received until 12:00 o'clock noon on Wednesday, October 15, 2014, this work being situated as follows:



Design-Build Contract for the MD 4 Community Safety & Enhancement Project
Ms. Norie A. Calvert
Office of Procurement and Contract Management
Fourth Floor, C-405
707 N. Calvert Street
Baltimore, Maryland 21202

In response to the advertisement by the Administration, inviting price 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, the Plans, 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.

SCHEDULE OF PRICES

ITEM NO. CCS NO.	APPROXIMATE QUANTITIES	DESCRIPTION OF ITEMS	SECTION	UNIT PRICE		AMOUNTS	
				DOLLARS	CENTS	DOLLARS	CENTS
1001 100000	LUMP SUM	DESIGN-BUILD	XXX	LUMP SUM			
1002 110500	22,000	EACH OF PRICE ADJUSTMENT FOR DIESEL FUEL	XXX SP	1	00	22,000	00

END OF CATEGORY NO. 1

SCHEDULE OF PRICES

ITEM NO. CCS NO.	APPROXIMATE QUANTITIES	DESCRIPTION OF ITEMS	SECTION	UNIT PRICE		AMOUNTS	
				DOLLARS	CENTS	DOLLARS	CENTS
3001 388130	10	EACH OF QUARTERLY EROSION AND SEDIMENT CONTROL INCENTIVE	308 SP	3,750	00	37,500	00
3002 388135	LUMP SUM	FINAL EROSION AND SEDIMENT CONTROL INCENTIVE	308 SP	37,500	00	37,500	00

END OF CATEGORY NO. 3

SCHEDULE OF PRICES

ITEM NO. CCS NO.	APPROXIMATE QUANTITIES	DESCRIPTION OF ITEMS	SECTION	UNIT PRICE		AMOUNTS	
				DOLLARS	CENTS	DOLLARS	CENTS
5001 504600	45,000	EACH OF PRICE ADJUSTMENT FOR ASPHALT BINDER	504 SP	1	00	45,000	00
5002 504605	111,615	EACH OF PAYMENT ADJUSTMENT FOR PAVEMENT DENSITY	504 SP	1	00	111,615	00
5003 504610	111,615	EACH OF PAYMENT ADJUSTMENT FOR HOT MIX ASPHALT MIXTURE	504 SP	1	00	111,615	00
5004 535100	55,700	EACH OF PAVEMENT SURFACE PROFILE PAY ADJUSTMENT	535 SP	1	00	55,700	00

END OF CATEGORY NO. 5

STATE CONTRACT - PG7585184

FEDERAL CONTRACT - NA - STATE FUNDED ONLY

SCHEDULE OF PRICES

ITEM NO. CCS NO.	APPROXIMATE QUANTITIES	DESCRIPTION OF ITEMS	SECTION	UNIT PRICE		AMOUNTS	
				DOLLARS	CENTS	DOLLARS	CENTS
8001 800000	LUMP SUM	UTILITY - WSSC	XXX	LUMP SUM	_____	_____	_____
					_____	_____	_____
					_____	_____	_____
					_____	_____	_____
					_____	_____	_____
					_____	_____	_____

END OF CATEGORY NO. 8

SCHEDULE OF PRICES

ITEM NO. CCS NO.	APPROXIMATE QUANTITIES	DESCRIPTION OF ITEMS	SECTION	UNIT PRICE		AMOUNTS	
				DOLLARS	CENTS	DOLLARS	CENTS
		AGGREGATE AMOUNT AT UNIT PRICES ALTERNATE A IS USING BID 1001, 1002, 3001, 3002, 5001-5004, 8001					
		THIS PROPOSAL SHALL BE FILLED IN BY THE BIDDER WITH PRICES IN NUMERALS AND EXTENSIONS SHALL BE MADE BY HIM.					



BUY AMERICAN STEEL

The work under this proposal shall be in conformance with the Annotated Code of Maryland Article 21, Section 8-701 through 8-705 and Comar 21.11.02.

The bidder who elects to supply Domestic Steel Products need not complete this form.

However, the bidder who elects to supply steel of Foreign Manufacture must complete this form. When steel of Foreign Manufacture is proposed, the Contractor must include the costs of Domestic Steel.

American Steel must be utilized if the total cost of Domestic Steel (D) is less than the amount of a twenty percent (20%) increase to the total cost of Foreign Steel (F).

In reference to Section 21.11.02:

- A.) Buy American Steel if the total cost of Domestic Steel (D) is less than the amount of a twenty percent (20%) increase to the total cost of Foreign Steel (F).

total cost (D) $1.2 \times$ total cost (F)

- B.) In a Substantial Labor Surplus Area, Buy American Steel if the total cost of Domestic Steel (D) is less than the amount of a thirty percent (30%) increase to the total cost of Foreign Steel (F).

total cost (D) $1.3 \times$ total cost (F)

Structural Steel Items

Category	Item No. _____	Description _____	
		Domestic	Foreign
Costs:	Furnishing	_____	_____
	Erection/Placement	_____	_____
	Inspection Cost	_____	_____
	Duties	_____	_____
	Transportation	_____	_____
	Other Costs	_____	_____
	Total Item Cost	_____	_____



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Structural Steel Items

	Domestic	Foreign
Costs: Furnishing	_____	_____
Erection/Placement	_____	_____
Inspection Cost	_____	_____
Duties	_____	_____
Transportation	_____	_____
Other Costs	_____	_____
 Total Item Cost	_____	_____

Structural Steel Items

	Domestic	Foreign
Costs: Furnishing	_____	_____
Erection/Placement	_____	_____
Inspection Cost	_____	_____
Duties	_____	_____
Transportation	_____	_____
Other Costs	_____	_____
 Total Item Cost	_____	_____

Other Than Structural Steel items

	Domestic	Foreign
Costs: Furnishing	_____	_____
Erection/Placement	_____	_____
Inspection Cost	_____	_____
Duties	_____	_____
Transportation	_____	_____
Other Costs	_____	_____
 Total Item Cost	_____	_____

Total Cost of All Steel Items D) _____ F) _____



BID/PROPOSAL AFFIDAVIT

- A. Each solicitation shall provide notice that the affidavit in §B of this regulation shall be completed and submitted to the procurement agency with the vendor's bid or offer.
- B. Mandatory Solicitation Addendum. The solicitation addendum shall be in substantially the same form as follows:

A. AUTHORITY

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, or on the basis of 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.



B-1. CERTIFICATION REGARDING MINORITY BUSINESS ENTERPRISES.

The undersigned bidder 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 proposal;
- (2) Fail to notify the certified minority business enterprise before execution of the contract of its inclusion in 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.
- (5) 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.

B-2. CERTIFICATION REGARDING VETERAN-OWNED SMALL BUSINESS ENTERPRISES. THE UNDERSIGNED

Bidder hereby certifies and agrees that it has fully complied with the State veteran-owned small business enterprise law, State Finance and Procurement Article, §14-605, Annotated Code of Maryland, which provides that a person may not:

- (1) Knowingly and with intent to defraud, fraudulently obtain, attempt to obtain, or aid another person in fraudulently obtaining or attempting to obtain public money, procurement contracts, or funds expended under a procurement contract to which the person is not entitled under this title;
- (2) Knowingly and with intent to defraud, fraudulently represent participation of a veteran-owned small business enterprise in order to obtain or retain a bid preference or a procurement contract;
- (3) Willfully and knowingly make or subscribe to any statement, declaration, or other document that is fraudulent or false as to any material matter, whether or not that falsity or fraud is committed with the knowledge or consent of the person authorized or required to present the declaration, statement, or document;



(4) Willfully and knowingly aid, assist in, procure, counsel, or advise the preparation or presentation of a declaration, statement, or other document that is fraudulent or false as to any material matter, regardless of whether that falsity or fraud is committed with the knowledge or consent of the person authorized or required to present the declaration, statement, or document;

(5) Willfully and knowingly fail to file any declaration or notice with the unit that is required by COMAR 21.11.12; or

(6) Establish, knowingly aid in the establishment of, or exercise control over a business found to have violated a provision of §B-2(1)—(5) of this regulation.

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:



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(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, §14-308 of the State Finance and Procurement Article of the Annotated Code of Maryland;

(5) Been convicted of a violation of §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 subsections (1)—(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) 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)—(8) 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. 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-M) 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) _____
Member Signature Title 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 MBE FORM A
STATE-FUNDED CONTRACTS
CERTIFIED MBE 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 not susceptible of being selected for award.

In connection with the bid/proposal submitted in response to Solicitation No. _____, I affirm the following:

1. MBE Participation (PLEASE CHECK ONLY ONE).

- I have met the overall certified Minority Business Enterprise (MBE) participation goal of Twenty-Six percent (26%) and the following subgoals, if applicable:
 - Seven percent (7%) for African American-owned MBE firms
 - Zero percent (0%) for Hispanic American-owned MBE firms
 - Four percent (4%) for Asian American-owned MBE firms
 - Zero percent (0%) for Women-owned MBE firms

I agree that these percentages of the total dollar amount of the Contract, for the MBE goal and subgoals (if any), will be performed by certified MBE firms as set forth in the MBE Participation Schedule - Part 2 of the MDOT MBE Form B (State-Funded Contracts).

OR

- I conclude that I am unable to achieve the MBE participation goal and/or subgoals. I hereby request a waiver, in whole or in part, of the overall goal and/or subgoals. 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 MBE firms will be used to accomplish the percentages of the total dollar amount of the Contract, for the MBE goal and subgoals (if any), as set forth in the MBE Participation Schedule - Part 2 of the MDOT MBE Form B (State-Funded Contracts).

2. Additional MBE 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:



**MDOT MBE FORM A
STATE-FUNDED CONTRACTS
CERTIFIED MBE UTILIZATION AND FAIR SOLICITATION AFFIDAVIT
PAGE 2 OF 2**

- (a) Outreach Efforts Compliance Statement (MDOT MBE Form C - State-Funded Contracts);
- (b) Subcontractor Project Participation Statement (MDOT MBE Form D - State-Funded Contracts);
- (c) If waiver requested, MBE Waiver Request Documentation and Forms (MDOT MBE/DBE Form E – Good Faith Efforts Guidance and Documentation) per COMAR 21.11.03.11; 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 MBE participation goal and subgoals, if any.

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 that the proposal is not susceptible of being selected for award.

3. Information Provided to MBE firms.

In the solicitation of subcontract quotations or offers, MBE firms were provided not less than the same information and amount of time to respond as were non-MBE firms.

4. Products and Services Provided by MBE firms.

I hereby affirm that the MBEs 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 MBE FORM B
STATE-FUNDED CONTRACTS
PART 1 – INSTRUCTIONS FOR MBE PARTICIPATION SCHEDULE
PAGE 1 OF 4

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.

PLEASE READ BEFORE COMPLETING THIS FORM

1. Please refer to the Maryland Department of Transportation (MDOT) MBE 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 prime or subcontractor is a certified MBE in the MDOT Directory can be used for purposes of achieving the MBE participation goals.
2. In order to be counted for purposes of achieving the MBE participation goals, the MBE firm (whether a prime or subcontractor) must be certified for that specific NAICS Code (“MBE” for State-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 MBE 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 an MBE firm is certified and eligible to receive MBE 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 MBE Directory includes the products to be supplied and/or services to be performed that are being used to achieve the MBE participation goals. If you have any questions as to whether a firm is certified to perform the specific services or provide specific products, please contact MDOT’s Office of Minority Business Enterprise at 1-800-544-6056 or via email at mbe@mdot.state.md.us.
4. Complete the Part 2 – MBE Participation Schedule for all certified MBE firms (including primes and subcontractors) being used to achieve the MBE participation goal and subgoals, if any.



MDOT MBE FORM B
STATE-FUNDED CONTRACTS
PART 1 – INSTRUCTIONS FOR MBE PARTICIPATION SCHEDULE
PAGE 2 OF 4

5. **MBE Prime Self-Performance.** When a certified MBE firm participates as a prime (independently or as part of a joint venture) on a contract, a procurement agency may count the distinct, clearly defined portion of the work of the contract that the certified MBE firm performs with its own forces toward fulfilling up to fifty-percent (50%) of the MBE participation goal (overall) and up to one hundred percent (100%) of not more than one of the MBE participation subgoals, if any, established for the contract. In order to receive credit for self-performance, an MBE prime must be (a) a certified MBE (see 1-3 above) and (b) listed in the Part 2 – MBE Participation Schedule with its certification number, the certification classification under which it will self-perform, and the percentage of the contract that can be counted as MBE self-performance. For the remaining portion of the overall goal and any subgoals, the MBE prime must also list, in the Part 2 – MBE Participation Schedule, other certified MBE firms used to meet those goals or, after making good faith efforts to obtain the participation of additional MBE firms, request a waiver. Note: A dually-certified MBE firm can use its own forces toward fulfilling **ONLY ONE** of the MBE subgoals for which it can be counted.

6. The Contractor's subcontractors are considered second-tier subcontractors. Third-tier contracting used to meet an MBE 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 MBE Participation Schedule.

7. For each MBE firm that is being used as a supplier/wholesaler/regular dealer/broker/manufacturer, please follow these instructions for calculating the **amount of the subcontract for purposes of achieving the MBE participation goals:**
 - 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 MBE 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 MBE participation credit will be given for the supply of these products.

 - C. For purposes of achieving the MBE participation goal, you may count only the amount of any reasonable fee that the MBE 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 MBE Participation Schedule, please divide the amount



MDOT MBE FORM B
STATE-FUNDED CONTRACTS
PART 1 – INSTRUCTIONS FOR MBE PARTICIPATION SCHEDULE
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of any reasonable fee that the MBE 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 description 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 MBE participation goal, you may count the total amount of the subcontract. For Column 3 of the MBE Participation Schedule, please divide the total amount of the subcontract by the total Contract value and insert the percentage in Line 3.1.
 - E. Is the firm certified as a supplier, wholesaler and/or regular dealer? If the answer is YES and the MBE 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 MBE 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 MBE 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.
8. For each MBE 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 MBE participation goals**, 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%

- 9. **WARNING:** The percentage of MBE participation, computed using the percentage amounts determined per Column 3 for all of the MBE firms listed in Part 2, **MUST** at least equal the MBE participation goal and subgoals (if applicable) as set forth in MDOT MBE Form A – State-Funded Contracts for this solicitation. If a bidder/offeror is unable to achieve the MBE participation goal and/or any subgoals (if applicable), 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 attached Goal/Subgoal Worksheet to assist you in calculating the percentages and confirming that you have met the applicable MBE participation goal and subgoals (if any).



MDOT MBE FORM B
STATE-FUNDED CONTRACTS
PART 1 – INSTRUCTIONS FOR MBE PARTICIPATION SCHEDULE
PAGE 4 OF 4
GOAL/SUBGOAL PARTICIPATION WORKSHEET

1. Complete the Part 2 – MBE Participation Schedule for each MBE being used to meet the MBE goal and any subgoals.
2. After completion of the Part 2 – MBE Participation Schedule, you may use the Goal/Subgoal Worksheet to calculate the total MBE participation commitment for the overall goal and any subgoals.
3. **MBE Overall Goal Participation Boxes:** Calculate the total percentage of MBE participation for each MBE classification by adding the percentages determined per Column 3 of the Part 2 – MBE Participation Schedule. Add the percentages determined in Lines 3.1 and 3.2 for the MBE subcontractor (subs) total. Add the overall participation percentages determined in Line 3.3 for the MBE prime total.
4. **MBE Subgoal Participation Boxes:** Calculate the total percentage of MBE participation for each MBE classification by adding the percentages determined per Column 3 of the Part 2 – MBE Participation Schedule. Add the percentages determined in Lines 3.1 and 3.2 for the MBE subcontractor (subs) total. Add the subgoal participation percentages determined in Line 3.3 for the MBE prime total.
5. The percentage amount for the MBE overall participation in the Total MBE Firm Participation Box F1 should be equal to the sum of the percentage amounts in Boxes A through E of the MBE Overall Goal Participation Column of the Worksheet.
6. The percentage amount for the MBE subgoal participation in the Total MBE Firm Participation Box L should be equal to the sum of the percentage amounts in Boxes A through E of the MBE Subgoal Participation Column of the Worksheet.

GOAL/SUBGOAL WORKSHEET		
MBE Classification	MBE Overall Goal Participation	MBE Subgoal Participation
(A) Total African American Firm Participation (Add percentages determined for African American-Owned Firms per Column 3 of MBE Participation Schedule)	_____ %subs _____ %prime	_____ %subs _____ %prime
(B) Total Hispanic American Firm Participation (Add percentages determined for Hispanic American-Owned Firms per Column 3 of MBE Participation Schedule)	_____ %subs _____ %prime	_____ %subs _____ %prime
(C) Total Asian American Firm Participation (Add percentages listed for Asian American-Owned Firms per Column 3 of MBE Participation Schedule)	_____ %subs _____ %prime	_____ %subs _____ %prime
(D) Total Women-Owned Firm Participation (Add percentages determined for Women-Owned Firms per Column 3 of MBE Participation Schedule)	_____ %subs _____ %prime	_____ %subs _____ %prime
(E) Total for all other MBE Firms (Add percentages for firms listed as Other MBE Classification per Column 3 of the MBE Participation Schedule)	_____ %subs _____ %prime	_____ %subs _____ %prime
Total MBE Firm Participation (Add total percentages determined for all MBE Firms in each column of the Worksheet)	(F1) _____ %	(F2) _____ %



**MDOT MBE FORM B
STATE-FUNDED CONTRACTS
PART 2 – MBE PARTICIPATION SCHEDULE
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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.

Prime Contractor	Project Description	Solicitation Number

LIST INFORMATION FOR EACH CERTIFIED MBE PRIME OR MBE SUBCONTRACTOR YOU AGREE TO USE TO ACHIEVE THE MBE PARTICIPATION GOAL AND SUBGOALS, IF ANY. NOTE INSTRUCTIONS IN EACH COLUMN.



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COLUMN 1	COLUMN 2	COLUMN 3 Unless the bidder/offeror requested a waiver in MDOT MBE Form A – State Funded Contracts for this solicitation, the cumulative MBE participation for all MBE firms listed herein must equal at least the MBE participation goal and subgoals (if applicable) set forth in Form A.
<p>NAME OF MBE PRIME OR MBE SUBCONTRACTOR OR AND TIER</p>	<p>CERTIFICATION NO. AND MBE CLASSIFICATION</p>	<p>FOR PURPOSES OF ACHIEVING THE MBE PARTICIPATION GOAL AND SUBGOALS, refer to Sections 5 through 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 MBE firm is being used as a wholesaler, supplier, or regular dealer. For items of work where the MBE firm is being used as a supplier, wholesaler and/or regular dealer, complete Line 3.2 using the 60% Rule. For items of work where the MBE firm is the prime, complete Line 3.3.</p>
<p>MBE Name:</p> <p>_____</p> <p><input type="checkbox"/> Check here if MBE firm is a subcontractor and complete in accordance with Sections 6, 7, & 8 of Part 1 - Instructions. If this box is checked, complete 3.1 or 3.2 in Column C, whichever is appropriate.</p> <p><input type="checkbox"/> Check here if MBE firm is the prime contractor, including a participant in a joint venture, and self-performance is being counted pursuant to Section 5 of Part 1 - Instructions. If this box is checked, complete 3.3 in Column C.</p> <p><input type="checkbox"/> Check here if MBE firm is a third-tier contractor (if applicable). Please submit written documents in accordance with Section 6 of Part 1 - Instructions</p>	<p>Certification Number:</p> <p>_____</p> <p>(If dually certified, check only one box.)</p> <p><input type="checkbox"/> African American-Owned</p> <p><input type="checkbox"/> Hispanic American-Owned</p> <p><input type="checkbox"/> Asian American-Owned</p> <p><input type="checkbox"/> Women-Owned</p> <p><input type="checkbox"/> Other MBE Classification</p> <p>_____</p>	<p>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).</p> <p>_____ % (Percentage for purposes of calculating achievement of MBE Participation goal and subgoals, if any)</p> <p>3.2 TOTAL PERCENTAGE TO BE PAID TO THE SUBCONTRACTOR FOR ITEMS OF WORK WHERE THE MBE 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 7(E) IN PART 1 - INSTRUCTIONS).</p> <p>_____ % Total percentage of Supplies/Products</p> <p>x _____ 60% (60% Rule)</p> <p>_____ % (Percentage for purposes of calculating achievement of MBE Participation goal and subgoals, if any)</p> <p>3.3. TOTAL PERCENTAGE TO BE PAID TO MBE PRIME FOR WORK THAT CAN BE COUNTED AS MBE SELF-PERFORMANCE (STATE THIS PERCENTAGE AS A PERCENTAGE OF THE TOTAL CONTRACT VALUE).</p> <p>(a) _____ % Total percentage for self-performed items of work in which MBE is certified)</p> <p>(b) _____ % (Insert 50% of MBE overall goal)</p> <p>(c) _____ % (Insert subgoal for classification checked in Column 2, if applicable)</p> <p>Percentages for purposes of calculating achievement of MBE Participation goals:</p> <ul style="list-style-type: none"> ➤ For MBE Overall goal – Use lesser of (a) or (b) ➤ For MBE Subgoal – Use lesser of (a) or (c) ➤ If MBE Prime is supplier, wholesaler and/or regular dealer, apply the 60% rule.

Check here if Continuation Sheets are attached.



MDOT MBE FORM B
STATE-FUNDED CONTRACTS
PART 2 – MBE PARTICIPATION SCHEDULE
CONTINUATION SHEET
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Prime Contractor	Project Description	Solicitation Number

LIST INFORMATION FOR EACH CERTIFIED MBE PRIME OR MBE SUBCONTRACTOR YOU AGREE TO USE TO ACHIEVE THE MBE PARTICIPATION GOAL AND SUBGOALS, IF ANY. NOTE INSTRUCTIONS IN EACH COLUMN.



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COLUMN 1	COLUMN 2	COLUMN 3 Unless the bidder/offeror requested a waiver in MDOT MBE Form A – State Funded Contracts for this solicitation, the cumulative MBE participation for all MBE firms listed herein must equal at least the MBE participation goal and subgoals (if applicable) set forth in Form A.
NAME OF MBE PRIME OR MBE SUBCONTRACTOR AND TIER	CERTIFICATION NO. AND MBE CLASSIFICATION	FOR PURPOSES OF ACHIEVING THE MBE PARTICIPATION GOAL AND SUBGOALS, refer to Sections 5 through 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 MBE firm is being used as a wholesaler, supplier, or regular dealer. For items of work where the MBE firm is being used as a supplier, wholesaler and/or regular dealer, complete Line 3.2 using the 60% Rule. For items of work where the MBE firm is the prime, complete Line 3.3.
MBE Name: <input type="checkbox"/> Check here if MBE firm is a subcontractor and complete in accordance with Sections 6, 7, & 8 of Part 1 - Instructions. If this box is checked, complete 3.1 or 3.2 in Column C, whichever is appropriate. <input type="checkbox"/> Check here if MBE firm is the prime contractor, including a participant in a joint venture, and self-performance is being counted pursuant to Section 5 of Part 1 - Instructions. If this box is checked, complete 3.3 in Column C. <input type="checkbox"/> Check here if MBE firm is a third-tier contractor (if applicable). Please submit written documents in accordance with Section 6 of Part 1 - Instructions	Certification Number: (If dually certified, check only one box.) <input type="checkbox"/> African American-Owned <input type="checkbox"/> Hispanic American-Owned <input type="checkbox"/> Asian American-Owned <input type="checkbox"/> Women-Owned <input type="checkbox"/> Other MBE Classification _____	<p>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).</p> <p>_____ % (Percentage for purposes of calculating achievement of MBE Participation goal and subgoals, if any)</p> <p>3.2 TOTAL PERCENTAGE TO BE PAID TO THE SUBCONTRACTOR FOR ITEMS OF WORK WHERE THE MBE 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 7(E) IN PART 1 - INSTRUCTIONS).</p> <p>_____ % Total percentage of Supplies/Products</p> <p>x _____ 60% (60% Rule)</p> <p>_____ % (Percentage for purposes of calculating achievement of MBE Participation goal and subgoals, if any)</p> <p>3.3. TOTAL PERCENTAGE TO BE PAID TO MBE PRIME FOR WORK THAT CAN BE COUNTED AS MBE SELF-PERFORMANCE (STATE THIS PERCENTAGE AS A PERCENTAGE OF THE TOTAL CONTRACT VALUE)..</p> <p>(a) _____ % Total percentage for self-performed items of work in which MBE is certified)</p> <p>(b) _____ % (Insert 50% of MBE overall goal)</p> <p>(c) _____ % (Insert subgoal for classification checked in Column 2, if applicable)</p> <p>Percentages for purposes of calculating achievement of MBE Participation goals:</p> <ul style="list-style-type: none"> ➔ For MBE Overall goal – Use lesser of (a) or (b) ➔ For MBE Subgoal – Use lesser of (a) or (c) ➔ If MBE Prime is supplier, wholesaler and/or regular dealer, apply the 60% rule.

Check here if Continuation Sheets are attached.



**MDOT MBE FORM B
STATE-FUNDED CONTRACTS
PART 3 – CERTIFICATION FOR MBE PARTICIPATION SCHEDULE**

**PARTS 2 AND 3 MUST BE INCLUDED WITH THE BID/PROPOSAL
AS DIRECTED IN THE REQUEST FOR PROPOSALS.**

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 MBE Directory for each of the MBE firms listed in Part 2 of this MBE Form B for purposes of achieving the MBE participation goals and subgoals that were identified in the MBE Form A that I submitted with this solicitation, and that the MBE 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 MBE Form B.

The undersigned Prime Contractor hereby certifies and agrees that they have 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 MBE 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 MBE/DBE 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 all 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;



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(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

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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?
	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> 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.



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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: <hr/> MBE Classification (Check only if requesting waiver of MBE subgoal.) <input type="checkbox"/> African American-Owned <input type="checkbox"/> Hispanic American-Owned <input type="checkbox"/> Asian American-Owned <input type="checkbox"/> Women-Owned <input type="checkbox"/> Other MBE Classification <hr/>		Date: <input type="checkbox"/> Mail <input type="checkbox"/> Facsimile <input type="checkbox"/> Email	Date: <input type="checkbox"/> Phone <input type="checkbox"/> Mail <input type="checkbox"/> Facsimile <input type="checkbox"/> Email	Time of Call: Spoke With: <input type="checkbox"/> Left Message	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Used Other MBE/DBE <input type="checkbox"/> Used Non-MBE/DBE <input type="checkbox"/> Self-performing
Firm Name: <hr/> MBE Classification (Check only if requesting waiver of MBE subgoal.) <input type="checkbox"/> African American-Owned <input type="checkbox"/> Hispanic American-Owned <input type="checkbox"/> Asian American-Owned <input type="checkbox"/> Women-Owned <input type="checkbox"/> Other MBE Classification <hr/>		Date: <input type="checkbox"/> Mail <input type="checkbox"/> Facsimile <input type="checkbox"/> Email	Date: <input type="checkbox"/> Phone <input type="checkbox"/> Mail <input type="checkbox"/> Facsimile <input type="checkbox"/> Email	Time of Call: Spoke With: <input type="checkbox"/> Left Message	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Used Other MBE/DBE <input type="checkbox"/> Used Non-MBE/DBE <input type="checkbox"/> 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
	<input type="checkbox"/> Self-performing <input type="checkbox"/> Using Non-MBE/DBE _____	\$ _____	_____ <input type="checkbox"/> MBE/DBE <input type="checkbox"/> Non-MBE/DBE	\$ _____	<input type="checkbox"/> Price <input type="checkbox"/> Capabilities <input type="checkbox"/> Other
	<input type="checkbox"/> Self-performing <input type="checkbox"/> Using Non-MBE/DBE _____	\$ _____	_____ <input type="checkbox"/> MBE/DBE <input type="checkbox"/> Non-MBE/DBE	\$ _____	<input type="checkbox"/> Price <input type="checkbox"/> Capabilities <input type="checkbox"/> Other
	<input type="checkbox"/> Self-performing <input type="checkbox"/> Using Non-MBE/DBE _____	\$ _____	_____ <input type="checkbox"/> MBE/DBE <input type="checkbox"/> Non-MBE/DBE	\$ _____	<input type="checkbox"/> Price <input type="checkbox"/> Capabilities <input type="checkbox"/> Other

Please check if Additional Sheets are attached.



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INFORMATION REQUIRED TO BE SUBMITTED FOR STRAIGHT STATE CONTRACTS:

(a) Each bidder shall provide the following information:

NAME OF FIRM: _____

Street and/or P.O. Box

City

State

Zip Code

____ MBE ____ Non-MBE 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

____ MBE ____ Non-MBE 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

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NAME OF FIRM: _____

Street and/or P.O. Box

City

State

Zip Code

____ MBE ____ Non-MBE 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



CONTRACT PROVISIONS
PROPOSAL FORM PACKET — STATE

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NAME OF FIRM: _____

Street and/or P.O. Box

City

State

Zip Code

____ MBE ____ Non-MBE 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

____ MBE ____ Non-MBE 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

____ MBE ____ Non-MBE 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 24A of 27, 24B of 27, etc. as necessary, and place them as the last pages in the Request for Proposals. 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

N/A (working days)

Wednesday, August 30, 2017 (calendar date)

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.

one thousand eight hundred ninety dollars (1890.00) 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:

- (1) A bond in a form satisfactory to the State underwritten by a company licensed to issue bonds in this State;
- (2) A bank certified check, bank cashier's check, bank treasurer's check, or cash;
- (3) Pledge of security backed by the full faith and credit of the United States government or bonds issued by the State of Maryland.

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 Guarantee (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 or national origin, sex, age, marital status, sexual orientation, 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. As a condition of entering into this Agreement, upon the Maryland Human Relations Commission's request, and only after the filing of a complaint against Contractor under Title 19 of the State Finance and Procurement Article, 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 is 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.