



Maryland Department of Transportation

*State Highway Administration
Baltimore, Maryland
Request for Proposals*

Contract No. WO6365170

F.A.P No. AC-NHPP-327-1(37)N

US 113 (Phase 3)

**US 113 (PHASE 3) - FROM NORTH OF MASSEY BRANCH
TO FIVE MILE BRANCH ROAD**

Design-Build

Worcester 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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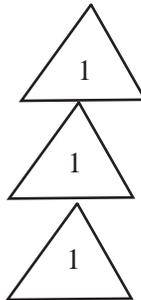
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NOTICE TO CONTRACTORS

Please note that the Disadvantaged Business Enterprises (DBE) professional services participation language has been updated in the Contract Provision - Affirmative Action Requirements Utilization of Disadvantaged Business Enterprises for Federal-Aid Contracts in this Request for Proposals (RFP).

The Administration is also rescinding the language from the Request for Qualifications which stated, "In addition, participation by any of the following Persons on more than one Proposer's team shall be deemed an organizational conflict of interest disqualifying the affected Proposers: a Principal Participant, Designer, subconsultant responsible for performing more than 15% of the design or subcontractor responsible for performing more than 30% of the construction, or an Affiliate of any such Person." With the removal of this language, the previous responses related to the ability for a prime contractor to act as a subcontractor shall be considered void. There is no contractual requirement prohibiting a Major Participant from acting as a subcontractor to another proposer.

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
<p>CATEGORY 1 Cones, tubular markers, flexible delineator posts, and drums (all without any accessories or attachments)</p>	<p>All devices shall conform to NCHRP Report 350 or MASH criteria.</p>
<p>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)</p>	<p>All devices shall conform to NCHRP Report 350 or MASH criteria.</p>
<p>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</p>	<p>All devices shall conform to NCHRP Report 350 or MASH criteria.</p>
<p>CATEGORY 4 Portable trailer mounted devices including area lighting supports, arrow panels, and changeable message signs</p>	<p>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.</p>



CONTRACTOR REGISTRATION REQUIREMENTS

On all Federal-Aid funded contracts, the Administration is requiring that Contractors have an active Dun and Bradstreet Data Universal Numbering System (DUNS) and be registered in the Central Contract Registration (CCR) database prior to Award of Contract.

The Contractor DUNS number is a unique nine-digit number issued by Dun & Bradstreet, followed by the optional 4 digit DUNS Plus number (reported as “999999999.9999”). A DUNS number can be obtained on-line at <http://fedgov.dnb.com/webform>.

The Central Contractor Registration (CCR) is no longer the primary registrant database for the U.S. Federal Government.

The System for Award Management (SAM) is the Official U.S. Government system that consolidated the capabilities of CCR/FedReg, ORCA, and EPLS. There is NO fee to register for this site. Entities may register at no cost directly from this page. User guides and webinars are available under the Help tab. Contractor’s can now register on-line at <https://www.sam.gov>.

NOTICE TO ALL HOLDERS OF THIS CONTRACT DOCUMENT

**MARYLAND MANUAL ON UNIFORM TRAFFIC CONTROL
DEVICES (MdMUTCD) REQUIREMENTS**

The 2011 Maryland Manual on Uniform Traffic Control Devices (MdMUTCD) is the legal State standard for traffic control devices. All traffic control devices (temporary or permanent) utilized on Administration projects shall be in conformance with the requirements provided in the 2011 Edition of the Administration's MdMUTCD for Streets and Highways.



OCCUPYING WETLANDS/WATERWAYS FOR DESIGN-BUILD

The Contractor is hereby alerted to the importance of preserving waterways and wetland areas. The Administration, in conjunction with the various environmental agencies, has developed these Contract Documents so as to minimize or eliminate disturbance and damage to existing waterways and wetland areas. Any design changes must result in further avoidance and minimization of disturbance of wetlands and waterways. In order to accomplish this, the following must be rigidly adhered to:

- (a) Prior to performing any work on the project, the areas of wetland will be identified and marked by orange safety fence or as directed by the Engineer. All personnel of the Contractor or sub-contractors shall be alerted to these designated areas.
- (b) The Contractor or sub-contractors shall not impact any wetland or waterway, whether it be permanently or temporarily unless otherwise stipulated in the permit and approved as an authorized action by the appropriate regulatory agency. No fill shall be placed in these areas without an appropriate permit. No storage of equipment or materials will be allowed in wetlands.
- (c) The Contractor or sub-contractor shall not impact a wetland or waterway that is not covered by an existing wetland permit.
- (d) If the Contractor impacts any wetland or waterway for which they do not have a wetland permit, they shall be responsible for contacting the State Highway Administration's Environmental Programs Division prior to restoring the wetland areas and mitigating the wetland impacts to the full satisfaction of the environment regulatory agencies, which could include monetary compensation.
- (e) The cost of restoration and mitigation of the impacted areas shall be at no additional cost to the Administration.
- (f) The Design-Builder will prepare permit modifications at the conclusion design and at the conclusion of construction. The modification will be based on surveyed as-built plans and will include standard 8.5"x 11.0" plates and a revised Joint State/Federal Nontidal Wetlands and Waterways Permit application.
- (g) This Contract will include the oversight of an Independent Environmental Monitor (IEM) supplied by the Administration. The IEM's duties will be to make sure the Contractor abides by all conditions in the environmental permits. The IEM will also assist the Contractor in developing ideas to minimize impacts to the wetlands. The Contractor will still be responsible for all violations occurring as stated above.

The importance of not abusing waterways and wetland areas cannot be overemphasized. It is possible that abuse of waterways and wetland areas could jeopardize the operation of the total Contract and could be cause for a shut-down. If a shut-down occurs because of the Contractor's failure to secure the required permits(i.e. the Contractor's method of work includes impacts not approved by previously acquired permits), the Contractor's negligence or operations, all costs and damages to the Contractor and to the State will be at the Contractor's expense. Non-compliance with these requirements will not be considered for an extension of Contract time.



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

1. NO EXCESS FILL, CONSTRUCTION MATERIAL, OR DEBRIS SHALL BE STOCKPILED OR STORED IN NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.
2. PLACE MATERIALS IN A LOCATION AND MANNER WHICH DOES NOT ADVERSELY IMPACT SURFACE OR SUBSURFACE WATER FLOW INTO OR OUT OF NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.
3. DO NOT USE THE EXCAVATED MATERIAL AS BACKFILL IF IT CONTAINS WASTE METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIAL, OR ANY OTHER DELETERIOUS SUBSTANCE. IF ADDITIONAL BACKFILL IS REQUIRED, USE CLEAN MATERIALS FREE OF WASTE METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIAL, OR ANY OTHER DELETERIOUS SUBSTANCE.
4. PLACE HEAVY EQUIPMENT ON MATS OR SUITABLY OPERATE THE EQUIPMENT TO PREVENT DAMAGE TO NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.
5. REPAIR AND MAINTAIN ANY SERVICEABLE STRUCTURE OR FILL SO THERE IS NO PERMANENT LOSS OF NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, OR WATERWAYS, OR PERMANENT MODIFICATION OF THE 100-YEAR FLOODPLAIN IN EXCESS OF THAT LOST UNDER THE ORIGINALLY AUTHORIZED STRUCTURE OR FILL.
6. RECTIFY ANY NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, OR 100-YEAR FLOODPLAIN TEMPORARILY IMPACTED BY ANY CONSTRUCTION.
7. ALL STABILIZATION IN THE NONTIDAL WETLAND AND NONTIDAL WETLAND BUFFER SHALL CONSIST OF THE FOLLOWING SPECIES:

ANNUAL RYEGRASS (LOLIUM MULTIFLORUM), MILLET (SETARIA ITALICA), BARLEY (HORDEUM SP.), OATS (UNIOLA SP.) AND/OR RYE (SECALE CEREALE). THESE SPECIES WILL ALLOW FOR THE 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.

**REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS**

- I. General
- II. Nondiscrimination
- III. Nonsegregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Compliance with Governmentwide Suspension and Debarment Requirements
- XI. Certification Regarding Use of Contract Funds for Lobbying

immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the

provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of

employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these

special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work

classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. (1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for

determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that

the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b.(1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g. , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed,

as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity

requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

(1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;

(2) the prime contractor remains responsible for the quality of the work of the leased employees;

(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and

(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is

evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.

2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1. Instructions for Certification – First Tier Participants:

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this

covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. Instructions for Certification - Lower Tier Participants:

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which

this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the

department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.



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**AFFIRMATIVE ACTION REQUIREMENTS
UTILIZATION OF DISADVANTAGED BUSINESS ENTERPRISES
FOR FEDERAL-AID CONTRACTS**

CONTRACT GOALS

FOR THE PURPOSE OF THIS CONTRACT, A GOAL OF 15 PERCENT HAS BEEN ESTABLISHED FOR SOCIALLY AND ECONOMICALLY DISADVANTAGED BUSINESSES THAT ARE OWNED AND CONTROLLED BY – THOSE INDIVIDUALS WHO ARE BLACK AMERICANS, HISPANIC AMERICANS, ASIAN-PACIFIC AMERICANS, SUBCONTINENT ASIAN AMERICANS, NATIVE AMERICANS, OR WOMEN PURSUANT TO THE MARYLAND DEPARTMENT OF TRANSPORTATION (MDOT) MINORITY BUSINESS ENTERPRISE PROGRAM:

The Design-Builder’s good faith efforts to achieve the overall contract goal shall include a good faith effort to achieve DBE participation in professional services (including design, supplemental geotechnical investigations, surveying and other preliminary engineering; quality control as defined in the Contract; environmental compliance activities; utility coordination; permitting; and public information) for this contract of no less than 30 percent of the portion of the contract price allocable to professional services.

It is the policy of the Maryland Department of Transportation that disadvantaged business enterprises as defined in 49 CFR Part 26 and the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) shall have an equal opportunity to participate in the performance of the contracts financed in whole or in part with Federal funds under these agreements. Consequently, the disadvantaged business enterprise requirements of 49 CFR Part 26 and SAFETEA-LU apply to this agreement.

The bidder agrees to ensure that disadvantaged business enterprises as defined in 49 CFR Part 26 and SAFETEA-LU have an equal opportunity to participate in the performance of contracts and subcontracts financed in whole or in part with Federal funds provided under this agreement. In this regard, all bidders shall take all necessary and reasonable steps in accordance with 49 CFR Part 26 and SAFETEA-LU to ensure that disadvantaged business enterprises have an equal opportunity to compete for and perform on Federally funded contracts. The Maryland Department of Transportation and their bidders shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of this Contract.

A. GENERAL

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

Administration Representative – A DBE/MBE Officer or employee of an Administration who enforces the laws and regulations pertaining to disadvantaged and minority business enterprise and contract compliance.

Affirmative Actions – Specific steps taken to eliminate discrimination and its effects, to ensure nondiscriminatory results and practices in the future, and to involve disadvantaged and minority business enterprises fully in contracts and programs.

Business Enterprises – Any legal entity which is organized in any form other than as a joint venture (e.g., sole proprietorship, partnership, corporation, etc.) to engage in lawful commercial transactions.



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Certified Business – A business which by order of the Chair/MBE Advisory Council or his/hers designee, has been certified as a bona fide DBE/MBE. MDOT certification does not equate to a pre-qualification status.

DBE – Disadvantaged Business Enterprise – Reference 49 CFR, Part 26, Subpart A) a small business concern: (1) which is at least 51 percent owned by one or more socially and economically disadvantaged individuals. Where stock ownership is involved, the disadvantaged owner(s) shall own at least 51 percent of each class of voting stock and at least 51 percent of the aggregate of all classes of stock that have been issued (also applies to publicly owned businesses); and (2) whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who have ownership. In this specification the terms MBE and DBE have the same meaning.

DBE/MBE Directory – A compilation of businesses certified by MDOT as disadvantaged, minority, or socially and economically disadvantaged businesses. The directory will be published annually with quarterly supplements. It will also be provided in automated format and on the Internet to be updated as changes are made.

DBE/MBE Participation Packet – The documents submitted by the bidder or proposer pursuant to the appropriate special bid provisions. The DBE/MBE Participation Packet consists of the Certified DBE Utilization and Fair Solicitation Affidavit and the DBE Participation Schedule, both of which must be submitted with your bid or initial price proposal. The DBE Participation Packet also includes the following documents, which shall be submitted after bids or proposals are opened: Outreach Efforts Compliance Statement (MDOT-OP-018-2), DBE Subcontractor Project Participation Affidavit (MDOT-OP-019-2), MDOT Joint Venture Disclosure Affidavit (D-EEO-006), and Minority Contractor Unavailability Certificate (OOC46).

DBE/MBE Program – A program developed by MDOT to implement the requirements of Title 14, Subtitle 3 of the State Finance and Procurement Article, Annotated Code of Maryland; Title 10, Subtitle 3 of the State Finance and Procurement Article of the Annotated Code of Maryland for Leases of State-Owned Property; and 49 CFR, Part 26, Subparts A and C for all Federal Department of Transportation Financial Assistance Programs.

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

Joint Venture – An association of a DBE/MBE firm and one or more other firms to carry out a single, for-profit business enterprise, for which the parties combine their property, capital, efforts, skills, and knowledge, and in which the DBE/MBE is responsible for a distinct, clearly defined portion of the work of the contract and whose share in the capital contribution, control, management, risks, and profits of the joint venture are commensurate with its ownership interest.

Small Business Administration (SBA) 8(a) Certification – The SBA 8(a) Certification Program is a Federal Program which establishes firms as disadvantaged and eligible for participation in the Federal SBA Program.

Socially and Economically Disadvantaged Individual Pursuant to 49 CFR, Part 26 – Those individuals who are citizens of the United States (or lawfully admitted permanent



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residents). For convenience, these individuals and groups are referred to as “minorities” in this document and who are:

1. Found by the MDOT to be socially and economically disadvantaged on a case-by-case basis;
2. Any individual in the following groups, members of which are rebuttably presumed to be socially and economically disadvantaged.
 - a. “Black Americans,” which includes persons having origins in any of the Black racial groups of Africa;
 - b. “Hispanic Americans,” which includes persons of Mexican, Puerto Rican, Cuban, Dominican, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race;
 - c. “Native Americans,” which includes persons who are American Indian, Eskimos, Aleuts, or Native Hawaiians;
 - d. “Asian-Pacific Americans,” which included persons whose origins are from Japan, China, Taiwan, Korea, Burma (Myanmar), Vietnam, Laos, Cambodia (Kampuchea), Thailand, Malaysia, Indonesia, the Philippines, Brunei, Samoa, Guam, the U.S. Trust Territories of the Pacific Islands (Republic of Palau), the Commonwealth of the Northern Marianas Islands, Macao, Fiji, Tonga, Kirbati, Juvalu, Nauru, Federated States of Micronesia, or Hong Kong;
 - e. “Subcontinent Asian American,” which includes persons whose origins are from India, Pakistan, Bangladesh, Bhutan, the Maldives Islands, Nepal or Sri Lanka;
 - f. Women;
3. Only those persons whose personal net worth does not exceed \$750,000 may be found to be economically disadvantaged.

B. DBE/MBE and Good Faith Effort Requirements

1. This contract includes a DBE participation goal for subcontracting and/or procurement of materials and/or services. Bidders (or offerors) must make a good faith effort to meet the DBE participation goal **before bids or proposals are due**, including outreach efforts. A bid or initial proposal must include both a completed and executed Certified DBE Utilization and Fair Solicitation Affidavit and DBE Participation Schedule. The failure of a bidder to complete and submit these documents shall result in a determination that the bid is not responsive. The failure of an offeror to complete and submit these documents shall result in a determination that the proposal is not susceptible of being selected for award.
2. In making a good faith effort to achieve the DBE goal, prior to completing the Certified DBE Utilization and Fair Solicitation Affidavit and the DBE Participation Schedule and prior to submitting a bid or initial proposal the bidders (or offerors) including those bidders or offerors that are certified DBEs must:



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- a. Identify specific work categories within the scope of the procurement appropriate for subcontracting and/or procurement of materials and/or services;
 - b. Solicit DBEs in writing at least 10 days before bids or initial proposals are due**, describing the identified work categories and providing instructions on how to bid on the subcontracts and/or procurement of materials and/or services;
 - c. Attempt to make personal contact with the DBEs solicited and to document these attempts;
 - d. Assist DBEs to fulfill, or to seek waiver of, bonding requirements; and
 - e. Attend prebid or other meetings the procurement agency schedules to publicize contracting opportunities to DBEs.
3. All firms bidding on a Federal-Aid Contract shall submit the name and address of all subcontractors, service providers and suppliers that submitted quotes on the Contract. All subcontractors, service providers and suppliers shall complete and submit the form entitled Contractor Information, to the Administration.
4. The bidder shall seek commitments from disadvantaged business enterprises by subcontracting and/or procurement of materials and/or services, the combined value of which equals or exceeds the appropriate percent (goal) of the total value of the prime contract. A bidder may count toward its DBE goals expenditures for materials and supplies obtained from DBE regular dealers and/or manufacturers provided that the DBEs assume the actual and contractual responsibility for the provision of the materials and supplies. The bidder may count its entire expenditure to a DBE manufacturer (i.e., a supplier that produces goods from raw materials or substantially alters them before resale). The bidder may count sixty (60) percent of its expenditures to a DBE regular dealer that is not a manufacturer, provided that the DBE supplier performs a commercially useful function in the supply process. The apparent low bidder shall submit to the Administration, within ten (10) business days after notification that it is the apparent low bidder, an acceptable Affirmative Action Plan for the utilization of Disadvantaged Business Enterprises in this Contract. The Contract will not be awarded without the Bidder's AAP being approved by the Administration.

The Affirmative Action Plan shall include as a minimum:

- a. The name of an employee designated as the bidder's liaison officer for minority affairs.
- b. A complete DBE Subcontractor Project Participation Affidavit (MDOT-OP-019-2), using contractors whose names appear in the DBE/MBE directory or who are otherwise certified by MDOT as being a disadvantaged business enterprise. Except as permitted by law and approved by the Administration, this affidavit shall include all DBE firms identified on the DBE Participation Schedule with a percentage of participation that meets or exceeds the percentage of participation indicated in the bid or initial proposal.
- c. A completed Outreach Efforts Compliance Statement (MDOT-OP 018-2).



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5. When a bidder intends to attain the appropriate goal for disadvantaged business enterprise participation by use of a joint venture, the bidder shall submit a Joint Venture Disclosure Affidavit (Form D-EEO-006-A) showing the extent of disadvantaged business participation. If a bidder intends to use a joint venture as a subcontractor to meet its goal, the affidavit shall be submitted through the bidder by the proposed subcontractor and be signed by all parties. A DBE, even in a joint venture arrangement shall be certified as a DBE by MDOT prior to being included in the Affirmative Action Plan.
6. Where the proposed DBE participation does not meet the DBE contract goals, sufficient evidence to demonstrate that the bidder has taken all necessary and reasonable steps to make a good faith effort to meet these goals shall be required.

7. Determination of Bid Responsiveness for Federal-Aid Contracts

If the bidder is unable to secure from DBEs by subcontracting and/or by procurement of materials and/or services, commitments which at least equal the appropriate percent (goal) of the values of the prime Contract at the time of bid, he shall request, in writing, a waiver of the unmet portion of the goal. This request must be initiated by checking the appropriate box on the Certified DBE Utilization and Fair Solicitation Affidavit submitted with the bid or initial proposal.

The waiver may be granted by the Administrator. To obtain approval of a waiver, the bidder shall submit the following information:

- a. A detailed statement of efforts made prior to bid to contact and negotiate with DBEs including: (i) the dates, names, addresses, and telephone numbers of DBEs who were contacted; (ii) a description of the information provided to DBEs requesting the plans, specifications, and anticipated time schedule for portions of the work to be performed and (iii) a detailed statement of the reasons why additional prospective agreements with DBEs were not reached;
 - b. A detailed statement of the efforts made to select portions of the work proposed to be performed by DBEs in order to increase the likelihood of achieving the stated goals;
 - c. For each DBE that the Contractor considers not qualified, but from which a bid has been received, a detailed statement of the reasons for the bidder's conclusion; and
 - d. For each DBE contacted but unavailable, (i) a Minority Contractor Unavailability Certificate (Form OOC46) signed by the disadvantaged business enterprise, or (ii) a statement from the bidder shall be submitted that states that the DBE refused to sign the Certificate.
- 8. Guidance concerning good faith efforts.** The following is a list of the types of actions and factors that will be used to determine the bidder's or offeror's good faith efforts to obtain DBE participation. It is not intended to be a mandatory checklist, nor is it intended to be exclusive or exhaustive. Other factors or types of efforts may be relevant in appropriate cases.

- (1) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of certified DBEs who



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have the capability to perform the work of the contract. The bidder must solicit this interest within sufficient time to allow the DBEs to respond to the solicitation. The bidder must determine with certainty if the DBEs are interested by taking appropriate steps to follow up initial solicitations.

- (2) Selecting portions of the work to be performed by DBEs in order to increase the likelihood that the DBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the bidder or offeror might otherwise prefer to perform these work items with its own forces.
- (3) Providing interested DBEs with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.
- (4) (a) Negotiating in good faith with interested DBEs. It is the bidder's or offeror's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to facilitate DBE participation.

(b) A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBEs is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable. Also, the ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidders and offerors are not, however, required to accept higher quotes from DBEs if the price difference is excessive or unreasonable.
- (5) Not rejecting DBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The contractor's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the contractor's efforts to meet the project goal.
- (6) Making efforts to assist interested DBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or contractor.
- (7) Making efforts to assist interested DBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.



- (8) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state, and Federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBEs.
- (9) In determining whether a bidder or offeror has made good faith efforts, you may take into account the performance of other bidders or offerors in meeting the contract goal. For example, when the apparent successful bidder or offeror fails to meet the contract goal, but others meet it, the Administration may reasonably raise the question of whether, with additional reasonable efforts, the apparent successful bidder or offeror could have met the goal. If the apparent successful bidder or offeror fails to meet the goal, but meets or exceeds the average DBE participation obtained by other bidders or offerors, the Administration may view this, in conjunction with other factors, as evidence of the apparent successful bidder or offeror having made good faith efforts.

9. Bidder Use of DBE Special Services

The bidder shall consider, whenever possible, utilizing the services of minority-owned banks. Most minority banks are full-service corporations that can provide an array of financial services such as Treasury and Tax Loan fund accounts, time and demand deposit accounts, payroll services, and if needed, organization investment counseling.

10. Bidder Records

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

11. Bidder Cooperation

The bidder shall cooperate with the Administration Representative in any reviews of the Contractor's procedures and practices with respect to DBEs which the Administration Representative may from time to time conduct.

12. Bidder DBE Modifications

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

C. RECORDS AND REPORTS

1. The Contractor shall keep such records as are necessary to determine compliance with its Minority Business Enterprise utilization obligations. The records kept by the Contractor shall be designed to indicate:



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- a. The name of disadvantaged and non-disadvantaged subcontractors and suppliers, the type of work materials or services being performed on or incorporated in this project, and the monetary value of such work materials or services.
 - b. Documentation of all correspondence, contacts, telephone calls, etc., to obtain the services of disadvantaged business enterprises on this project.
 - c. The progress and efforts made in seeking out disadvantaged contractor organizations and individual disadvantaged contractors for work on this project.
2. Information required to be submitted for Federally Assisted contracts in accordance with 49 CFR Part 26:
- a. All bidders (not only the apparent successful bidder) shall provide the following information:
 - (1) The age of the bidding firm; and
 - (2) The annual gross receipts of the bidding firm.
 - b. All bidders (not only the apparent successful bidder) shall provide the following information for each firm quoting or considered as subcontractors:
 - (1) The name of firm; and
 - (2) The address of firm.
 - c. The Administration will contact each of the firms quoting or considered as subcontractors to obtain:
 - (1) The age of the firm; and
 - (2) The annual gross receipts of the firm
- If this information already has been gathered by the Administration on a firm and it is current, it will not be requested.
3. The Contractor shall submit reports on a monthly basis of those contracts and other business transactions executed with disadvantaged business enterprises with respect to the records referred to in Subparagraph 1.a above, in such form, manner, and content as prescribed by the Administration. The reports shall be due monthly on the 15th calendar day of each month. If the Contractor cannot submit their report on time, they shall notify the Administration's Representative and request additional time to submit the report. Failure of the Contractor to report in a timely manner may result in a finding of noncompliance. Additional reports may be required by the Administration upon written request.
4. To ensure compliance with the certified DBE contract participation goals, the Contractor shall:
- a. Submit monthly, a report listing unpaid invoices, over 30 days, from all certified DBE subcontractors and the reason payment has not been made;



CONTRACT PROVISIONS
DBE FOR FEDERAL-AID DESIGN-BUILD CONTRACTS

CONTRACT NO. WO6365170
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- b. Include in its agreement with certified DBE subcontractors a requirement that the DBE subcontractors are to submit monthly to the Administration, a report identifying the prime Contractor and listing the following:
 - 1. Payment received from the Contractor in the preceding 30 days; and
 - 2. Invoices for which the subcontractor has not been paid.
- 5. All such records shall be retained for a period of three years following acceptance of final payment and shall be available for inspection by the U.S. Department of Transportation, the Maryland Department of Transportation, and the Administration.

D. ADMINISTRATIVE PROCEDURES FOR ENFORCEMENT

- 1. Whenever the Administration believes the prime Contractor or any subcontractor may not be operating in compliance with the terms of these provisions, the Administration Representative will conduct an investigation. If the Administration Representative finds the prime Contractor or any subcontractor not in compliance with these provisions, he will make a report of non-compliance and notify such Contractor in writing of the steps that will, in the judgment of the Administration, bring the Contractor into compliance. If the Contractor fails or refuses to comply fully with such steps, the Administration Representative will make a final report of noncompliance to the Administrator, who may direct the imposition of one or more of the sanctions listed below:
 - a. Suspension of work on a project, pending correction;
 - b. Withholding payment or a percentage thereof, pending correction;
 - c. Referral of DBE/MBE to MDOT Office of MBE for review for decertification or minority business fraud investigation;
 - d. Referral to MDOT Office of MBE for review/referral to the Attorney General's Office for review for initiation of debarment;
 - e. Referral to the Attorney General's Office for review for debarment or for criminal prosecution through the MDOT Office of General Counsel; or
 - f. Any other action as appropriate.

The Administrator will determine which sanction(s) should be imposed in order to promote the purpose of the MDOT DBE/MBE Program.

- 2. If the documents used to determine the status of a DBE contain false, misleading, or misrepresenting information, the matter may be referred to the MDOT Office of MBE for appropriate action.
- 3. Loss of DBE Certification
 - a. When a prime Contractor has made a commitment to use a DBE who has lost its certification but the subcontract has not been executed prior to the notice of loss of certification, the prime Contractor is required to obtain an eligible, certified DBE for the contract or demonstrate to MDOT that it has made a good faith effort to do so.



CONTRACT PROVISIONS
DBE FOR FEDERAL-AID DESIGN-BUILD CONTRACTS

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- b. When a prime Contractor has executed a contract with a DBE subcontractor before the notice of loss of certification, the prime Contractor may continue to use the firm on the contract and may continue to receive credit towards its DBE goal, i.e., contract goal, for the work of that subcontractor.
- c. The work carried out by a DBE Prime Contractor would be counted by MDOT up to the loss of certification. The work performed after the loss of certification would not be considered DBE participation.
- d. When a DBE subcontractor has lost its certification, MDOT may not continue to count the DBE participation which takes place after the loss of certification as DBE work when counting participation towards the overall goal of the modal administration or the Department.
- e. If a DBEs loss of certification is the result of exceeding the size standards while performing on a contract, the DBE participation may be counted for both the contract goal and the overall goal.

E. SUBCONTRACTING.

Subcontracting by the Prime Contractor. Form B Request for Approval of Subcontractor shall be used by the Prime Contractor to request approval of a Subcontractor and also to ensure that a formal Subcontract has been or will be written and kept on file by the Prime Contractor. Completion and submittal of the form by the Prime Contractor acknowledges that the Administration's Contracting Officer may require the submission of the written Subcontract for review by the Administration and/or FHWA.

Lower Tier Subcontracting by an Approved Subcontractor. Form B Subcontractor's Request for Approval of Lower Tier Subcontractor shall be used by an Approved Subcontractor to request approval of a Lower Tier Subcontractor and also to ensure that a formal Subcontract has been or will be written and kept on file by the Subcontractor. Completion and submittal of the form by the Subcontractor acknowledges that the Administration's Contracting Officer may require the submission of the written Subcontract for review by the Administration and/or FHWA.

Form Acquisitions. Maryland State Highway Administration Form B may be acquired through the Administration's Contracts Award Team or District Office. All questions should be directed to the Office of Construction, Contracts Award Team.

It is the Administration's intention to randomly select during each calendar quarter a representative sample of written Subcontracts for review. This review will be conducted by the Office of Construction's Contracts Award Team.



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

CONTRACT NO. WO6365170
FAP NO. AC-NHPP-327-1(37)N
1 of 1

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.



CONTRACT PROVISIONS
CONTRACTOR AND RAILROAD PUBLIC LIABILITY

CONTRACT NO. WO6365170
1 of 2

CONTRACTOR AND RAILROAD PUBLIC LIABILITY
AND PROPERTY DAMAGE INSURANCE

INCLUDED

In addition to other forms or bonds required under the terms of the Contract and/or specifications, the Contractor shall obtain, furnish and keep in force insurance policies as follows:

(A) CONTRACTOR'S PUBLIC LIABILITY AND PROPERTY DAMAGE INSURANCE

Limits not less than \$2,000,000 for Bodily Injury and/or Death and Property Damage, per occurrence, within an aggregate limit of \$6,000,000 for the term of the policy.

(B) CONTRACTOR'S PROTECTIVE PUBLIC LIABILITY AND PROPERTY DAMAGE INSURANCE

If any part of the work is to be performed by a subcontractor the prime Contractor shall carry in his own behalf insurance in the same limits as set forth in paragraph (A).

(C) RAILROAD PROTECTIVE PUBLIC LIABILITY AND PROPERTY DAMAGE LIABILITY INSURANCE

This policy shall name the appropriate Railroad as "The Insured" to comply with the Standard Uniform Policy for Railroad Protective Liability and Property Damage Insurance developed and adopted in 1958 by AASHTO-AAR and by Federal Aid Policy Guide 646A Subchapter G, Subpart A, Sections 646.101 through 646.111. Limits in the following amounts:

Bodily Injury and/or Death and Property Damage Liability limit not less than \$2,000,000 per occurrence within an aggregate limit of \$6,000,000 for the term of the policy.

GENERAL

The original of policy (C) shall be furnished to and approved by the Railroad. For (A) and (B), the certificates shall be furnished to the Administration's Engineer and to the Railroad on request. In all instances, the Contractor shall furnish evidence to the Administration's Engineer and Railroad that the insurance has been purchased and is in force until the Contract is completed and accepted.

The Contractor is prohibited from entering Railroad Property until the Insurance Policies have been approved. Policies, certificates, notices of cancellation or changes, etc., shall be sent by the Contractor direct to the Engineering Officer of the Railroad. The Contractor and his insurance representative shall reconcile all policy requirements to the satisfaction of the Railroad and the Administration's Engineer.



CONTRACT PROVISIONS
CONTRACTOR AND RAILROAD PUBLIC LIABILITY

CONTRACT NO. WO6365170
2 of 2

For the Contractor's insurance broker's information, it is estimated that percent of value of the subject Contract will be performed within 50 ft of the rails of the Railroad's track.

The cost for the insurance will not be measured but will be incidental to the Contract lump sum price for Mobilization, Section 108. If an item for Mobilization is not provided, the cost of the insurance will be incidental to the other items specified in the Contract Documents.



**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.



CONTRACT PROVISIONS
PREVAILING WAGE INSTRUCTIONS

CONTRACT NO. WO6365170
2 of 4

- (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. WO6365170
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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. WO6365170
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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

General Decision Number: MD140102 09/26/2014 MD102

State: Maryland

Construction Type: Highway

Counties: Somerset, Wicomico and Worcester Counties in
Maryland.

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).

Modification Number Publication Date

0 09/26/2014

SUMD2014-015 08/27/2014

	Rates	Fringes
CARPENTER.....	\$ 26.01	12.05
CEMENT MASON/CONCRETE FINISHER.....	\$ 22.68	6.17
ELECTRICIAN.....	\$ 35.10	16.53
IRONWORKER, REINFORCING.....	\$ 26.86	15.27
IRONWORKER, STRUCTURAL.....	\$ 27.44	15.27
LABORER: Asphalt, Includes		
Raker, Shovel, Spreader and Distributor.....	\$ 17.19	15.85
Laborer: Common or General including Flagger.....	\$ 16.46	6.05
LABORER: Grade Checker.....	\$ 18.86	15.85
LABORER: Luteman.....	\$ 17.79	5.97
LABORER: Mason Tender -Cement/Concrete.....	\$ 16.84	7.26
LABORER: Pipelayer.....	\$ 19.14	8.62
OPERATOR: Backhoe/Excavator/Trackhoe.....	\$ 26.15	12.15
OPERATOR: Bobcat/Skid Steer/Skid Loader.....	\$ 23.63	12.15
OPERATOR: Broom/Sweeper.....	\$ 23.49	12.15
OPERATOR: Bulldozer.....	\$ 26.45	12.15
OPERATOR: Crane.....	\$ 29.74	14.18
OPERATOR: Forklift.....	\$ 23.49	12.15
OPERATOR: Gradall.....	\$ 27.45	12.15
OPERATOR: Grader/Blade.....	\$ 27.45	12.15
OPERATOR: Loader.....	\$ 26.45	12.15
OPERATOR: Mechanic.....	\$ 26.45	12.15

OPERATOR: Milling Machine.....	\$ 26.45	12.15
OPERATOR: Oiler.....	\$ 23.49	12.15
OPERATOR: Paver (Asphalt, Aggregate, and Concrete).....	\$ 25.55	12.15
OPERATOR: Piledriver.....	\$ 26.62	8.18
OPERATOR: Roller.....	\$ 25.55	12.15
OPERATOR: Screed.....	\$ 18.48	4.40
PAINTER: Spray.....	\$ 32.66	8.97
PAINTER: Steel.....	\$ 32.66	8.97
TRUCK DRIVER: Dump Truck.....	\$ 16.31	2.88
TRUCK DRIVER: Flatbed Truck.....	\$ 20.53	0.00
TRUCK DRIVER: Lowboy Truck.....	\$ 29.37	9.36
TRUCK DRIVER: TackTruck.....	\$ 22.94	7.43
TRUCK DRIVER: Tandem Axle Truck.....	\$ 15.00	1.87
TRUCK DRIVER: Water Truck.....	\$ 18.58	3.06

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is union or non-union.

Union Identifiers

An identifier enclosed in dotted lines beginning with characters other than "SU" denotes that the union classification and rate have found to be prevailing for that classification. Example: PLUM0198-005 07/01/2011. The first four letters , PLUM, indicate the international union and the four-digit number, 0198, that follows indicates the local union number or district council number where applicable , i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2011, following these characters is the effective date of the most current negotiated rate/collective bargaining agreement which would be July 1, 2011 in the above example.

Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rates.

0000/9999: weighted union wage rates will be published annually each January.

Non-Union Identifiers

Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union majority rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date. Survey wage rates will remain in effect and will not change until a new survey is conducted.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION



CONTRACT PROVISIONS
NOTICE OF ACTIONS FOR AFFIRMATIVE ACTION

CONTRACT NO. WO6365170
1 of 8

**NOTICE OF ACTIONS REQUIRED FOR AFFIRMATIVE ACTION TO
ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246)**

1. The Offeror's or Bidders attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Specifications" set forth herein.
2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate work force in each trade on all construction work in the covered area, are as noted in Appendix A and B:

These goals are applicable to all the Contractors' construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the contractor also is subject to the goals for both its federally involved and nonfederally involved construction.

The contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this notification. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed.
4. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is noted on appendix B.

**STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION
CONTRACT SPECIFICATIONS (Executive Order 11246)**

1. As used in these specifications:
 - a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;
 - b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;



CONTRACT PROVISIONS
NOTICE OF ACTIONS FOR AFFIRMATIVE ACTION

CONTRACT NO. WO6365170
2 of 8

- c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
- d. "Minority" includes:
 - (i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
 - (ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish culture or origin regardless of race);
 - (iii) Asian and Pacific Islander (all persons having origins in any of the original people of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and,
 - (iv) American Indians or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).
- 2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.
- 3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.
- 4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7.a through 7.p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. The Contractor is expected to make substantially uniform progress toward its goal in each craft during the period specified.
- 5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.



CONTRACT PROVISIONS
NOTICE OF ACTIONS FOR AFFIRMATIVE ACTION

6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.
7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:
 - a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
 - b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
 - c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with reason therefore, along with whatever additional actions the Contractor may have taken.
 - d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
 - e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7.b above.
 - f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the



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policy with all management personnel and with all minority and female employees at least once a year and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

- g.** Review, at least annually, the company's EEO Policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
- h.** Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.
- i.** Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
- j.** Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.
- k.** Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
- l.** Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
- m.** Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to insure that the EEO policy and the Contractor's obligations under these specifications are being carried out.
- n.** Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
- o.** Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.



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- p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.
- 8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7.a through 7.p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more if its obligations under 7.a through 7.p of these specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female work force participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's non-compliance.
- 9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).
- 10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.
- 11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.
- 12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.
- 13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.
- 14. The Contractors shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and



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retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents

(a.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

16. The Contractor will receive at the time of Award Federal Form CC-257 for his use in reporting monthly the Affirmative Actions for minority and female which he has employed.



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APPENDIX A

The following goals and timetables for female utilization shall be included in all Federal and federally assisted construction contracts and subcontracts in excess of \$10,000. The goals are applicable to the Contractor's aggregate on-site construction work force whether or not part of that work force is performing on a Federal or federally assisted construction contract or subcontract.

AREA COVERED: Nationwide

GOALS AND TIMETABLES

Timetable	Goals (percent)
From April 1, 1978 until March 31, 1979.....	3.1
From April 1, 1979 until March 31, 1980.....	5.0
From April 1, 1980 until further notice.....	6.9



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APPENDIX B

Until further notice, the following goals for minority utilization in each construction craft and trade shall be included in all Federal or federally assisted construction contracts and subcontracts in excess of \$10,000 to be performed in the respective geographical areas. The goals are applicable to each nonexempt contractor's total on-site construction work force, regardless of whether or not part of that work force is performing work on a Federal, federally assisted or nonfederally related project, contract or subcontract.

Construction contractors which are participating in an approved Hometown Plan (see 41 CFR 60-4.5) are required to comply with the goals of the Hometown Plan with regard to construction work they perform in the area covered by the Hometown Plan. With regard to all their other covered construction work such contractors are required to comply with the applicable SMSA or EA goal contained in this appendix B-80.

State	Goal (percent)
Maryland:	
019 Baltimore, MD:	
SMSA Counties:	
0720 Baltimore, MD.....	23.0
MD Anne Arundel; MD Baltimore; MD Carroll; MD Harford; MD Howard; MD Baltimore City	
Non-SMSA Counties.....	23.6
MD Caroline; MD Dorchester; MD Kent; MD Queen Annes; MD Somerset; MD Talbot; MD Wicomico; MD Worcester	
Washington, DC:	
020 Washington, DC:	
SMSA Counties:	
8840 Washington, DC.....	28.0
MD Charles; MD Montgomery; MD Prince Georges	
Non-SMSA Counties.....	25.2
MD Calvert; MD Frederick MD St. Marys; MD Washington	
Pennsylvania	
Non-SMSA Counties.....	4.8
MD Allegany; MD Garrett	



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TRAINING PROVISIONS

As part of the Contract's Equal Employment Opportunity Affirmative Action Program, on-the-job training shall be provided as follows:

The on-the-job training shall be aimed at developing full journeymen in the type of trade or job classification involved. On this Contract 2 persons will be trained.

In the event that a Contractor subcontracts a portion of the Contract work, the Contractor shall determine how many, if any, of the trainees are to be trained by the subcontractor, however, the Contractor shall retain the primary responsibility for meeting the training requirements imposed by this Provision. The Contractor shall also insure that this training Provision is physically included in each subcontract to insure that the workforce utilized by the subcontractor meet the goals for minority and female employment and training. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

The number of trainees in each classification shall be distributed among the work classifications on the basis of the Contractor's needs, minority and women employment goals specified for each trade in the Contract Provision, and the reasonable area of recruitment.

Prior to beginning construction, the Contractor shall submit to the Administration for approval a Manpower and Training Utilization (MTU) Schedule no later than at the preconstruction meeting.

The MTU schedule shall include:

1. The proposed training programs.
2. The number of trainees to be trained in each classification.
3. Anticipated starting and ending dates for training in each classification.

No Contract work may be undertaken until the Administration has accepted the schedule.

If the submitted training programs fail to meet the requirements as defined within these Provisions, the Administration will withhold one percent of the total category code one pay items from the payment due the Contractor. The Contractor shall submit a revised Manpower and Training Utilization Schedule when major changes in the Contract work schedule occur that substantially affect the previously submitted schedule.

The Contractor shall be credited for each trainee employee who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for the hourly cost of the trainee as specified in the schedule of prices.

Training and upgrading of minorities and women toward journeyman status is a primary objective of this Training Provision. The purpose for this objective is to insure a pool of qualified minorities and women to replace those journeymen who, in the natural course of events will leave the workforce. The program will also provide opportunities to the minorities and women trainees in geographic areas where shortages in minority and women journeymen are prevalent and recognized due to the Contractor's inability to meet the Equal Employment Opportunity goals specified in this Contract.

The training requirements of this Training Provision are not intended nor shall they be used to discriminate against any applicant for training, whether a member of a protected class or not. It is



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the Contractor's responsibility to demonstrate good faith efforts to ensure an adequate workforce representation of minorities and women in all job classifications on this Contract. Therefore, the Contractor shall consider the employment Contract goals set for minorities and females when enrolling trainees. The Contractor's utilization of the on-the-job training goals will be weighed when an Equal Employment Opportunity workforce compliance determination is made.

The Contractor shall make every effort to enroll minority and women trainees (e.g., by conducting systematic and direct recruitment through public and private sources likely to yield minorities and women to the extent that these persons are available within a reasonable area of recruitment).

No employee shall be employed as a trainee in any classification which the individual has successfully completed a training program leading to journey person status or has been employed as a journey person. This includes a person gainfully employed as a journey person by virtue of informal on-the-job training. The Contractor should satisfy this requirement by including appropriate questions in the employee job application or by other suitable means. Regardless of the method used, the Contractor's records shall document the findings in each case. In the case of apprentices, evidence of indentureship and registration of the approved apprenticeship program shall be included in the Contractor's records.

The minimum length and type of training and rate for each classification shall be specified in the training program by the Contractor and approved by the Administration and the Federal Highway Administration.

The Administration will approve any program specified in the Administration's On-The-Job Training Manual. The Administration and the Federal Highway Administration will consider other programs if it is reasonably calculated that the programs conform to the Equal Employment Opportunity obligations of the Contract and will qualify the average trainee for journey person status in the specified classification by the end of the training period. Apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau, and training programs approved by, but not necessarily sponsored by the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training will also be acceptable, provided that the program being offered is administered in a manner consistent with the Equal Employment obligation of Federal-aid highway construction Contracts and meets the minimum requirements of this Training Provision.

Some offsite training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

Unless otherwise specified, the Contractor will be reimbursed 80 cents per hour of training given an employee on this Contract in conformance with an approved training program. As approved by the Engineer, reimbursement will be made for training persons in excess of the number specified herein. This reimbursement will be made even though the Contractor received additional training program funds from other sources, provided that the other sources do not specifically prohibit the Contractor from receiving other reimbursement. Reimbursement for offsite training indicated above will only be made to the Contractor where the Contractor does one or more of the following and the trainees are concurrently employed on a Federal-aid project:



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1. Contributes to the cost of the training.
2. Provides the instruction to the trainee or pays the trainee's wages during the offsite training period.

No payment will be made to the Contractor if either the failure to provide the required training, or the failure to hire the trainee as a journeyman is caused by the Contractor and evidences a lack of "good faith" on the part of the Contractor in meeting the requirements of this Training Provision. It is normally expected that a trainee will begin training on the project as soon as feasible after the start of work utilizing the skill involved and remain on the project as long as training opportunities exist in the work classification or until the program is completed. It is not required that all trainees be on board for the entire length of the Contract. A Contractor will have fulfilled their responsibilities under this Training Provision when:

1. Systematic and direct recruitment likely to yield qualified minority and women applicants is conducted through:
 - a. Public and private referral sources.
 - b. Advising the existing workforce of training opportunities.
 - c. Unions (if applicable).
2. Acceptable training has been provided to trainees enrolled in the program.
3. The number of specified trainees have completed the minimum hours required in an approved training program.
4. Trainees completing approved programs are retained in the workforce as journeymen.

The Contractor shall pay the trainees at least 60 percent of the appropriate minimum journeyman's hourly rate plus the full fringe benefits specified in the Contract for the first half of the training period, 75 percent for the third quarter of the training period plus full fringe benefits, and 90 percent for the last quarter of the training period plus full fringe benefits. However, in no case shall the total hourly rate be less than the U.S. Department of Labor's unskilled laborer wage rate for the project. In addition, all trainees shall be identified as such on the certified payroll.

The Contractor shall furnish the trainee a copy of the approved training program in which the trainee is enrolled. The Contractor shall provide each trainee with a certificate showing the type and length of training satisfactorily completed. The Contractor shall submit a Certificate to the trainee in the following instances:

1. Certificate of Completion when a trainee completes the total number of hours required to complete a training program.
2. Certificate of Training when a trainee does not totally complete the required program hours.

The Contractor shall provide for the maintenance of records and furnish periodic reports inclusive of the Administration's Contractor's Semiannual Training Reports, documenting his performance under this Training Provision. The Semiannual Training Report is to be submitted by the 10th of the month following the reporting period (July 10 and January 10).



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If the Contractor fails to fully comply with these Training Provisions, the Administration's Representative will make a final report of non compliance to the Administrator, who may direct the imposition of one or both of the sanctions listed below:

1. Withholding a percentage of the progress payment.
2. Other action appropriate and/or within the discretion of the Administrator.



NOTICE TO ALL HOLDERS OF THIS CONTRACT DOCUMENT

HIGH VISIBILITY SAFETY APPAREL POLICY

BACKGROUND. Research indicates that high visibility garments have a significant impact on the safety of employees who work on highways and rights-of-way. In addition, high visibility garments may help to prevent injuries and accidents and to make highway workers more visible to the motoring public, which ultimately improves traffic safety.

STATEMENT OF POLICY.

- (a) The High Visibility Safety Apparel Policy provides a standardized apparel program.
- (b) The program seeks to improve the visibility of all persons who work on Administration highways and rights-of-way.
- (c) All apparel shall contain the appropriate class identification label.
- (d) Compliance with this policy is retroactive and becomes effective immediately. All affected employees shall receive high visibility apparel awareness training.

APPLICABILITY. This policy applies to all Administration employees and all other persons who work on Administration highways and rights-of-way. All workers shall wear, at a minimum, Class 2 ANSI/ISEA 107/2004 apparel.

- (a) For Administration employees, this apparel shall have a fluorescent yellow-green background material color and be the outermost garment worn.
- (b) Retro-reflective material color for Administration employee apparel shall be silver or white and be visible at a minimum distance of 1,000 feet. The retro-reflective safety apparel shall be designed to clearly recognize and differentiate the wearer from the surrounding work environment. The retro-reflective material may be contrasted by fluorescent orange background material not exceeding one and one half inches on either side of the retro-reflective material.
- (c) For non-Administration employees, this apparel shall be either fluorescent orange-red or fluorescent yellow-green background material color and be the outermost garment worn.
- (d) Retro-reflective material color for non-Administration employee apparel shall either be orange, yellow, white, silver, yellow-green, or a fluorescent version of these colors, and be visible at a minimum distance of 1,000 feet. The retro-reflective safety apparel shall be designed to clearly recognize and differentiate the wearer from the surrounding work environment.



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HIGH VISIBILITY SAFETY APPAREL POLICY

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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

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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

01/02/2013

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:

31901 Tri-County Way
Suite 111
Salisbury, Maryland 21804
Telephone (410) 341-8533 Fax: (410) 334-3454

NOTICE TO CONTRACTOR

PROJECT SCHEDULE. Section 109 shall apply.

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 proposer 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.

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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. All requests for additional information or clarification of the RFP shall be done by the specifications outlined in TC 2

RIGHT-OF-WAY STATUS

In accordance with the requirements of Title 23, Code of Federal Regulations, Part 635, this is to certify that of the forty-two (42) parcels needed for construction on the above-captioned contract, four (4) are in the possession of the State Highway Administration at this time.

- 106234 - John Derrickson 11; Optioned
- 106237 - Alan Hancock; Optioned
- 106239 - Vaughn & Pearl L. Dale; Optioned
- 106240 - Jeffery D. & Dawn P. Pruitt; Optioned

The status of the thirty-eight (38) parcels not in our possession is as follows:

- 106231 - Ronald K. & Betty L. Bevard; awaiting appraisal
- 106232 - Ronald K. & Betty L. Bevard; awaiting appraisal
- 106233 - County commissioners of Worcester County; awaiting Appraisal
- 106235 - County Commissioners of Worcester County; awaiting appraisal
- 106236 - Maryland & Delaware Railroad Company; awaiting appraisal
- 106238 - Mary E. Cropper; awaiting appraisal
- 106243 - Florence M. Donoway; awaiting appraisal
- 106244 - Andre B. & Bonnie P. Lewis; awaiting appraisal
- 106245 - Glen Edward & Katherine R. Donoway; awaiting appraisal
- 106246 - Joanne D. & Sarah Mason; awaiting appraisal
- 106247 - George C. Townsend; awaiting appraisal
- 106248 - James Doran, Jr.; awaiting appraisal
- 106249 - Go Getters Foundation, Inc.; awaiting appraisal
- 106250 - Frederick T. & Peggy P. Parker, Jr.; awaiting appraisal
- 106251 - M.C.P.B. Limited Partnership; awaiting appraisal
- 106252 - Howard O. Vansice; awaiting appraisal
- 106253 - Donald F. & Jane H. Klein; awaiting appraisal
- 106254 - John C. Timmons; awaiting appraisal
- 106255 - Hilton P. Bradford/Credit Shelter Trust; awaiting appraisal

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- 106256 - Ralph L. Mason, I11 & Nancy M. Bounds, & C.M. Wood, & T.C. Mason; awaiting appraisal
- 106257 - Sewell Sidney & Mabel Eloise Cropper; awaiting appraisal
- 106258 - Robert M. & Barry D. Baker; awaiting appraisal
- 106259 - Watson H. Powell; awaiting appraisal
- 106260 - Watson H. Powell; awaiting appraisal
- 106261 - Thomas R. & Kim S. Donoway; awaiting appraisal
- 106262 - Henry S. & Luvenia P. Spence; awaiting appraisal
- 106263 - Harry Watson Powell, Jr. & Annette Jones; awaiting appraisal
- 106264 - Michael & Nancy P. Donoway; awaiting appraisal
- 106265 - Watson H. Powell & Betty Jean Trustees & Bonnie T. Lewis Trustee; awaiting appraisal
- 106266 - Diane D. Charnick, Kathleen D. Mitchell & Patricia D. Jackson; awaiting appraisal
- 106267 - Charlotte C. & William R. Serman; awaiting appraisal
- 106268 - Tanya L. Miller; awaiting appraisal
- 106269 - Arcdia Development, LLC; awaiting appraisal
- 106270 - Ronald K. & Betty Bevard; lSt offer made

The following two (2) parcels are being taken to court:

- 106241 - Ralph T. & Deborah C. Wooten; monies to be posted into court
- 106242 - Donald L. & Kathryn V. Westbrook; monies to be posted into court

Although 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 has been acquired. Trial or appeal of some parcels may be pending in court and on other parcels full legal possession has not been obtained but right of entry has been obtained, the occupants of a11 lands and improvements have vacated and the State Highway Administration has physical possession and right to remove, salvage, or demolish these improvements.

Relocation assistance services will be utilized for the above-captioned contract. All individuals and families will be relocated into decent, safe and sanitary housing. It is the obligation of the SHA to pursue expeditiously the availability to relocatees of comparable housing in accordance with the provisions of the Federal Highway Relocation Assistance Program. Relocation assistance services are being utilized on the following items:

- 106237 - Alan Hancock
- 106239 - Vaughn & Pearl L. Dale
- 106241 - Ralph T. & Deborah C. Wooten
- 106242 - Donald L. & Kathryn V. Westbrook

This is a design-build project and the right-of-way requirements continue to be determined. All of the right-of-way acquisitions will be done by the State Highway Administration.

03-05-14¶

SPECIAL PROVISIONS
NOTICE TO CONTRACTOR

CONTRACT NO. WO6365170
4 of 4

As the right-of-way requirements are determined, plats will be issued, appraisals completed and approved and first-offers will be made. Once first-offers have been made, a new Right of Way Certification 2 will be issued.

The Design-Build Team will be unable to proceed with construction until such time as the SHA issues a Right-of-way Certification 1 for each phase or segment of the right-of-way that is clear.

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

The SHA has determined that it is in the public interest to advertise in advance for construction of the total right-of-way clearance for the following reasons:

The proposed US 113 Phase 3 project will dualize the existing US 113 two-lane section from North of Massey Branch to Five Mile Branch Road to improve safety conditions and traffic operations in this area as part of the US 113 corridor improvement efforts.

The need for the project is demonstrated by the number of fatal accidents, which have occurred along the two-lane portions of US 113 at a rate that exceeds the statewide average for similar two-lane rural highways in Maryland.

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 2.07.02.05.7 Permits.



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

AUG 21 2014

Operations Division

Maryland State Highway Administration
Attn: Mr. Todd Nichols, Chief
Environmental Programs Division
707 North Calvert Street
Baltimore, Maryland 21202

Dear Mr. Nichols:

This letter is in response to submittal of information required under special permit conditions of your Department of the Army (DA) authorization, **CENAB-OP-RMN (MD SHA/US 113: MD 394 to Delaware Line) 1997-63647**, issued September 30, 1998, to dualize US 113 from MD 394, in Snow Hill, Maryland, to the Delaware State line. The project is located in the Pokomoke River, Newport Bay, Isle of Wight Bay watersheds in Worcester County, Maryland.

The Corps has updated our files with the impact drawings and impact summary table for Phase III of the project from North of Five Mile Branch to South of Massey Branch, Worcester County, Maryland. We acknowledge that Phase III of the project will result in 23,120 square feet of permanent wetland impacts, and 1,678 linear feet (39,234 square feet) of permanent impacts to waters of the U.S. Please attach the enclosed plans, which include sheets 1-13, dated February 2014, to your original DA authorization and include the plans in the information posted at the construction site.

All other general and special conditions of the DA permit remain in effect and adherence must be strictly maintained. All required State and local authorizations must be secured prior to commencement of construction.

If you have any questions concerning this matter, please contact Mr. Jack Dinne of this office at (410) 962-6005.

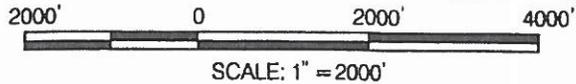
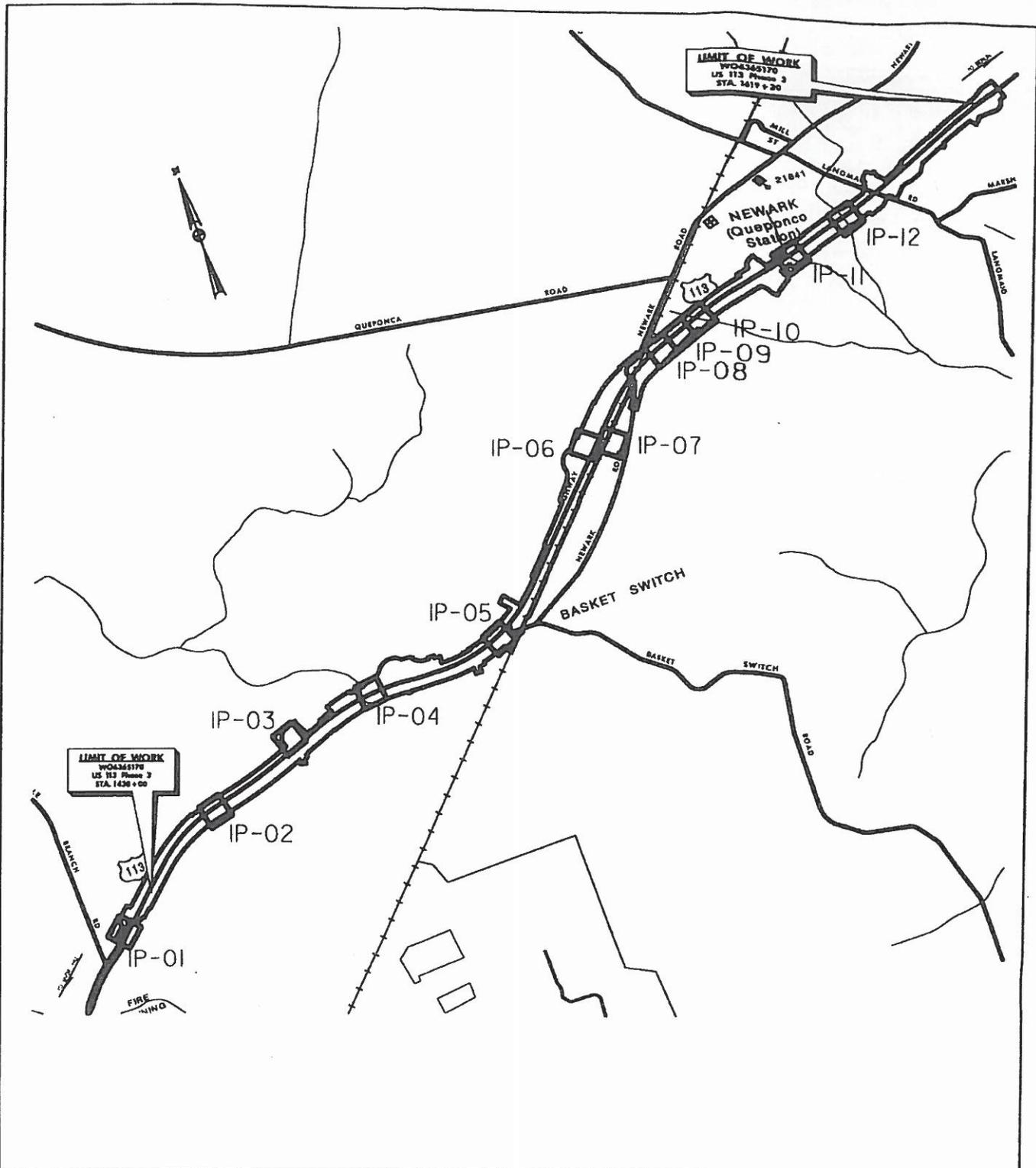
By Authority of the Secretary of the Army:

Joseph P. DaVia
Chief, Maryland Section Northern

Issued For and in Behalf of
Colonel J. Richard Jordan, III
District Engineer

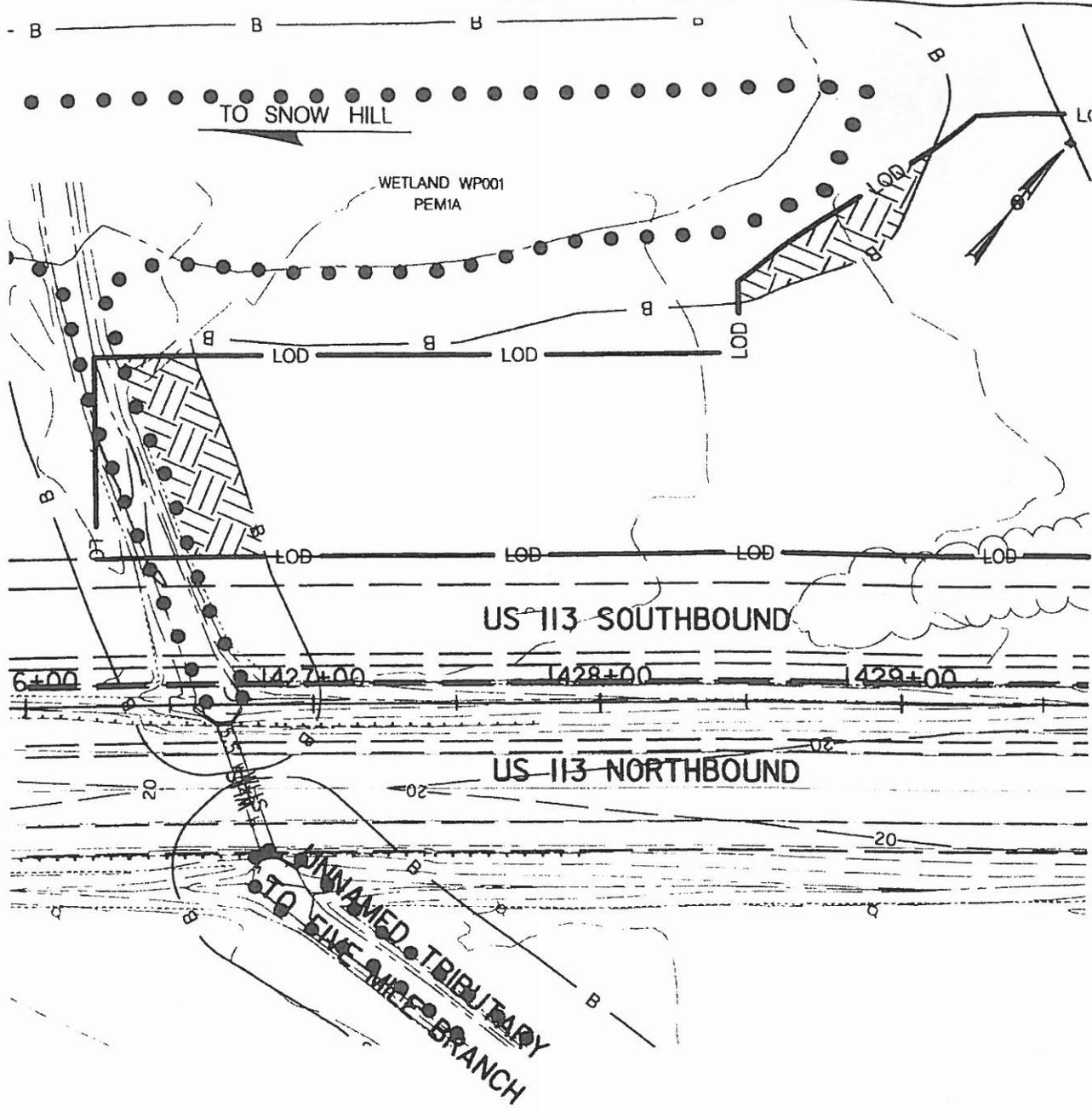
Enclosures

Cc:
Ms. Emily Dolbin, MDE – Nontidal Wetlands Division



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

WETLAND IMPACT PLATE INDEX
 PROJECT: US 113 - PHASE 3
 COUNTY: WORCESTER
 STATE: MARYLAND
 APPLICATION BY: MDSA
 WETLAND PLATE NO. IP-INDEX
 SHEET 1 OF 13 DATE: FEB 2014
 SHA PROJECT NO.: WO6365170



PERMANENT 25-FT BUFFER IMPACTS
2,791 SQ. FT./0.064 AC. (MDE)



NON-TIDAL WETLAND



WUS ——— WATERS OF THE U.S.



B ——— 25-FOOT WETLAND BUFFER



LOD ——— LIMIT OF DISTURBANCE



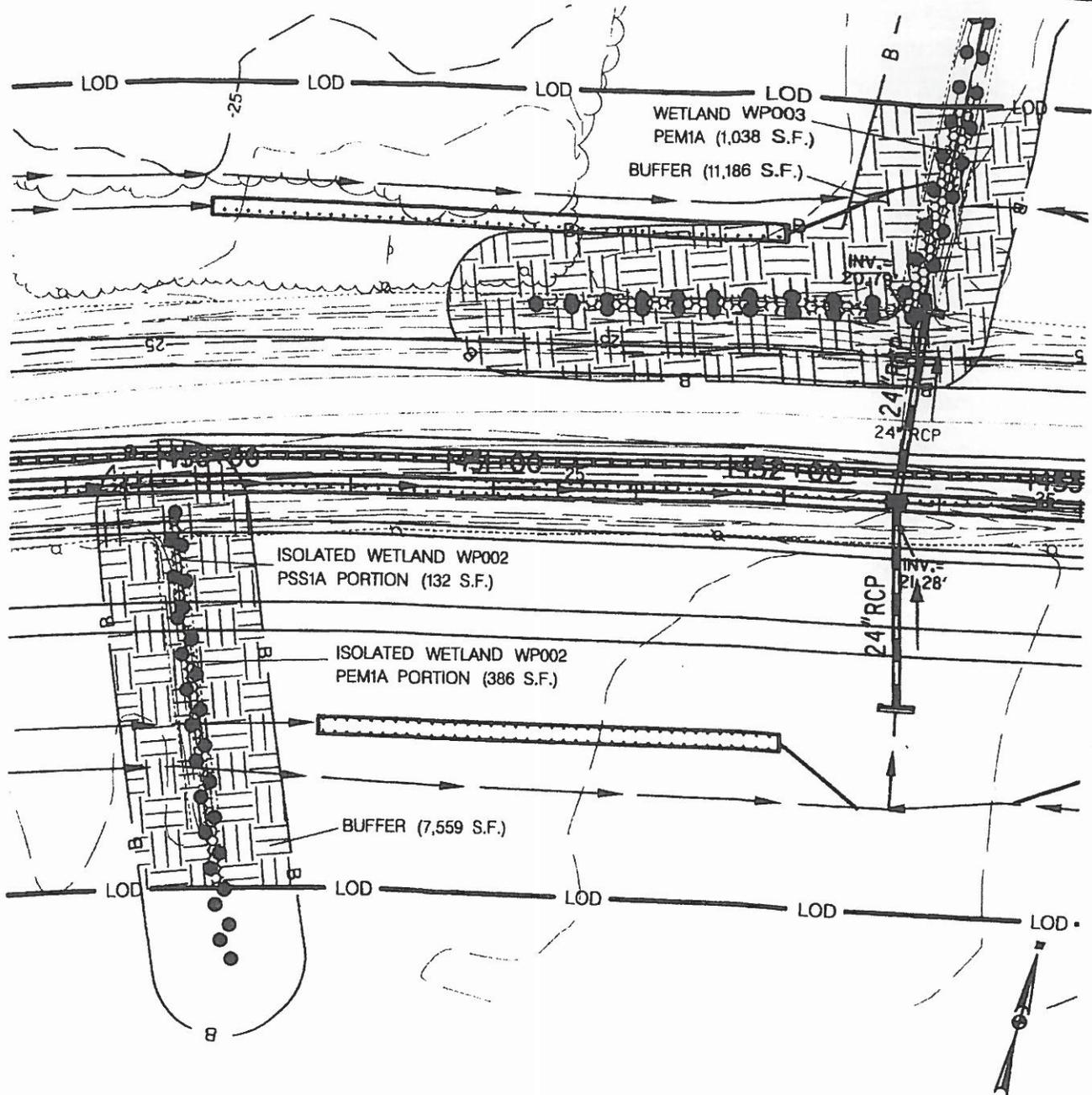
SCALE: 1" = 50'

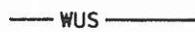
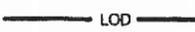


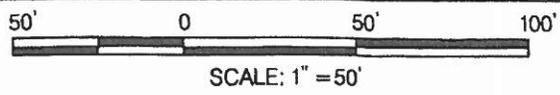
MARYLAND STATE HIGHWAY ADMINISTRATION
707 NORTH CALVERT ST.
BALTIMORE, MARYLAND 21202

WETLAND IMPACT PLATE

PROJECT: US 113 - PHASE 3
COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSHA
WETLAND PLATE NO. IP-01
SHEET 2 OF 13 DATE: FEB 2014
SHA PROJECT NO.: WO6365170

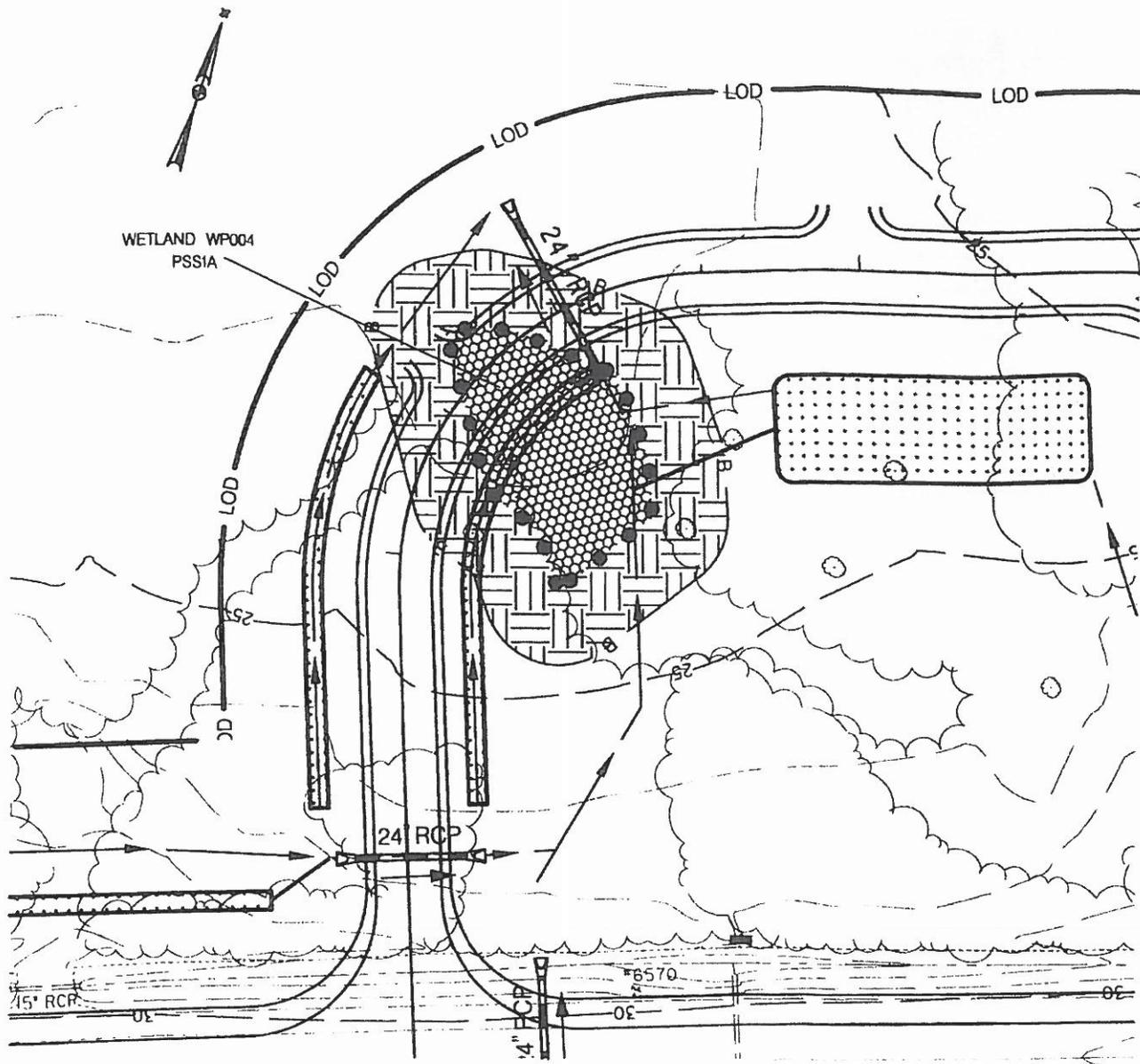


-  PERMANENT WETLAND IMPACTS
1,038 SQ. FT./0.024 AC. (MDEUSACE)
ISOLATED 518 S.F./0.12 AC. (MDE)
-  PERMANENT 25-FT BUFFER IMPACTS
18,745 SQ. FT./0.430 AC.
-  NON-TIDAL WETLAND
-  25-FOOT WETLAND BUFFER
-  WUS — WATERS OF THE U.S.
-  LOD — LIMIT OF DISTURBANCE

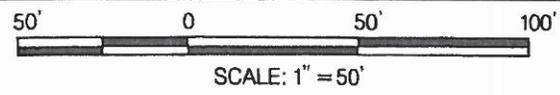


SHA
MARYLAND STATE HIGHWAY ADMINISTRATION
707 NORTH CALVERT ST.
BALTIMORE, MARYLAND 21202

WETLAND IMPACT PLATE
PROJECT: US 113 - PHASE 3
COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSHA
WETLAND PLATE NO. IP-02
SHEET 3 OF 13 DATE: FEB 2014
SHA PROJECT NO.: WO6365170

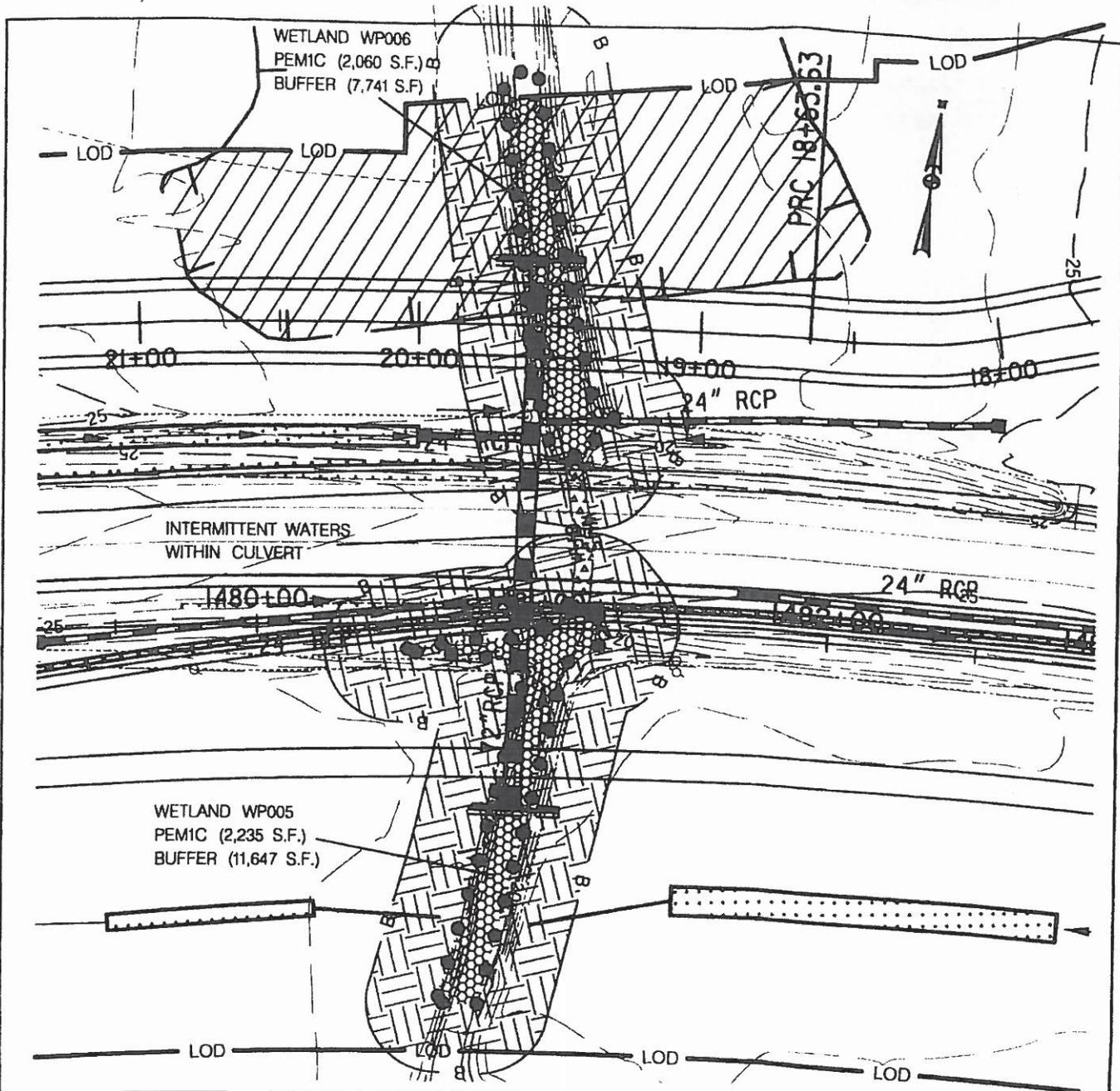


- PERMANENT WETLAND IMPACTS
3,619 SQ. FT./0.083 AC.
- PERMANENT 25-FT BUFFER IMPACTS
8,054 SQ. FT./0.185 AC.
- NON-TIDAL WETLAND
- WUS — WATERS OF THE U.S.
- B — 25-FOOT WETLAND BUFFER
- LOD — LIMIT OF DISTURBANCE

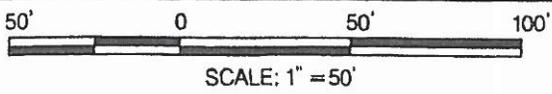


SHA
 MARYLAND STATE HIGHWAY ADMINISTRATION
 707 NORTH CALVERT ST.
 BALTIMORE, MARYLAND 21202

WETLAND IMPACT PLATE
 PROJECT: US 113 - PHASE 3
 COUNTY: WORCESTER
 STATE: MARYLAND
 APPLICATION BY: MDSHA
 WETLAND PLATE NO. IP-03
 SHEET 4 OF 13 DATE: FEB 2014
 SHA PROJECT NO.: WO6365170

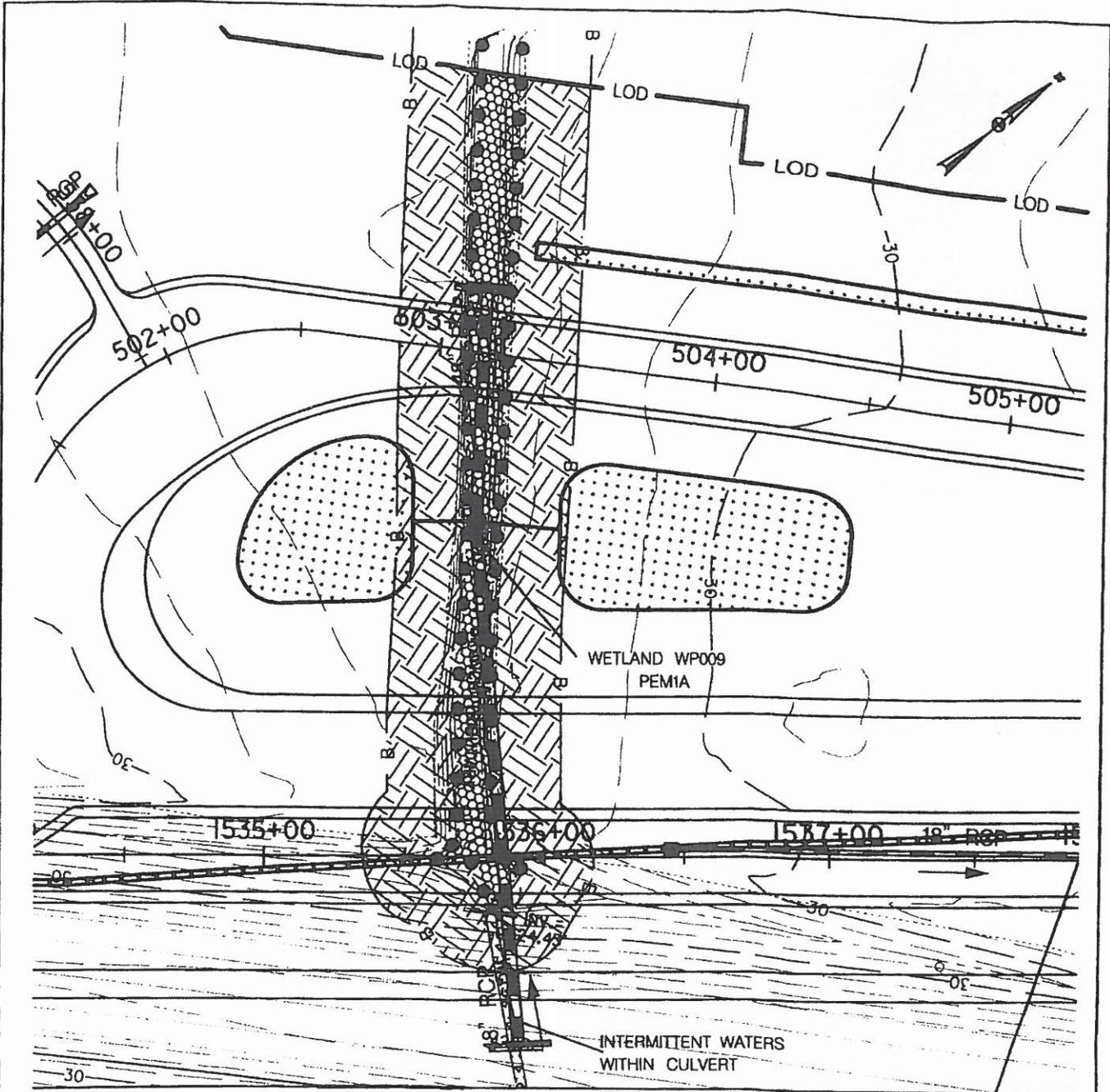


- PERMANENT WETLAND IMPACTS
4,295 S.F./0.099 AC. (MDE/USACE)
- PERMANENT 25-FT BUFFER IMPACTS
19,388 S.F./0.445 AC. (MDE)
- PERMANENT WATERS IMPACTS
336 S.F./0.008 AC./56 L.F. (MDE/USACE)
- NON-TIDAL WETLAND
- 25-FOOT WETLAND BUFFER
- PERMANENT FLOODPLAIN IMPACTS
16,080 S.F./0.369 AC. (MDE)
- 100-YEAR FEMA PRELIMINARY FLOODPLAIN BOUNDARY
- WUS — WATERS OF THE U.S.
- LOD — LIMIT OF DISTURBANCE



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

WETLAND IMPACT PLATE
 PROJECT: US 113 - PHASE 3
 COUNTY: WORCESTER
 STATE: MARYLAND
 APPLICATION BY: MDSA
 WETLAND PLATE NO. IP-04
 SHEET 5 OF 13 DATE: FEB 2014
 SHA PROJECT NO.: WO6365170



MATCH LINE - SEE PLATE IP-07



PERMANENT WETLAND IMPACTS
3,863 S.F./0.089 AC. (MDE/USACE)



NON-TIDAL WETLAND



25-FOOT WETLAND BUFFER



PERMANENT 25-FT BUFFER IMPACTS
16,171 S.F./0.371 AC. (MDE)



WATERS OF THE U.S.



LIMIT OF DISTURBANCE



PERMANENT WATER IMPACTS
232 S.F./0.005 AC/65 L.F.
(MDE/USACE)



SCALE: 1" = 50'

SHA

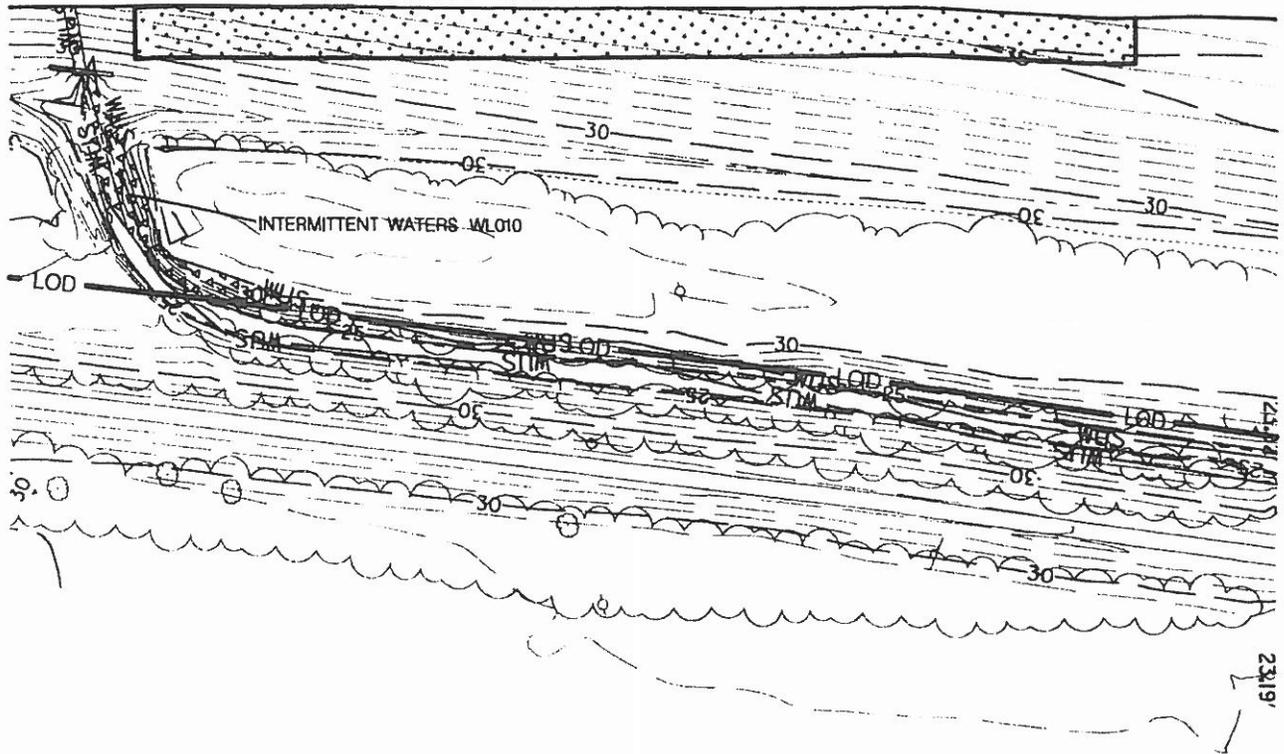
MARYLAND STATE HIGHWAY ADMINISTRATION
707 NORTH CALVERT ST.
BALTIMORE, MARYLAND 21202

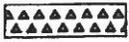
WETLAND IMPACT PLATE

PROJECT: US 113 - PHASE 3
COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSHA
WETLAND PLATE NO. IP-06
SHEET 7 OF 13 DATE: FEB 2014
SHA PROJECT NO.: WO6365170



MATCH LINE - SEE PLATE IP-06



-  PERMANENT WATERS IMPACTS
857 S.F./0.020 AC/132 L.F. (MDE/USACE)
-  NON-TIDAL WETLAND
-  B 25-FOOT WETLAND BUFFER
-  WUS WATERS OF THE U.S.
-  LOD LIMIT OF DISTURBANCE



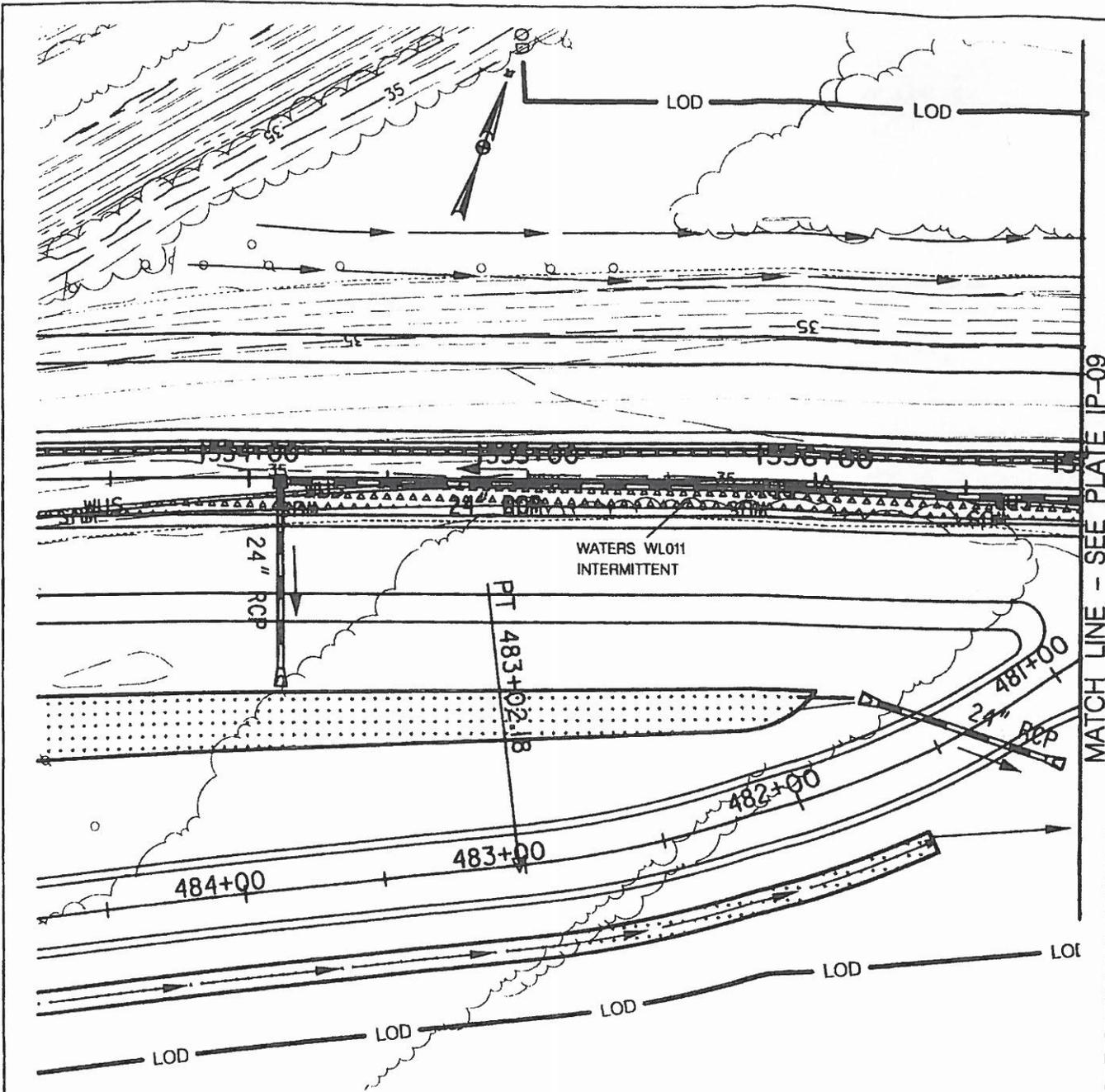
SCALE: 1" = 50'

SHA

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

WETLAND IMPACT PLATE

PROJECT: US 113 - PHASE 3
COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSHA
WETLAND PLATE NO. IP-07
SHEET 8 OF 13 DATE: FEB 2014
SHA PROJECT NO.: WO6365170



MATCH LINE - SEE PLATE IP-09

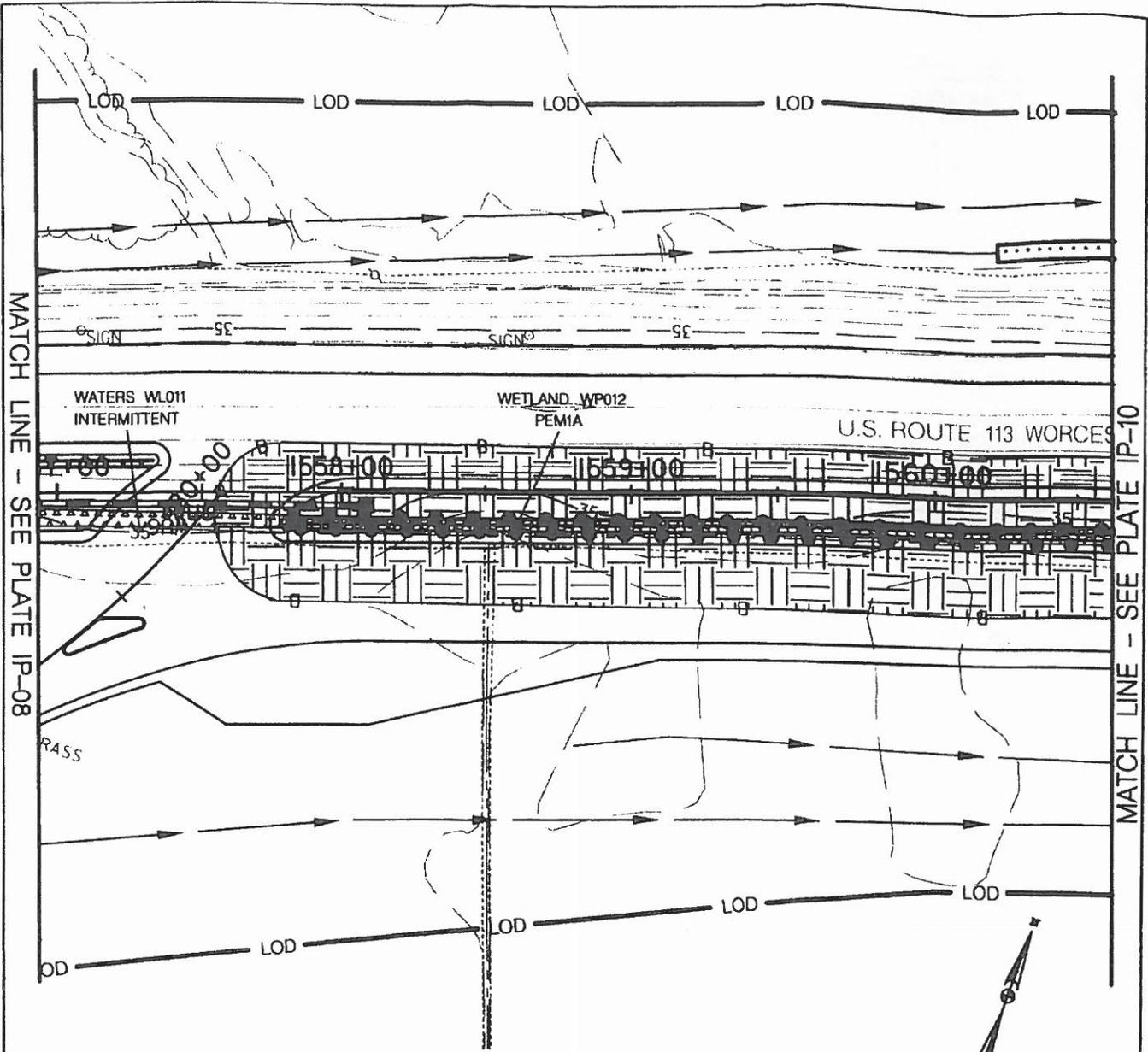
- PERMANENT WATERS IMPACTS
 2,493 SQ. FT./0.057 AC/370 L.F. (MDEUSACE)
- NON-TIDAL WETLAND
- B 25-FOOT WETLAND BUFFER
- WUS WATERS OF THE U.S.
- LOD LIMIT OF DISTURBANCE



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

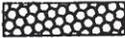
WETLAND IMPACT PLATE
 PROJECT: US 113 - PHASE 3
 COUNTY: WORCESTER
 STATE: MARYLAND
 APPLICATION BY: MDSA
 WETLAND PLATE NO. IP-08
 SHEET 9 OF 13 DATE: FEB 2014
 SHA PROJECT NO.: WO6365170



MATCH LINE - SEE PLATE IP-08

MATCH LINE - SEE PLATE IP-10

LEGEND

- 
PERMANENT WETLAND IMPACTS
1,209 SQ. FT./0.028 AC. (MDE/USACE)
- 
PERMANENT 25-FT BUFFER IMPACTS
15,228 SQ. FT./0.350 AC. (MDE)
- 
PERMANENT WATERS IMPACTS
473 SQ. FT./0.011 AC./92 L.F. (MDE/USACE)
- 
NON-TIDAL WETLAND
- 
25-FOOT WETLAND BUFFER
- 
WUS ——— WATERS OF THE U.S.
- 
LOD ——— LIMIT OF DISTURBANCE



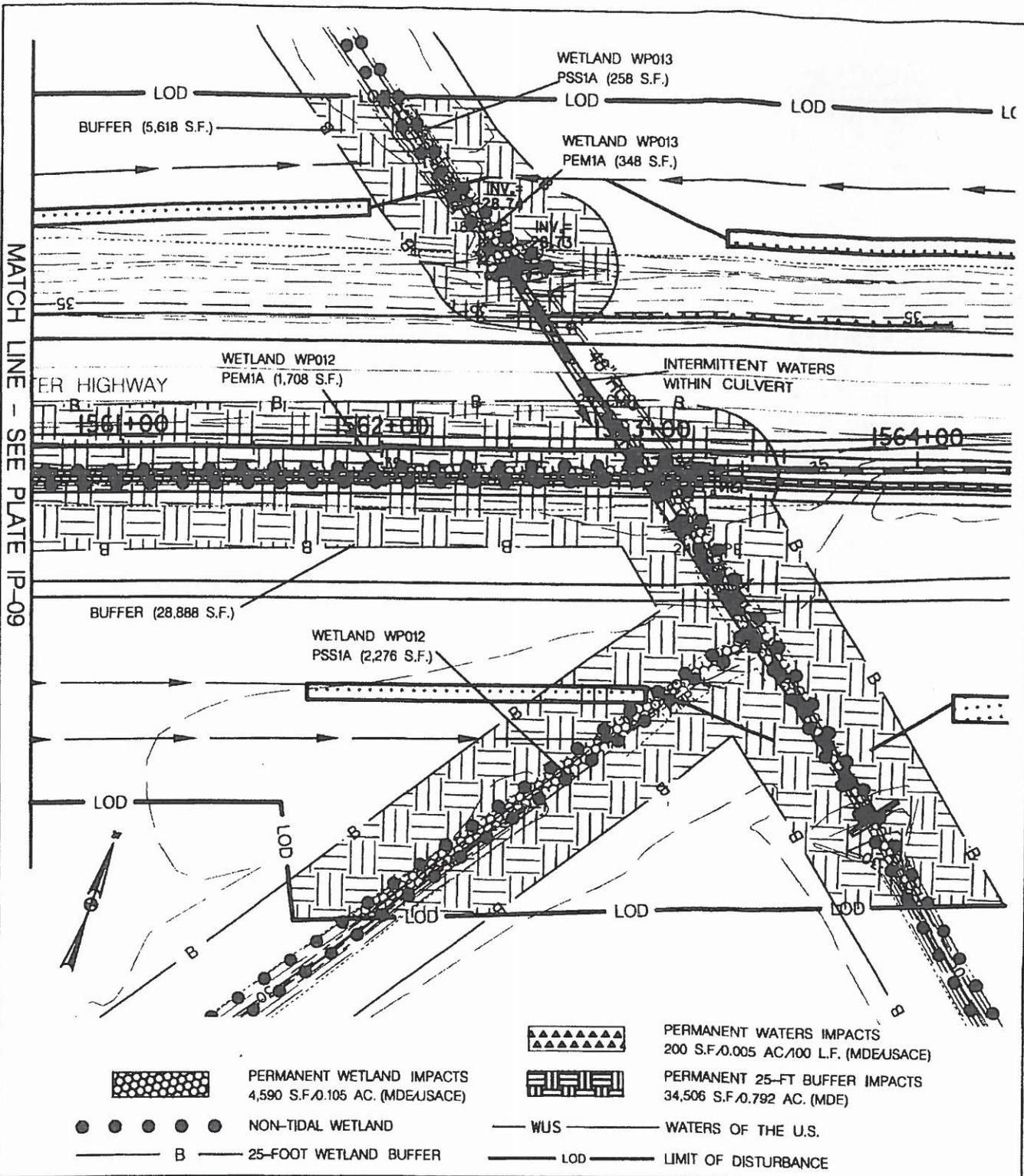
SCALE: 1" = 50'

SHA

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

WETLAND IMPACT PLATE

PROJECT: US 113 - PHASE 3
COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSHA
WETLAND PLATE NO. IP-09
SHEET 10 OF 13 DATE: FEB 2014
SHA PROJECT NO.: WO6365170

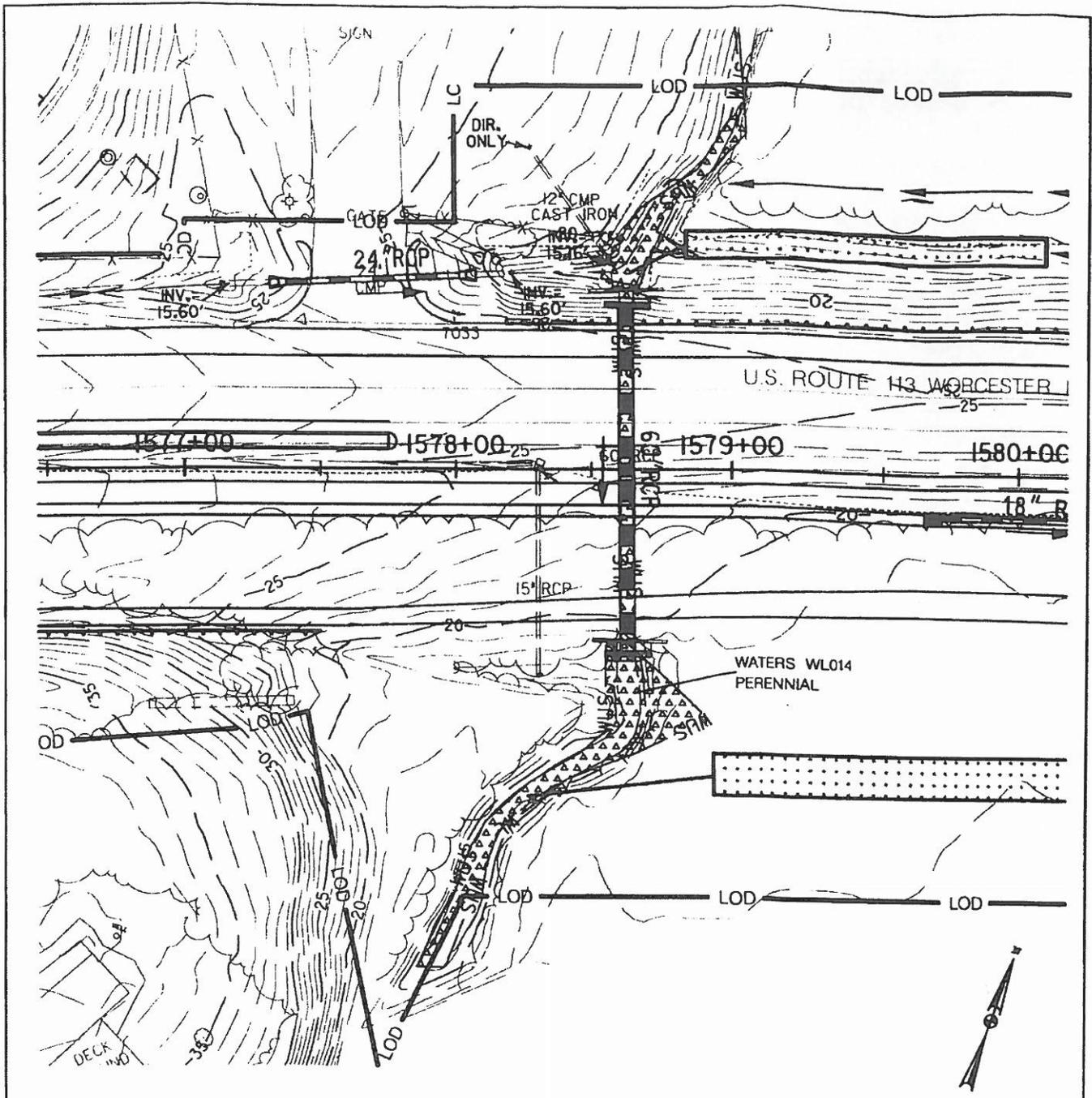


MATCH LINE - SEE PLATE IP-09

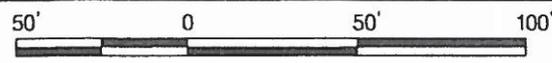


WETLAND IMPACT PLATE
 PROJECT: US 113 - PHASE 3
 COUNTY: WORCESTER
 STATE: MARYLAND
 APPLICATION BY: MDSA
 WETLAND PLATE NO. IP-10
 SHEET 11 OF 13 DATE: FEB 2014
 SHA PROJECT NO.: WO6365170

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



-  PERMANENT WATERS IMPACTS
2,992 S.F./0.069 AC./365 L.F. (MDE/USACE)
-  NON-TIDAL WETLAND
-  B 25-FOOT WETLAND BUFFER
-  WUS WATERS OF THE U.S.
-  LOD LIMIT OF DISTURBANCE



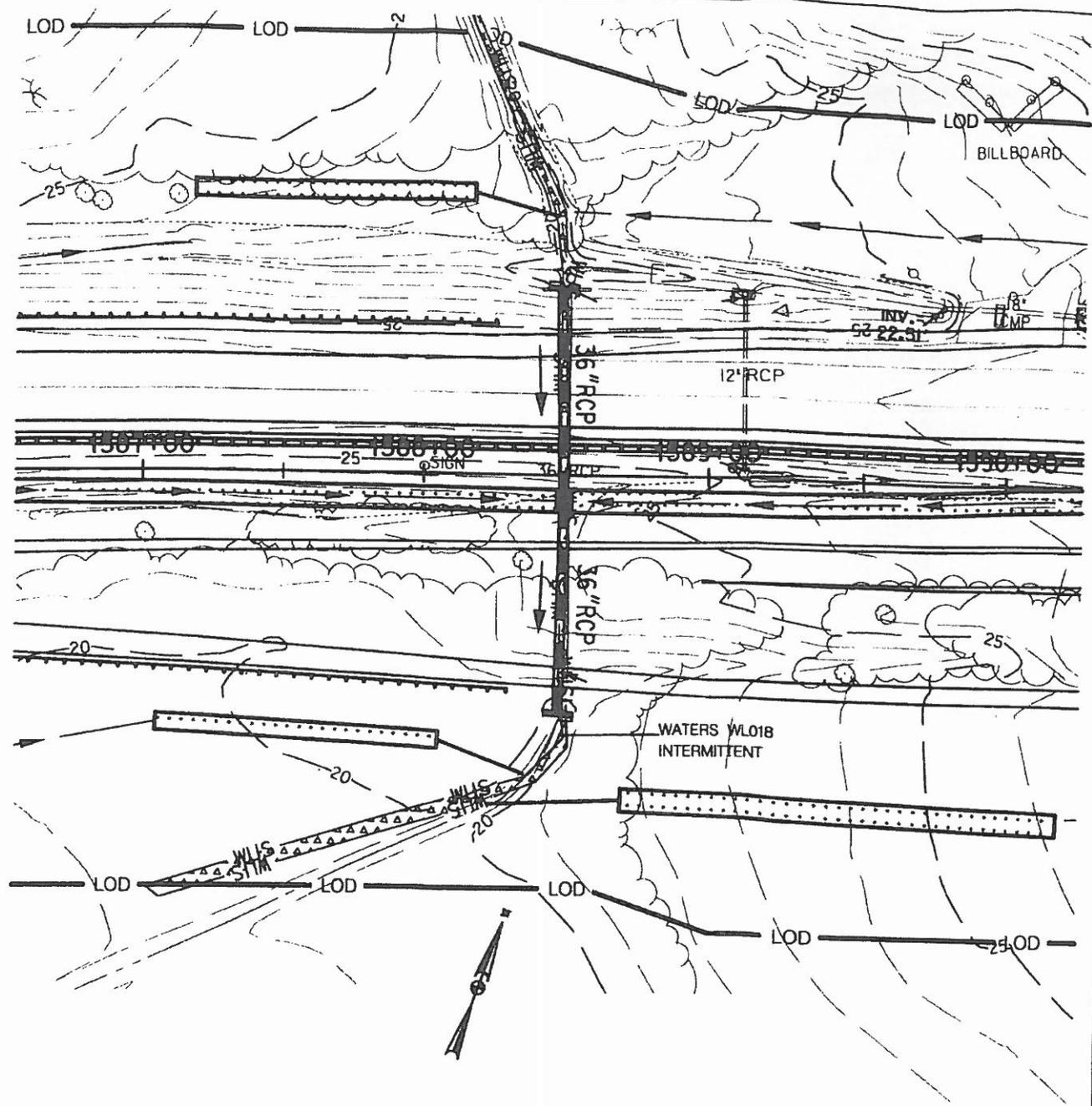
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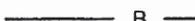
SHA

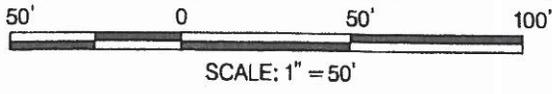
MARYLAND STATE HIGHWAY ADMINISTRATION
707 NORTH CALVERT ST.
BALTIMORE, MARYLAND 21202

WETLAND IMPACT PLATE

PROJECT: US 113 - PHASE 3
COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSA
WETLAND PLATE NO. IP-11
SHEET 12 OF 13 DATE: FEB 2014
SHA PROJECT NO.: WO6365170



-  PERMANENT WATERS IMPACTS
1,473 S.F./0.034 AC/404 L.F. (MDE/USACE)
-  NON-TIDAL WETLAND
-  B 25-FOOT WETLAND BUFFER
-  WUS WATERS OF THE U.S.
-  LOD LIMIT OF DISTURBANCE



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

WETLAND IMPACT PLATE
 PROJECT: US 113 - PHASE 3
 COUNTY: WORCESTER
 STATE: MARYLAND
 APPLICATION BY: MDSHA
 WETLAND PLATE NO. IP-12
 SHEET 13 OF 13 DATE: FEB 2014
 SHA PROJECT NO.: WO6365170

SHA: US 113 Improvements Phase III, North of Five Mile Branch to South of Massey Branch													
Summary of Wetlands, Waters and Floodplain Impacts- Permanent													
Wetlands	Waters	Plate No.	Community (Sq. Ft.)		Total Wetland Impacts		25' Wetland Buffer Impacts (MDE)		Waters Impacts		Floodplain Impacts (MDE)		
			PSS	PEM	Sq. Ft.	Acres	Sq. Ft.	Acres	Sq. Ft.	L.F.	Sq. Ft.	Acres	
WP001		IP-01						2,791	0.064				
WP002*		IP-02	132	386	518	0.012	7,559	0.174					
WP003		IP-02		1,038	1,038	0.024	11,186	0.256					
WP004*		IP-03		3,619	3,619	0.083	8,054	0.185					
WP005		IP-04		2,235	2,235	0.051	11,647	0.267					
WP006		IP-04		2,060	2,060	0.047	7,741	0.178				16,080	0.369
	In Culvert	IP-04								336	56		
WP007		IP-05		814	814	0.019	6,025	0.138					
WP008		IP-05		3,174	3,174	0.073	17,222	0.395					
	In Culvert	IP-05								178	94		
WP009		IP-06		3,863	3,863	0.089	16,171	0.371					
	In Culvert	IP-06								232	65		
	WLO10	IP-07								857	132		
	WLO11	IP-08,-09								2,966	462		
WP012		IP-09,-10	2,276	2,917	5,193	0.119	44,116	1.014					
WP013		IP-10	258	348	606	0.014	5,618	0.129					
	In Culvert	IP-10								200	100		
	WLO14	IP-11								2,992	365		
	WLO18	IP-12								1,473	404		
Total			2,666	20,454	23,120	0.531	138,130	3.171	9,234	1,678	16,080	0.369	

*Indicates Isolated Wetland regulated by MDE only.

SHA: US 113 Improvements Phase III, North of Five Mile Branch to South of Massey Branch
 Summary of Impact Plates

Plate No.	Community (Sq. Ft.)		Total Permanent Wetland Impacts		Permanent 25' Wetland Buffer		Permanent Waters Impacts		Permanent Floodplain Impacts (MDE)	
	PSS	PEM	Sq. Ft.	Acres	Sq. Ft.	Acres	Sq. Ft.	L.F.	Sq. Ft.	Acres
IP-01					2,791	0.064				
IP-02	132	1,424	1,556	0.036	18,745	0.430				
IP-03		3,619	3,619	0.083	8,054	0.185				
IP-04		4,295	4,295	0.098	19,388	0.445	336	56	16,080	0.369
IP-05		3,988	3,988	0.092	23,247	0.534	178	94		
IP-06		3,863	3,863	0.089	16,171	0.371	232	65		
IP-07							857	132		
IP-08							2,493	370		
IP-09		1,209	1,209	0.028	15,228	0.350	473	92		
IP-10	2,534	2,056	4,590	0.105	34,506	0.792	200	100		
IP-11							2,992	365		
IP-12							1,473	404		
Total	2,666	20,454	23,120	0.531	138,130	3.171	9,234	1,678	16,080	0.369

LIMIT OF WORK
 W06065170
 US 113
 STA. 1430 + 00

PROPOSED RIGHT OF WAY LINE

EXISTING RIGHT OF WAY LINE

STATIONING

1426+00 1427+00 1428+00 1429+00 1430+00 1431+00 1432+00 1433+00 1434+00 1435+00 1436+00 1437+00 1438+00 1439+00 1440+00

SMA

ROADWAY PLAN

HD 01 19

MR&A

WILHELM REINHARDT
 & ASSOCIATES, LLP

STATE OF MARYLAND
DEPARTMENT OF THE ENVIRONMENT
WATER MANAGEMENT ADMINISTRATION
NONTIDAL WETLANDS AND WATERWAYS PERMIT

PERMIT NUMBER: 14-NT-2027/201460434
EFFECTIVE DATE: August 20, 2014
EXPIRATION DATE: August 20, 2017
PERMITTEE: 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, Maryland Department of Transportation, State Highway Administration ("PERMITTEE"), 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 August 20, 2014 ("APPROVED PLAN") AND PREPARED BY Maryland State Highway Administration AND INCORPORATED HEREIN, AS DESCRIBED BELOW:

This approval authorizes 27,896 square feet of permanent impacts to nontidal wetlands (5,160 square feet of palustrine forested, 2,666 square feet of palustrine scrub-shrub, and 20,070 square feet of palustrine emergent), 167,515 square feet of permanent impact to nontidal wetland buffer, 1,678 linear feet (9,234 square feet) of permanent impacts to unnamed tributaries to Five Mile Branch and Marshall Creek and disturbance in the 100-year floodplain of an unnamed tributary to Five Mile Branch for US 113 North of Five Mile Branch to South of Massey Branch, Phase 3 Improvements. The project is located in Worcester County along US 113 and extends from north of the Five Mile Road to south of Massey Branch. The project involves removing and reconstructing portions of US 113 including installation of new service roads, J-turn intersections, and a modified Maryland T-intersection. The proposed work includes new roadway construction, pavement resurfacing and improvements, tree replacements, drainage improvements, culvert extensions, stormwater management improvements, signage and pavement markings, intersection lighting, and bicycle accommodations.

MD Grid Coordinates: N64913 x E548121

SHA Contract No. WO636A31

Handwritten signature of Amanda Sigillito in cursive.

Amanda Sigillito, Chief
Nontidal Wetlands Division

Attachments: Special and General Conditions of Permit
Best Management Practices
Impact Plates

cc: Jack Dinne, MD SHA Liaison, US Army Corps of Engineers
WMA, Compliance Program w/ file

SPECIAL CONDITIONS

1. **Avoidance and minimization:** Avoidance and minimization of impacts to wetlands, wetland buffers, waters, and the regulated floodplain shall be emphasized throughout the remainder of the design and construction process.
2. **Environmental Monitor:** Prior to the start of construction, the Permittee shall retain a qualified Independent Environmental Monitor (IEM) that is independent from the Permittee, design consultants, and construction contractors working on the project. The Permittee shall retain the IEM for 24 hours per week to assess compliance with all conditions of this and other applicable permits and environmental regulations. The IEM shall:
 - a. Review design submittals and construction activities for compliance with all conditions of this and other applicable permits and environmental regulations;
 - b. Report findings directly and concurrently to the Water Management Administration Nontidal Wetlands and Waterway Construction Divisions (the "Divisions"), and the Army Corps of Engineers (Corps), notifying them and the Permittee immediately of any reported or observed violations or non-compliance issues within the terms or conditions of this Permit, the Water Quality Certification, or Approved Plans and specifications;
 - c. Document impacts to regulated resources by developing and maintaining a detailed tracking list of impacted resources;
 - d. Assist with identification of ongoing opportunities for further avoidance and minimization of impacts to regulated environmental resources and protection of water quality.
3. **Best Management Practices:** The provisions contained in the attached "Best Management Practices for Working in Wetlands and Waterways" are a part of this permit and shall be strictly enforced. The Permittee shall emphasize the sensitivity of the environmental resources along the transportation corridor and stress the importance of stringent adherence to all best management practices to its contractors during all pre-construction and progress meetings.
4. **Wetland and Waterway Impacts – Plan Submittal:** Prior to any disturbance to State regulated wetlands, wetland buffers, waterways, and the 100-year floodplain, detailed plan submittals for the proposed impacts must be submitted and approved by the Divisions. Submittals to the Waterway Construction Division will be in accordance with COMAR 26.17.04 and include a design report. In addition, sediment and erosion control plans, including methods for protection of water quality, maintenance of stream flow, and dewatering, shall be submitted to the Divisions for approval prior to initiation of work in these areas. Any proposed changes to approved sediment and erosion control plans during construction shall be forwarded for approval prior to their implementation.
5. **Submittal Review:** No work within a regulated resource area shall begin without written approval of the above plan submittals by the Divisions. The Divisions will have up to 45 calendar days to review and respond to each submittal or response to comments. The Permittee shall develop a submittal schedule indicating anticipated dates for submission of plans and reports, and shall update the schedule as required. If the Divisions are unable to return comments or approval within 14 days, the Divisions will notify the Permittee and provide an estimate for when the comments or approval is expected.
6. **Stormwater Management:** No stormwater Management structures shall be placed in wetlands or waterways with the exception of WP015 on Sheet 6 of 17 in the approved plan. Proposed stormwater features shall be submitted to the Divisions for review to assure compliance with permit conditions and Water Quality Certification. Stormwater shall be controlled to prevent washing of sediments, trash, and debris into receiving wetlands or waterways.
7. **Changes to approved impacts:** Should final design result in necessary impacts to any wetland or waterway greater than those approved in this permit, an approved Nontidal Wetlands and Waterway Construction Permit Modification shall be required prior to initiation of work in these areas. At the Divisions' discretion, minor increases may be initially approved by letter with subsequent Permit Modification reconciling impact totals. Should unplanned impacts occur (such as resulting from a failure of sediment and erosion control, or equipment exceeding the limits of disturbance), the affected area shall be restored to their pre-existing contours and elevations, and replanted with native vegetative species similar to the composition which existed prior to disturbance. The restored area shall be approved by the Nontidal Wetlands Division and additional mitigation may be required.
8. **Passage of Aquatic Life:** Provisions for passage of aquatic life will be a strong consideration during the review of waterways crossing design. Adequate sizing of structures in order to reduce velocities, promote natural substrate development, and allow adequate depression to accommodate future stream conditions will be considerations. All rip-rap within streams shall have a depressed "low flow" channel or other feature to allow passage. Where appropriate and

practicable, structures greater than 150 linear feet will incorporate provisions to promote passage, including resting areas, baffles, and / or other techniques appropriate to promote passage of those species known to occur in the waterway.

GENERAL CONDITIONS

1. **Validity:** Permit is valid only for use by Permittee. Permit 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 Permit.
2. **Initiation of Work, Modifications and Extension of Term:** Permittee shall initiate authorized activities with two (2) years of the Effective Date of this Permit or the Permit shall expire. Permittee may submit written requests to the Administration for (a) extension of the period for initiation of work, (b) modification of Permit, 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:** Permittee is fully responsible for all work performed and activities authorized by this Permit shall be performed in compliance with this Permit and Approved Plan. Permittee agrees that a copy of the Permit and Approved Plan shall be kept at the construction site and provided to its employees, agents and contractors. A person (including Permittee, its employees, agents or contractors) who violates or fails to comply with the terms and conditions of this Permit, 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 Permittee, its employees, agents or contractors fail to comply with this Permit or Approved Plan, the Administration may, in its discretion, issue an administrative order requiring Permittee, its employees, agents and contractors to cease and desist any activities which violate this Permit, or the Administration may take any other enforcement action available to it by law, including filing civil or criminal charges.
5. **Suspension or Revocation:** Permit may be suspended or revoked by the Administration, after notice of opportunity for a hearing, if Permittee: (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 Permit; (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 Permit and new information, changes in site conditions, or amended regulatory requirements necessitate revocation or suspension.
6. **Other Approvals:** Permit 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:** Permittee 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. Permittee shall provide necessary assistance to effectively and safely conduct such inspections and evaluations.
8. **Inspection Notification:** Permittee shall notify the Administration's Compliance Program at least five (5) days before starting authorized activities and five (5) days after completion. For Caroline, Cecil, Dorchester, Harford, Kent, Queen Anne's, Somerset, Talbot, Wicomico and Worcester Counties, Permittee shall call 410-901-4020. If Permit 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:** Permittee shall obtain approval from the 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 in accordance with the attached Water Quality Certification.

- X Coastal Zone Consistency:** This Permit 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:** Permittee, 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, Permittee, 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:** 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): **Unnamed Tributaries to Fivemile Branch are Use I waterways;** in-stream work may not be conducted from **March 1st** through **June 15th**, inclusive, of any year.
 17. **Instream Blasting:** Permittee shall obtain prior written approval from the Administration before blasting or using explosives in the stream channel.
 18. **Minimum Disturbance:** Any disturbance of stream banks, channel bottom, wetlands, and wetlands buffer authorized by Permit 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.
 19. **Restoration of Construction Site:** Permittee 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 Permittee as directed by the Administration.
 20. **Mitigation:** The Permittee has completed mitigation for the loss 5,160 square feet of palustrine forested wetlands, 2,666 square feet of palustrine scrub-shrub wetlands, and 20,070 square feet of palustrine emergent wetlands by creating the equivalent of at least 10,320 square feet of palustrine forested wetlands, 5,332 square feet of palustrine scrub-shrub wetlands, and 20,070 square feet of palustrine emergent wetlands in accordance with the Phase II Mitigation Plan approved by the Administration. The Permittee has already completed mitigation for nontidal wetland impacts associated with all phases of the US 113 Project through the creation and enhancement of nontidal wetlands in the Pocomoke River, Newport Bay, and Isle of Wright Bay watersheds. In the event of discrepancy with the mitigation requirements found in this Condition, the standards and requirements set forth in Approval Letter shall govern. If the Permittee as stated in the Permit, changes, the Permittee must notify the Section. If the mitigation obligation is to be transferred to another party, the Permittee must notify the Section.

U.S. ARMY CORPS OF ENGINEERS AUTHORIZATION

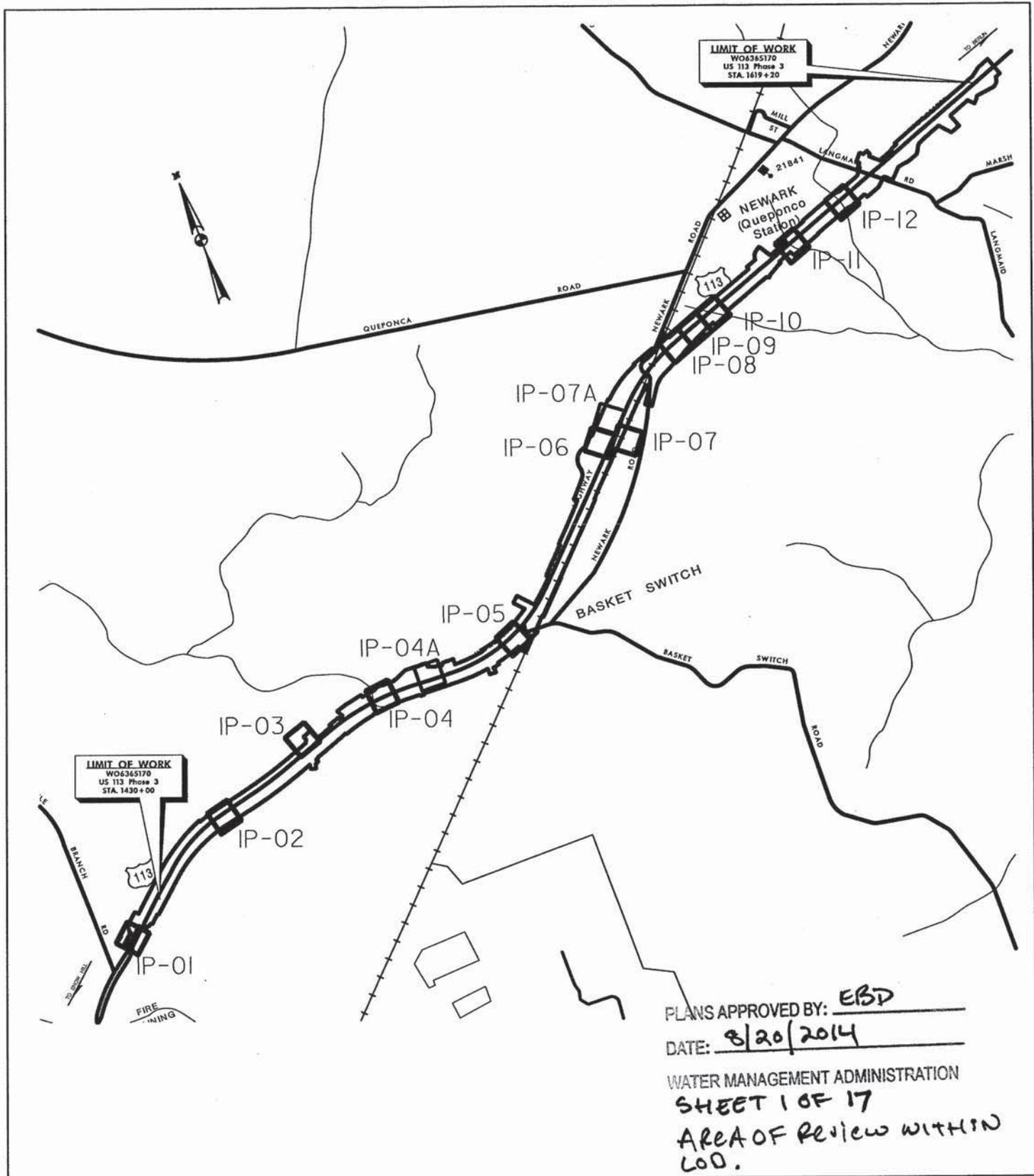
The U.S. Army Corps of Engineers has reviewed this activity and issued individual permit 97-63647-9 on September 30, 1998. Information regarding the terms and conditions of the permit were sent directly to the applicant by the Corps.

**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:

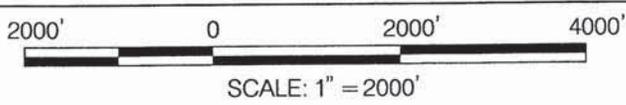
Use I waters: In-stream work shall not be conducted during the period March 1 through June 15, inclusive, during any year.

- 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.



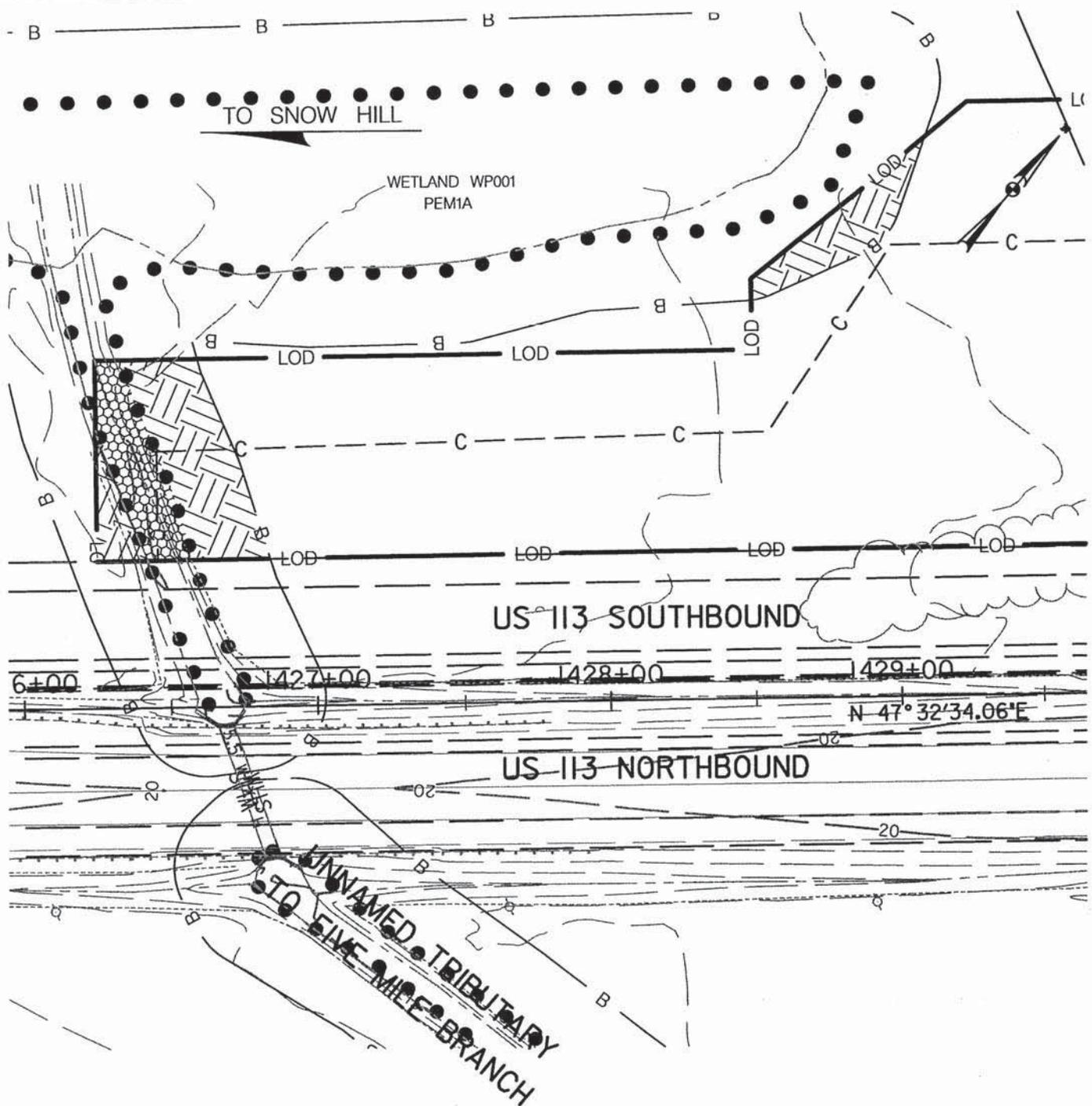
PLANS APPROVED BY: EBD
 DATE: 8/20/2014

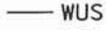
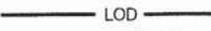
WATER MANAGEMENT ADMINISTRATION
SHEET 1 OF 17
 AREA OF REVIEW WITHIN
 LOD.



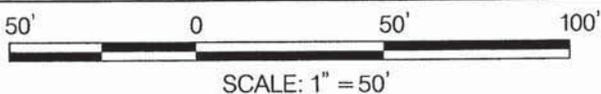
SHA
 MARYLAND STATE HIGHWAY ADMINISTRATION
 707 NORTH CALVERT ST.
 BALTIMORE, MARYLAND 21202

WETLAND IMPACT PLATE INDEX
 PROJECT: US 113 - PHASE 3
 COUNTY: WORCESTER
 STATE: MARYLAND
 APPLICATION BY: MDSA
 WETLAND PLATE NO. IP-INDEX
 SHEET 1 OF 15 DATE: JUNE 2014
 SHA PROJECT NO.: WO6365170



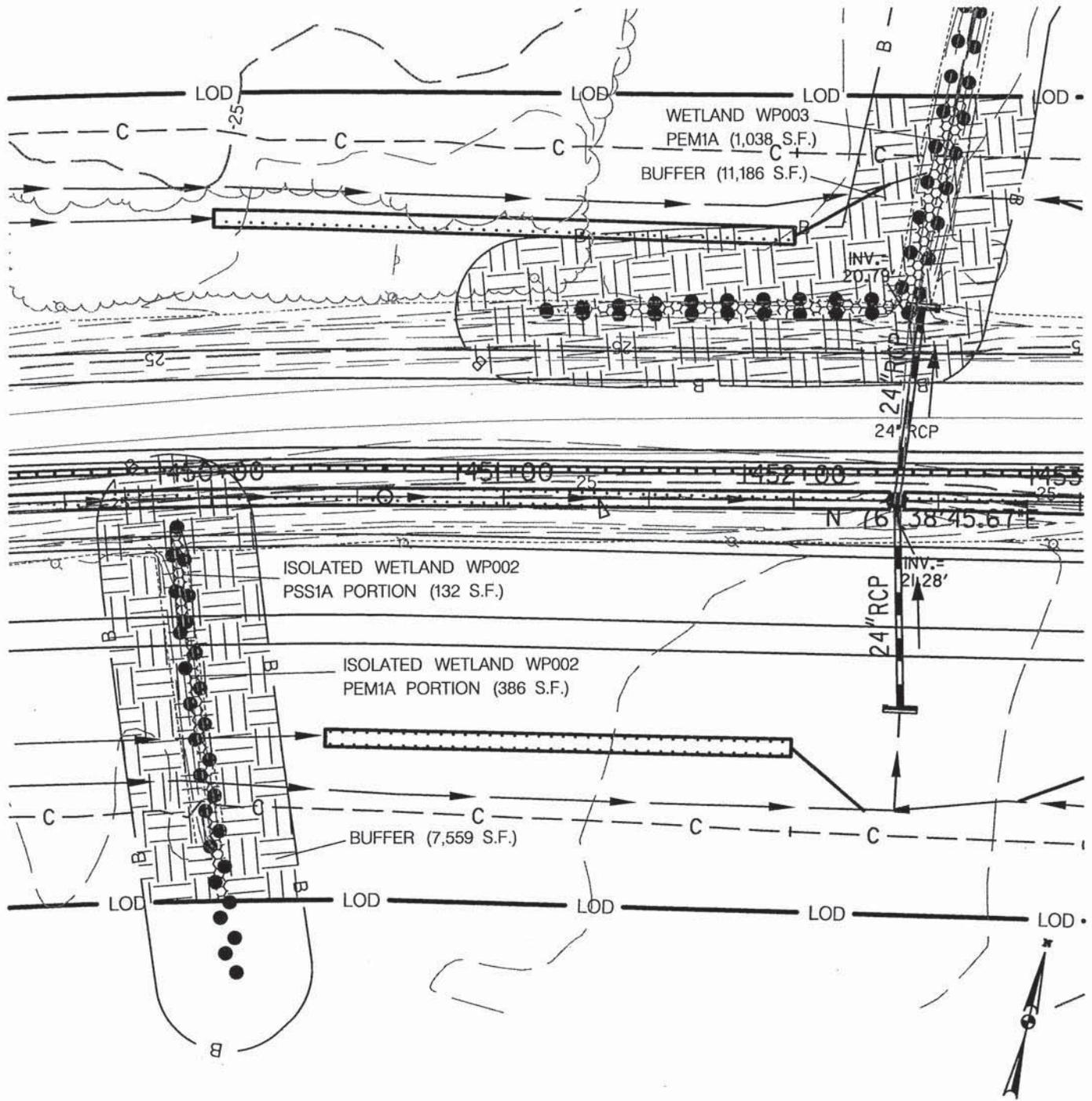
-  PERMANENT WETLAND IMPACTS
1,063 SQ. FT./0.024 AC (MDE/USACE)
-  PERMANENT 25-FT BUFFER IMPACTS
3,196 SQ. FT./0.073 AC. (MDE)
-  NON-TIDAL WETLAND
-  WUS ——— WATERS OF THE U.S.
-  B ——— 25-FOOT WETLAND BUFFER
-  LOD ——— LIMIT OF DISTURBANCE

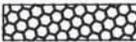
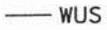
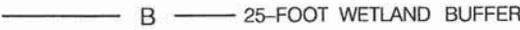
SHEET 2 OF 17

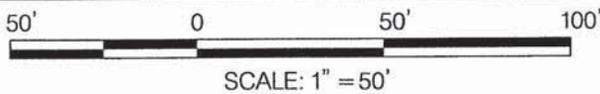


MARYLAND STATE HIGHWAY ADMINISTRATION
707 NORTH CALVERT ST.
BALTIMORE, MARYLAND 21202

WETLAND IMPACT PLATE
PROJECT: US 113 - PHASE 3
COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSA
WETLAND PLATE NO. IP-01
SHEET 2 OF 15 DATE: JUNE 2014
SHA PROJECT NO.: WO6365170

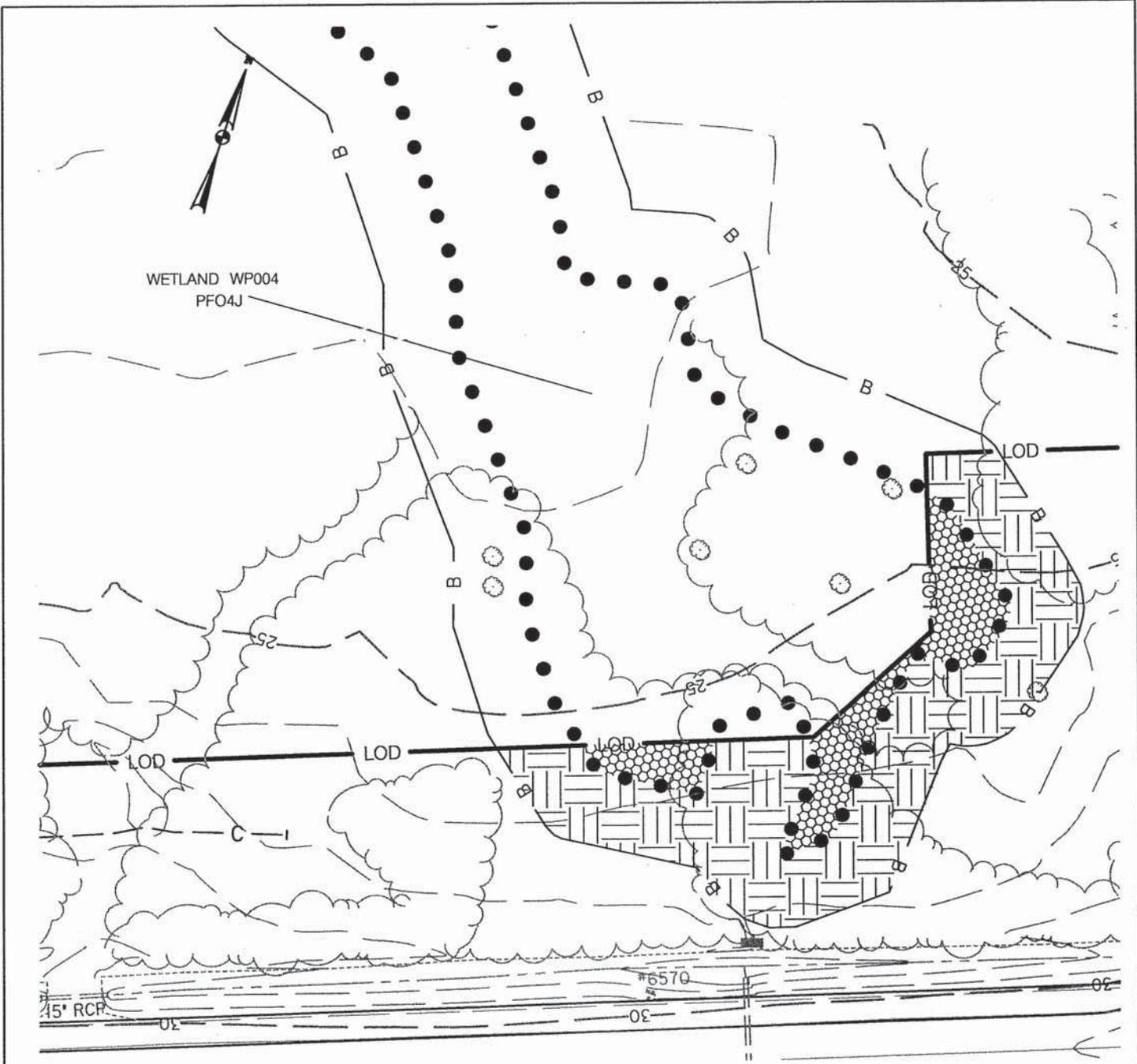


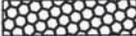
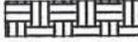
- 
PERMANENT WETLAND IMPACTS
1,038 SQ. FT./0.024 AC. (MDE/USACE)
ISOLATED 518 S.F./0.12 AC. (MDE)
- 
PERMANENT 25-FT BUFFER IMPACTS
18,745 SQ. FT./0.430 AC.
- 
NON-TIDAL WETLAND
- 
WUS ——— WATERS OF THE U.S.
- 
B ——— 25-FOOT WETLAND BUFFER
- 
LOD ——— LIMIT OF DISTURBANCE



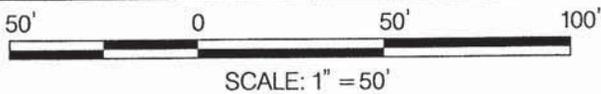
SHA
 MARYLAND STATE HIGHWAY ADMINISTRATION
 707 NORTH CALVERT ST.
 BALTIMORE, MARYLAND 21202

WETLAND IMPACT PLATE
 PROJECT: US 113 - PHASE 3
 COUNTY: WORCESTER
 STATE: MARYLAND
 APPLICATION BY: MDSHA
 WETLAND PLATE NO. IP-02
 SHEET 3 OF 15 DATE: JUNE 2014
 SHA PROJECT NO.: WO6365170



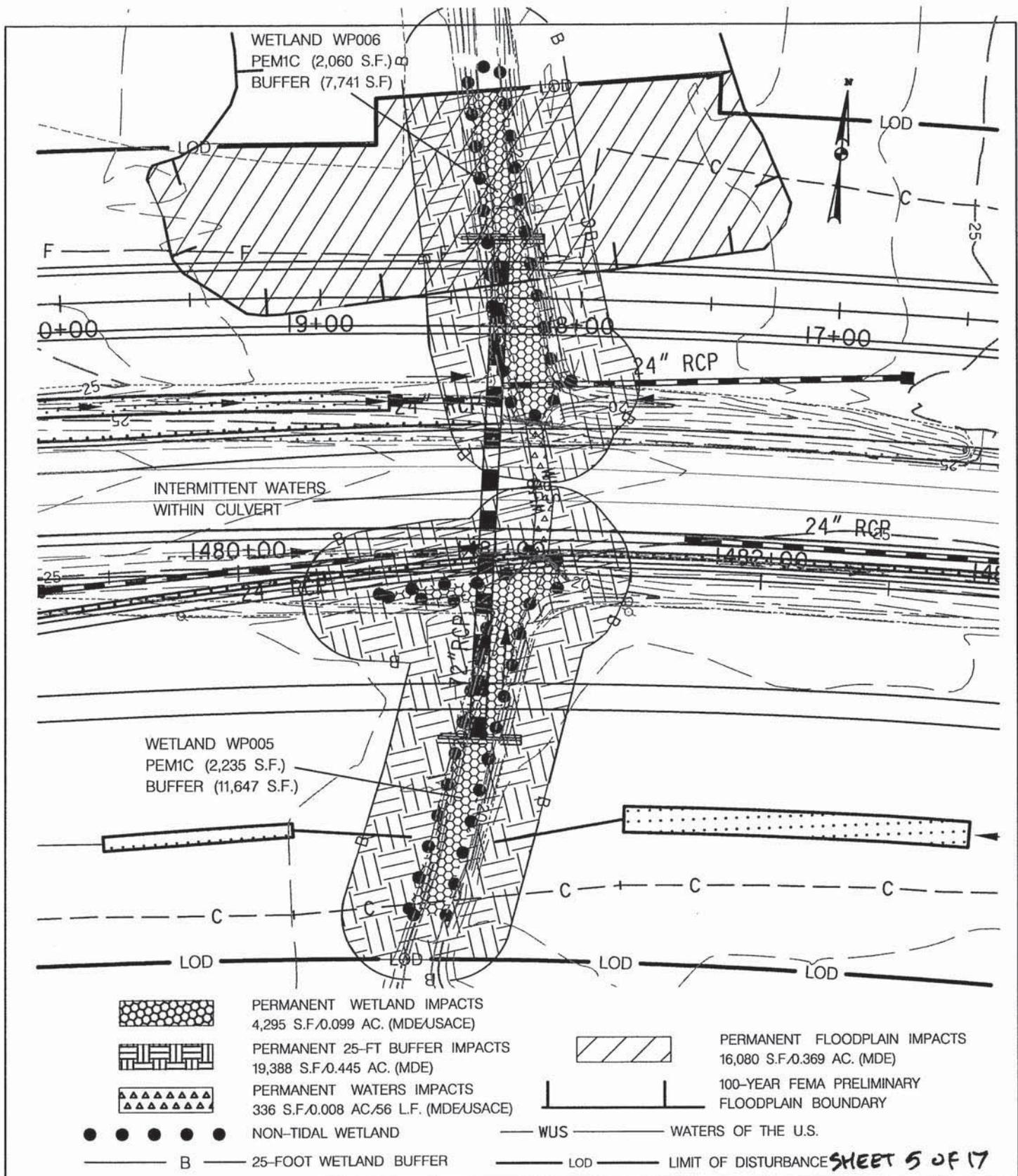
-  PERMANENT WETLAND IMPACTS
2,644 SQ. FT./0.061 AC.
-  PERMANENT 25-FT BUFFER IMPACTS
8,898 SQ. FT./0.204 AC.
-  NON-TIDAL WETLAND
-  WUS ——— WATERS OF THE U.S.
-  B ——— 25-FOOT WETLAND BUFFER
-  LOD ——— LIMIT OF DISTURBANCE

SHEET 4 OF 17



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

WETLAND IMPACT PLATE
PROJECT: US 113 - PHASE 3
COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSA
WETLAND PLATE NO. IP-03
SHEET 4 OF 15 DATE: JUNE 2014
SHA PROJECT NO.: WO6365170



PERMANENT WETLAND IMPACTS
4,295 S.F./0.099 AC. (MDE/USACE)



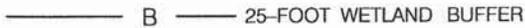
PERMANENT 25-FT BUFFER IMPACTS
19,388 S.F./0.445 AC. (MDE)



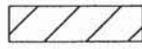
PERMANENT WATERS IMPACTS
336 S.F./0.008 AC./56 L.F. (MDE/USACE)



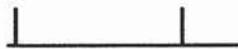
NON-TIDAL WETLAND



B 25-FOOT WETLAND BUFFER



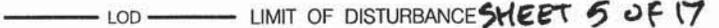
PERMANENT FLOODPLAIN IMPACTS
16,080 S.F./0.369 AC. (MDE)



100-YEAR FEMA PRELIMINARY
FLOODPLAIN BOUNDARY



WUS WATERS OF THE U.S.



LOD LIMIT OF DISTURBANCE

SHEET 5 OF 17



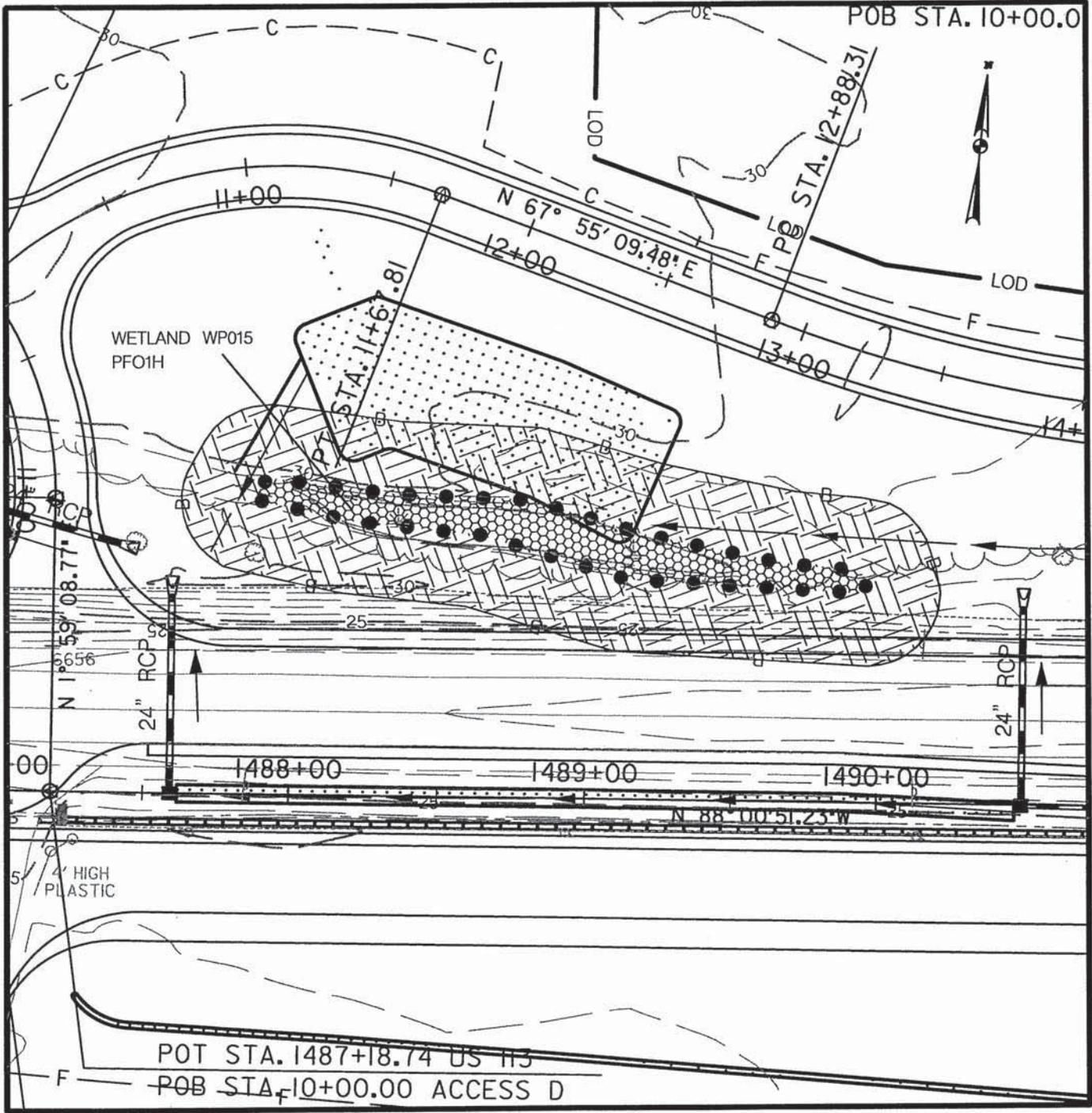
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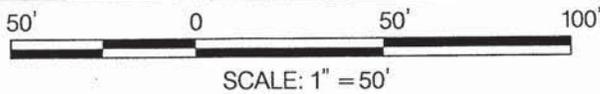
MARYLAND STATE HIGHWAY ADMINISTRATION
707 NORTH CALVERT ST.
BALTIMORE, MARYLAND 21202

WETLAND IMPACT PLATE

PROJECT: US 113 - PHASE 3
COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSA
WETLAND PLATE NO. IP-04
SHEET 5 OF 15 DATE: JUNE 2014
SHA PROJECT NO.: WO6365170

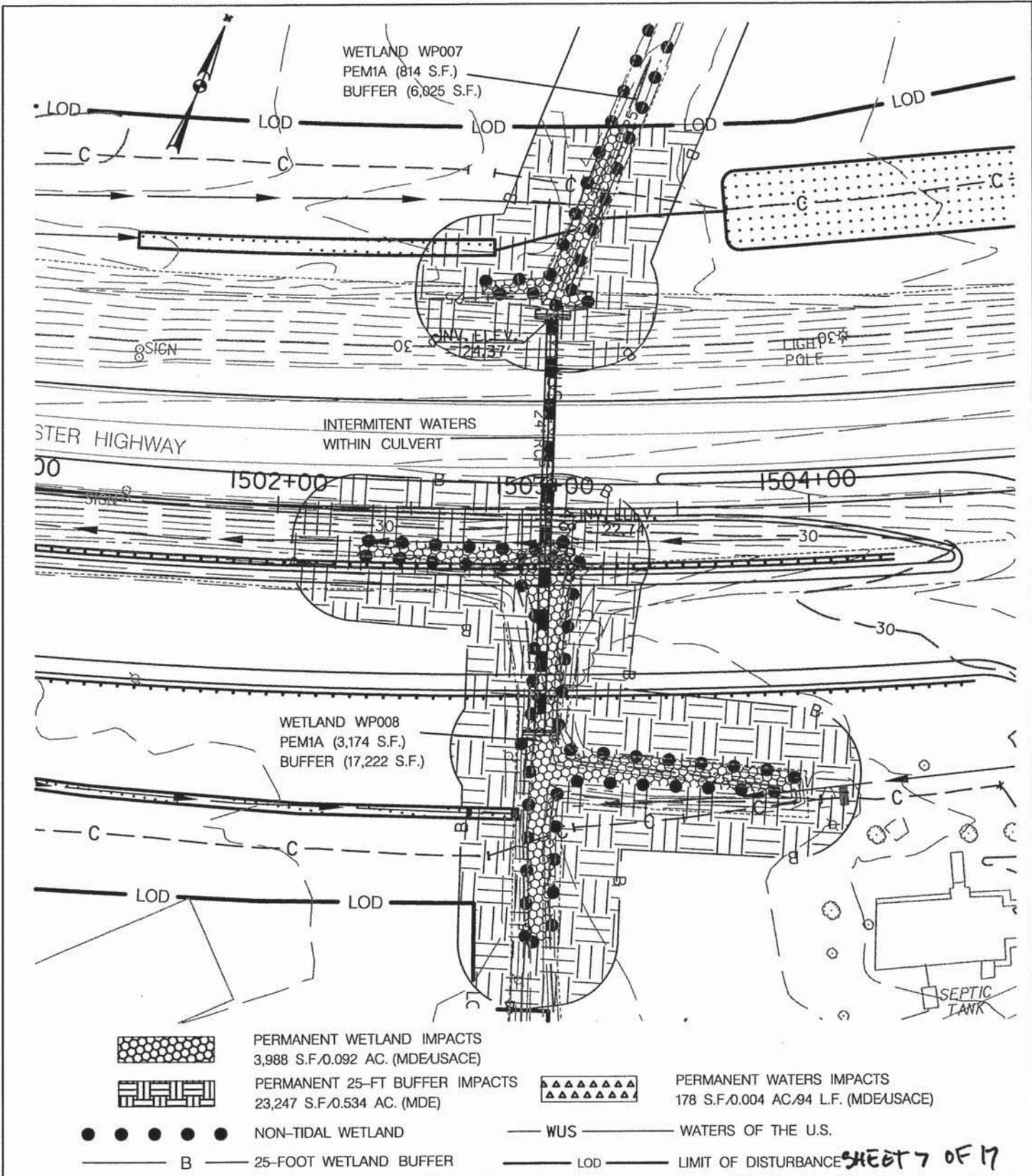


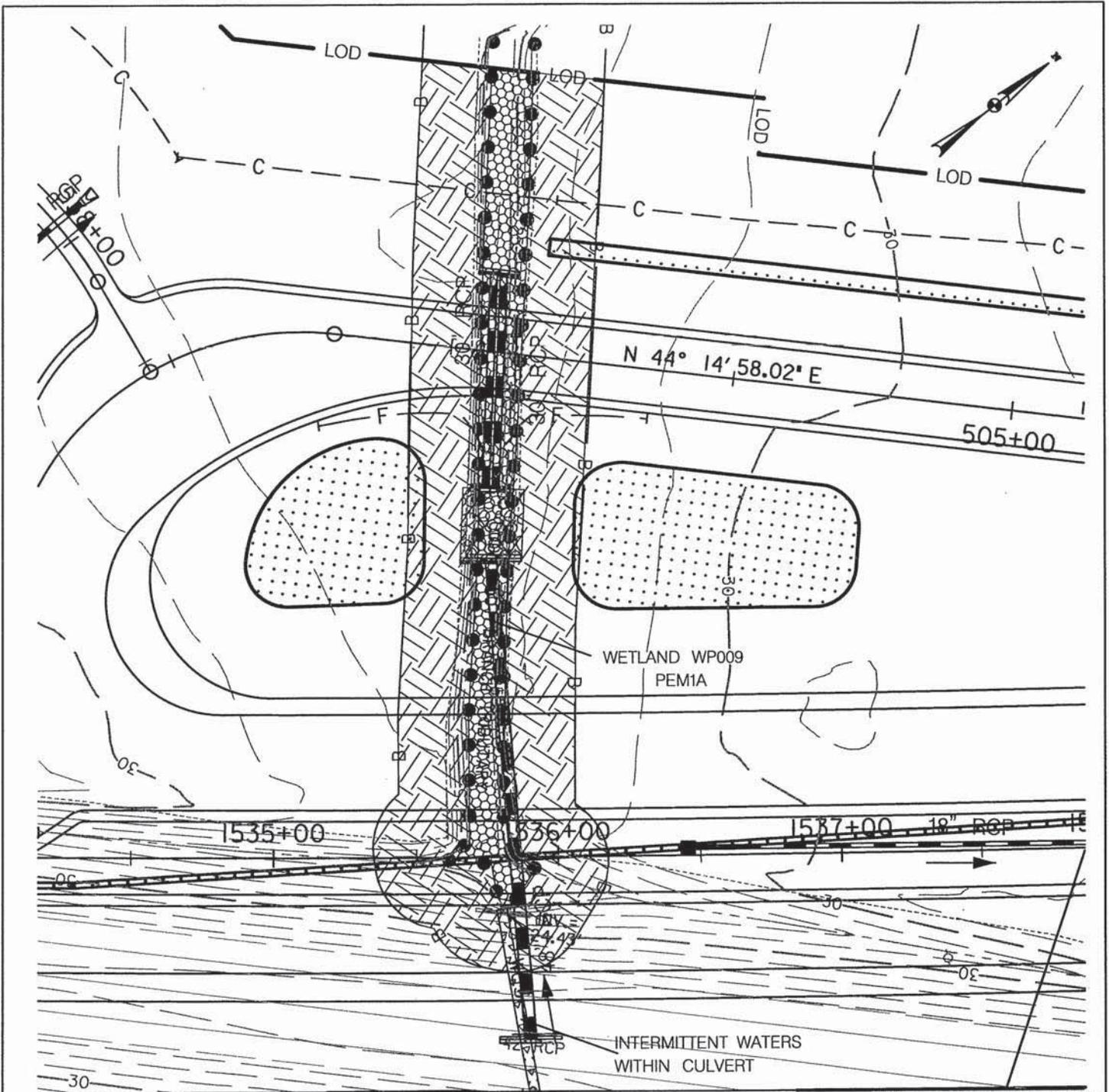
- PERMANENT WETLAND IMPACTS
2,516 S.F./0.058 AC. (MDE)
- PERMANENT 25-FT BUFFER IMPACTS
12,822 S.F./0.294 L.F. (MDE)
- NON-TIDAL WETLAND
- WUS ——— WATERS OF THE U.S.
- B ——— 25-FOOT WETLAND BUFFER
- LOD ——— LIMIT OF DISTURBANCE



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

WETLAND IMPACT PLATE
 PROJECT: US 113 – PHASE 3
 COUNTY: WORCESTER
 STATE: MARYLAND
 APPLICATION BY: MDSA
 WETLAND PLATE NO. IP-04A
 SHEET 6 OF 15 DATE: JUNE 2014
 SHA PROJECT NO.: WO6365170





MATCH LINE - SEE PLATE IP-07

- | | | | |
|---|--|---|---|
|  | PERMANENT WETLAND IMPACTS
3,863 S.F./0.089 AC. (MDEUSACE) |  | PERMANENT 25-FT BUFFER IMPACTS
16,171 S.F./0.371 AC. (MDE) |
| ● ● ● ● ● | NON-TIDAL WETLAND | — WUS — | WATERS OF THE U.S. |
| — B — | 25-FOOT WETLAND BUFFER | — LOD — | LIMIT OF DISTURBANCE |

PERMANENT WATER IMPACTS
232 S.F./0.005 AC./65 L.F.
(MDEUSACE)

SHEET 8 OF 17



SCALE: 1" = 50'



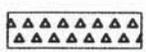
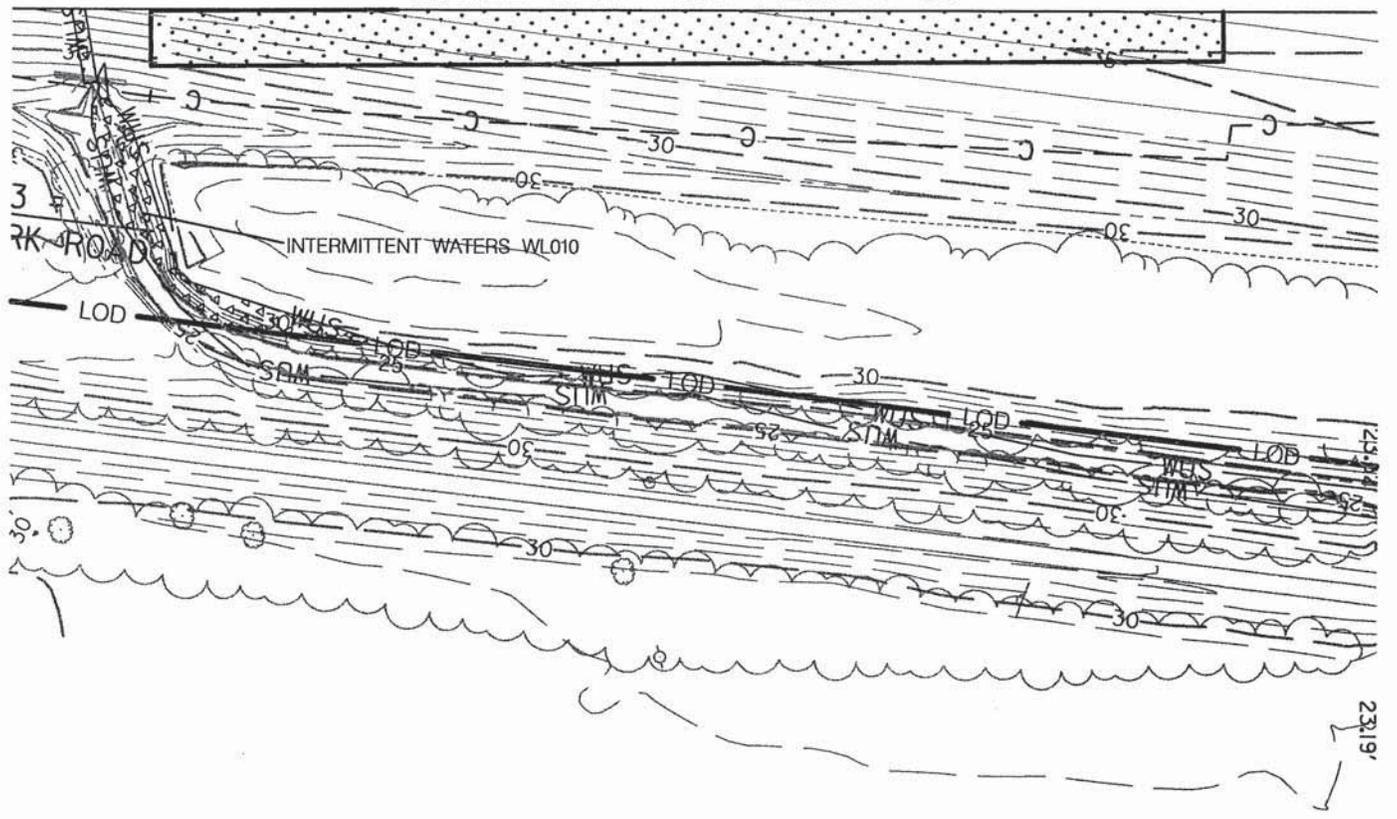
MARYLAND STATE HIGHWAY ADMINISTRATION
707 NORTH CALVERT ST.
BALTIMORE, MARYLAND 21202

WETLAND IMPACT PLATE

PROJECT: US 113 - PHASE 3
COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSA
WETLAND PLATE NO. IP-06
SHEET 8 OF 15 DATE: JUNE 2014
SHA PROJECT NO.: WO6365170



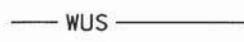
MATCH LINE - SEE PLATE IP-06



PERMANENT WATERS IMPACTS
857 S.F./0.020 AC/132 L.F. (MDEUSACE)



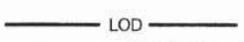
NON-TIDAL WETLAND



WUS ——— WATERS OF THE U.S.

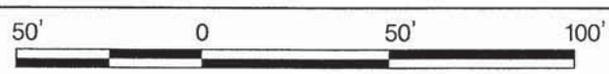


B ——— 25-FOOT WETLAND BUFFER



LOD ——— LIMIT OF DISTURBANCE

SHEET 9 OF 17



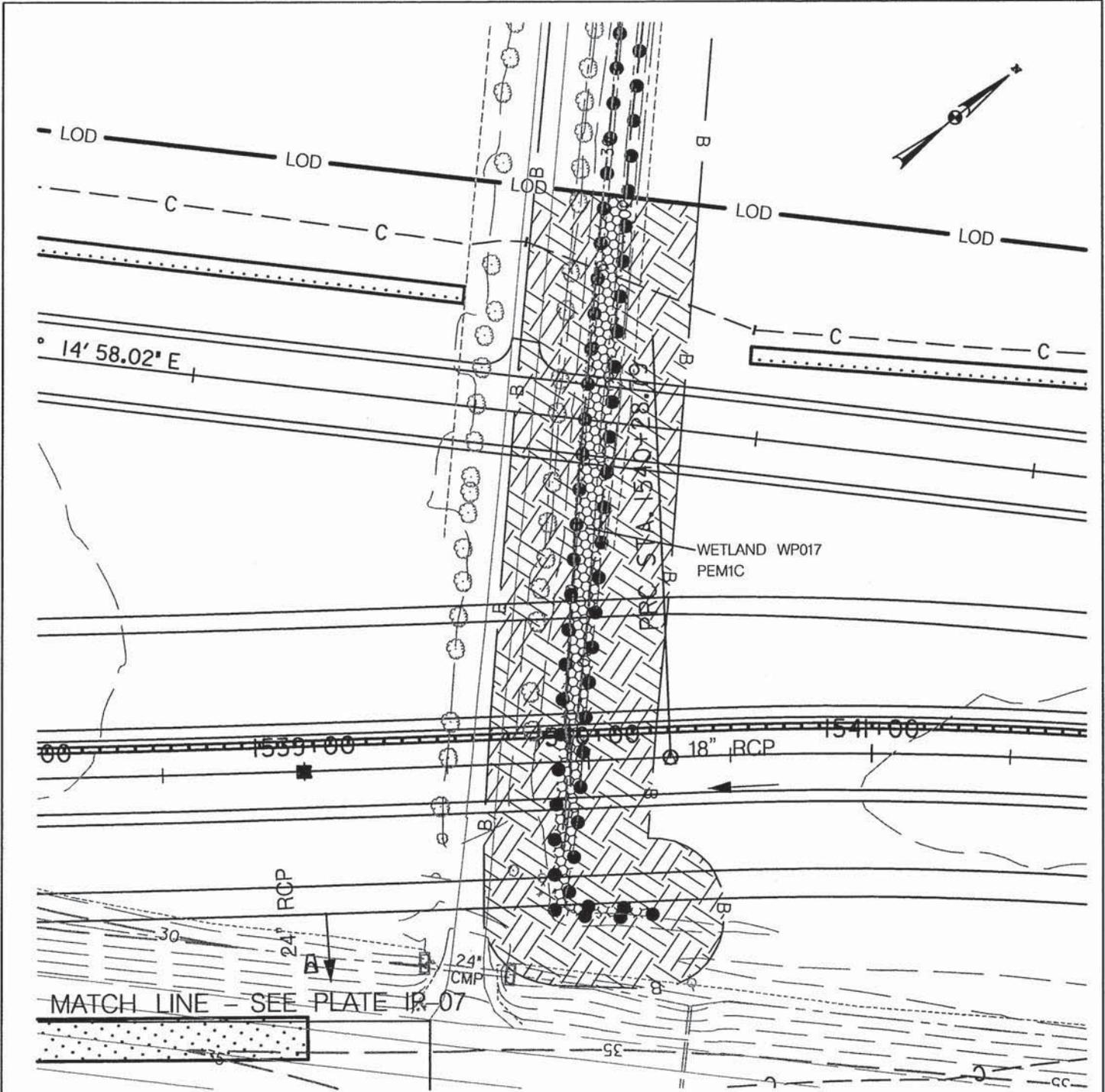
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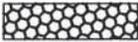
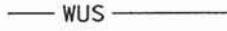


MARYLAND STATE HIGHWAY ADMINISTRATION
707 NORTH CALVERT ST.
BALTIMORE, MARYLAND 21202

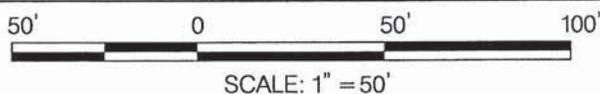
WETLAND IMPACT PLATE

PROJECT: US 113 - PHASE 3
COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSA
WETLAND PLATE NO. IP-07
SHEET 9 OF 15 DATE: JUNE 2014
SHA PROJECT NO.: WO6365170



-  PERMANENT WETLAND IMPACTS
2,172 S.F./0.050 AC. (MDE)
-  PERMANENT 25-FT BUFFER IMPACTS
15,314 S.F./0.352 AC. (MDE)
-  NON-TIDAL WETLAND
-  WUS ——— WATERS OF THE U.S.
-  B ——— 25-FOOT WETLAND BUFFER
-  LOD ——— LIMIT OF DISTURBANCE

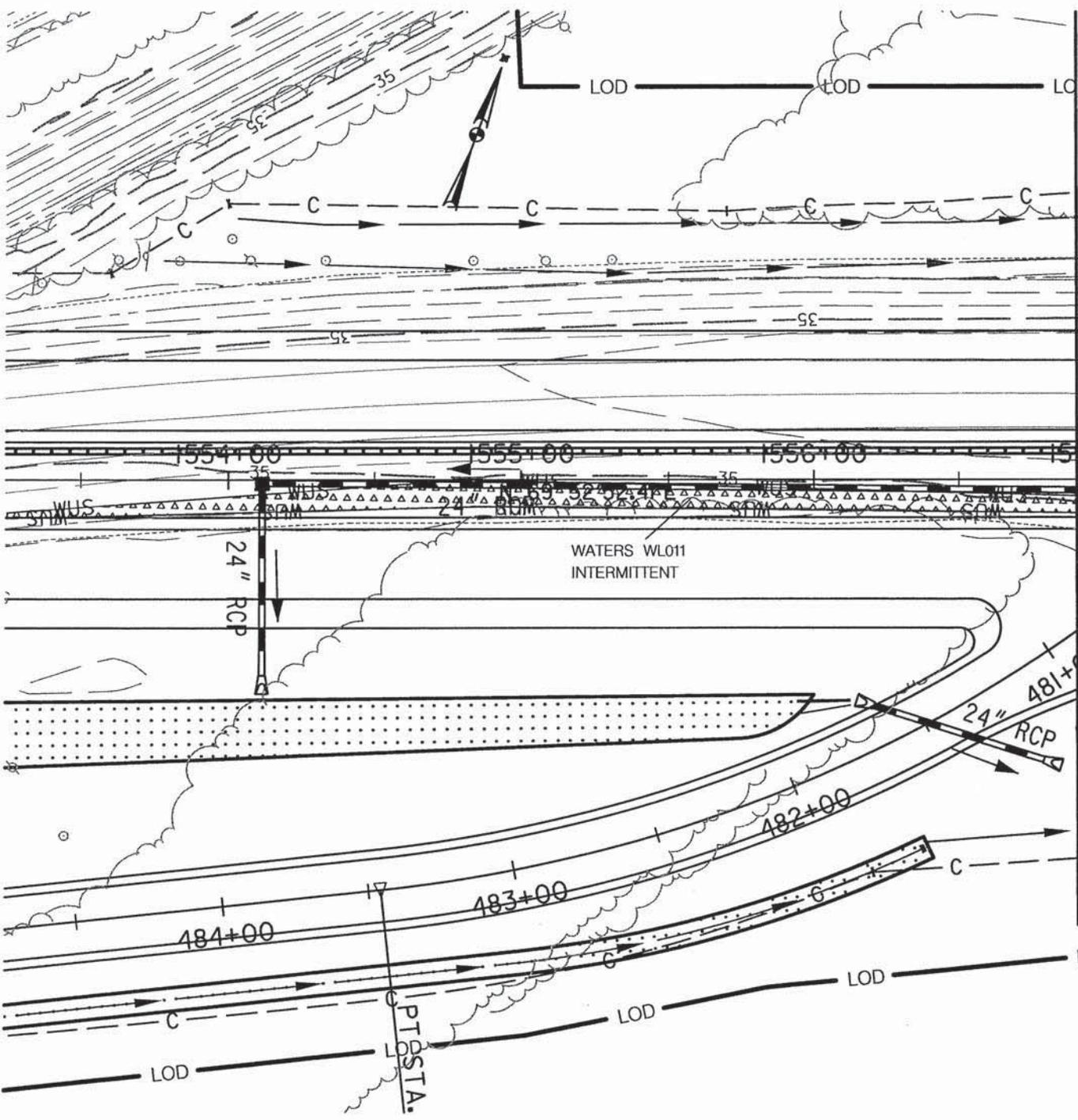
SHEET 10 OF 17



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

WETLAND IMPACT PLATE

PROJECT: US 113 - PHASE 3
COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSA
WETLAND PLATE NO. IP-07A
SHEET 10 OF 15 DATE: JUNE 2014
SHA PROJECT NO.: WO6365170



MATCH LINE - SEE PLATE IP-09



PERMANENT WATERS IMPACTS
2,493 SQ. FT./0.057 AC./370 L.F. (MDEUSACE)

- ● ● ● ● NON-TIDAL WETLAND
- B — 25-FOOT WETLAND BUFFER

- WUS — WATERS OF THE U.S.
- LOD — LIMIT OF DISTURBANCE

SHEET 11 OF 17



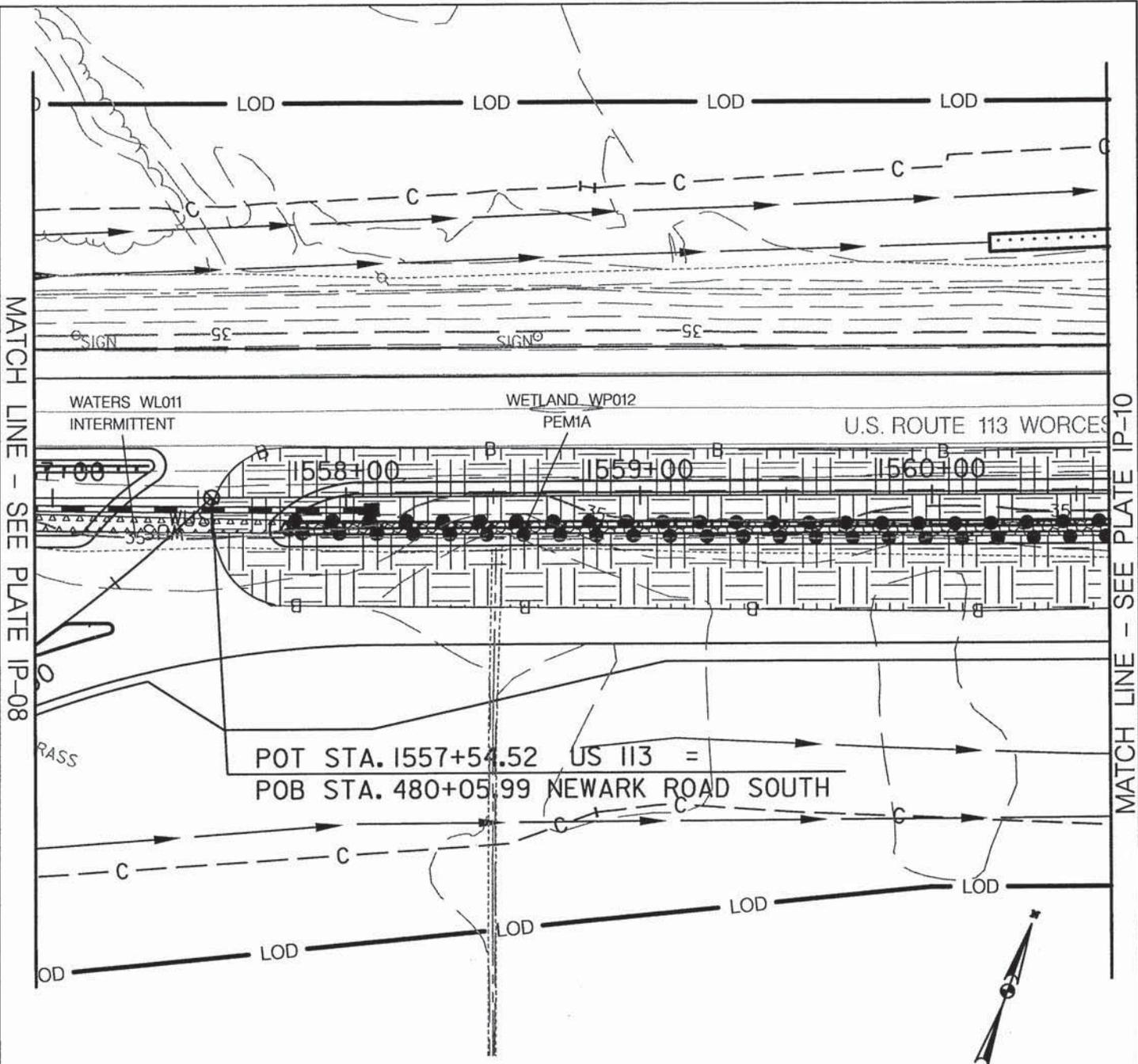
SCALE: 1" = 50'



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

WETLAND IMPACT PLATE

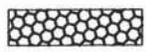
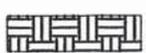
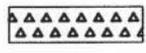
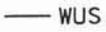
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COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSHA
WETLAND PLATE NO. IP-08
SHEET 11 OF 15 DATE: JUNE 2014
SHA PROJECT NO.: WO6365170



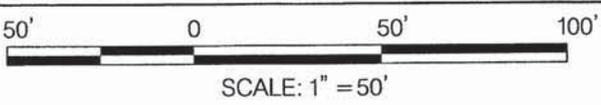
MATCH LINE - SEE PLATE IP-08

MATCH LINE - SEE PLATE IP-10

LEGEND

-  PERMANENT WETLAND IMPACTS
1,209 SQ. FT./0.028 AC. (MDEUSACE)
-  PERMANENT 25-FT BUFFER IMPACTS
15,228 SQ. FT./0.350 AC. (MDE)
-  PERMANENT WATERS IMPACTS
473 SQ. FT./0.011 AC./92 L.F. (MDEUSACE)
-  NON-TIDAL WETLAND
-  WUS — WATERS OF THE U.S.
-  B — 25-FOOT WETLAND BUFFER
-  LOD — LIMIT OF DISTURBANCE

SHEET 12 OF 17

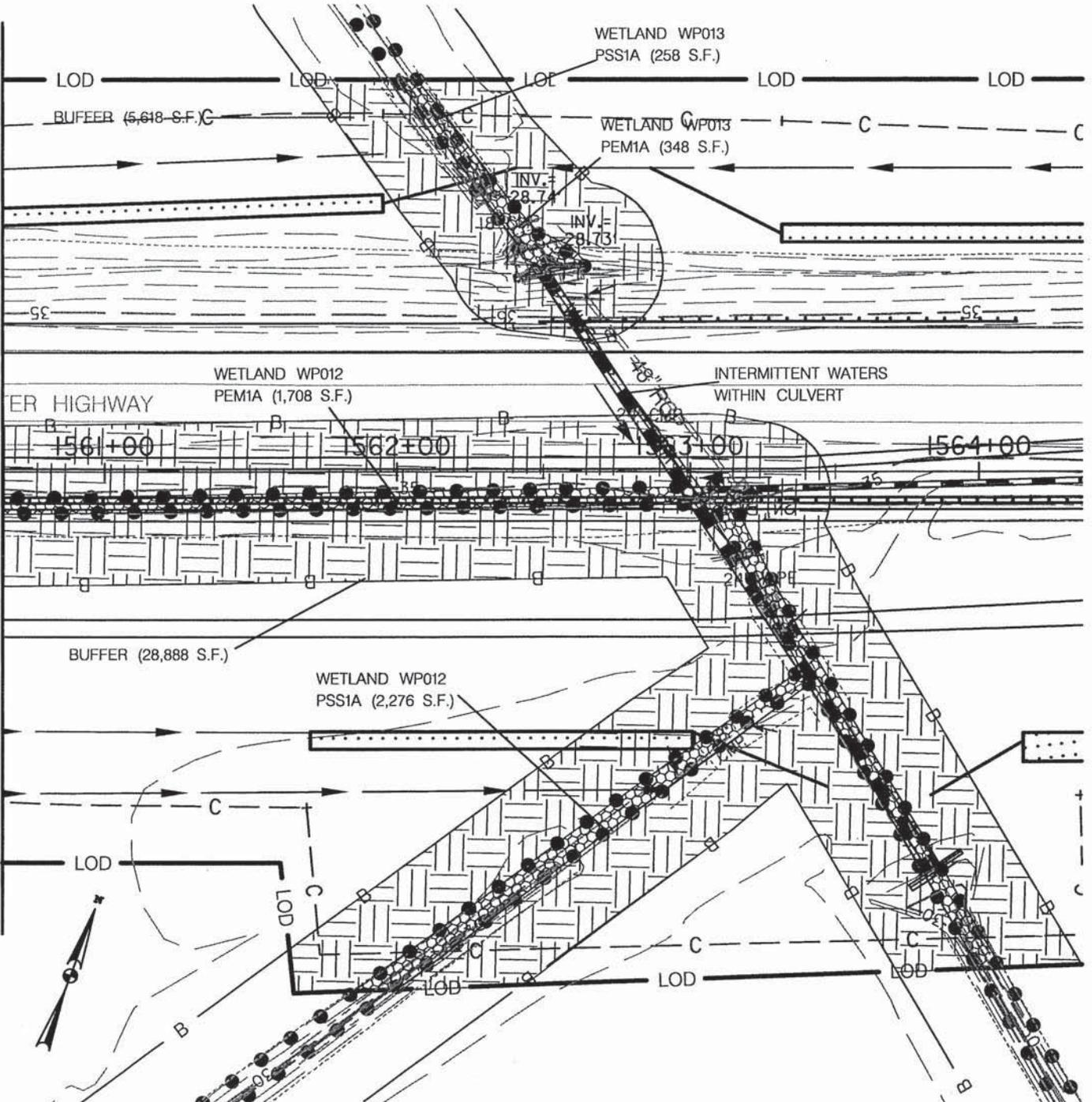


MARYLAND STATE HIGHWAY ADMINISTRATION
707 NORTH CALVERT ST.
BALTIMORE, MARYLAND 21202

WETLAND IMPACT PLATE

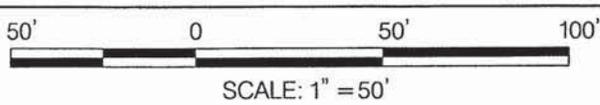
PROJECT: US 113 - PHASE 3
COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSA
WETLAND PLATE NO. IP-09
SHEET 12 OF 15 DATE: JUNE 2014
SHA PROJECT NO.: WO6365170

MATCH LINE - SEE PLATE IP-09



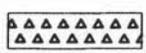
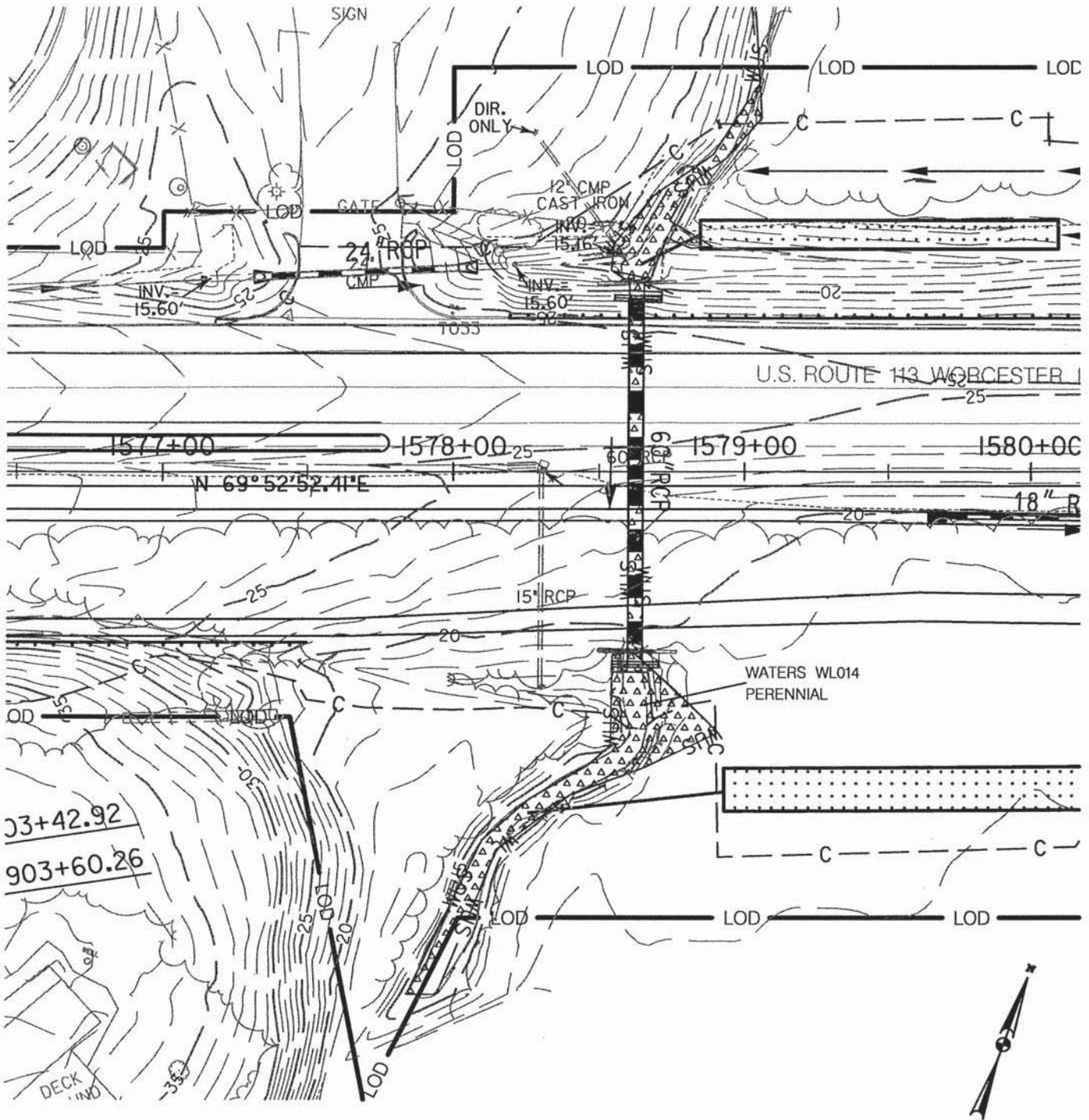
- NON-TIDAL WETLAND
- PERMANENT WETLAND IMPACTS
4,590 S.F./0.105 AC. (MDEUSACE)
- PERMANENT WATERS IMPACTS
200 S.F./0.005 AC./100 L.F. (MDEUSACE)
- PERMANENT 25-FT BUFFER IMPACTS
34,506 S.F./0.792 AC. (MDE)
- B — 25-FOOT WETLAND BUFFER
- WUS — WATERS OF THE U.S.
- LOD — LIMIT OF DISTURBANCE

SHEET 13 OF 17



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

WETLAND IMPACT PLATE
PROJECT: US 113 - PHASE 3
COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSA
WETLAND PLATE NO. IP-10
SHEET 13 OF 15 DATE: JUNE 2014
SHA PROJECT NO.: WO6365170



PERMANENT WATERS IMPACTS
2,992 S.F./0.069 AC/365 L.F. (MDE/USACE)



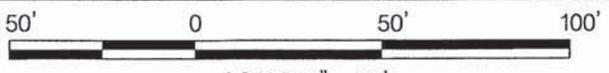
NON-TIDAL WETLAND

WUS ————— WATERS OF THE U.S.

B ————— 25-FOOT WETLAND BUFFER

LOD ————— LIMIT OF DISTURBANCE

SHEET 14 OF 17



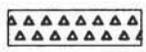
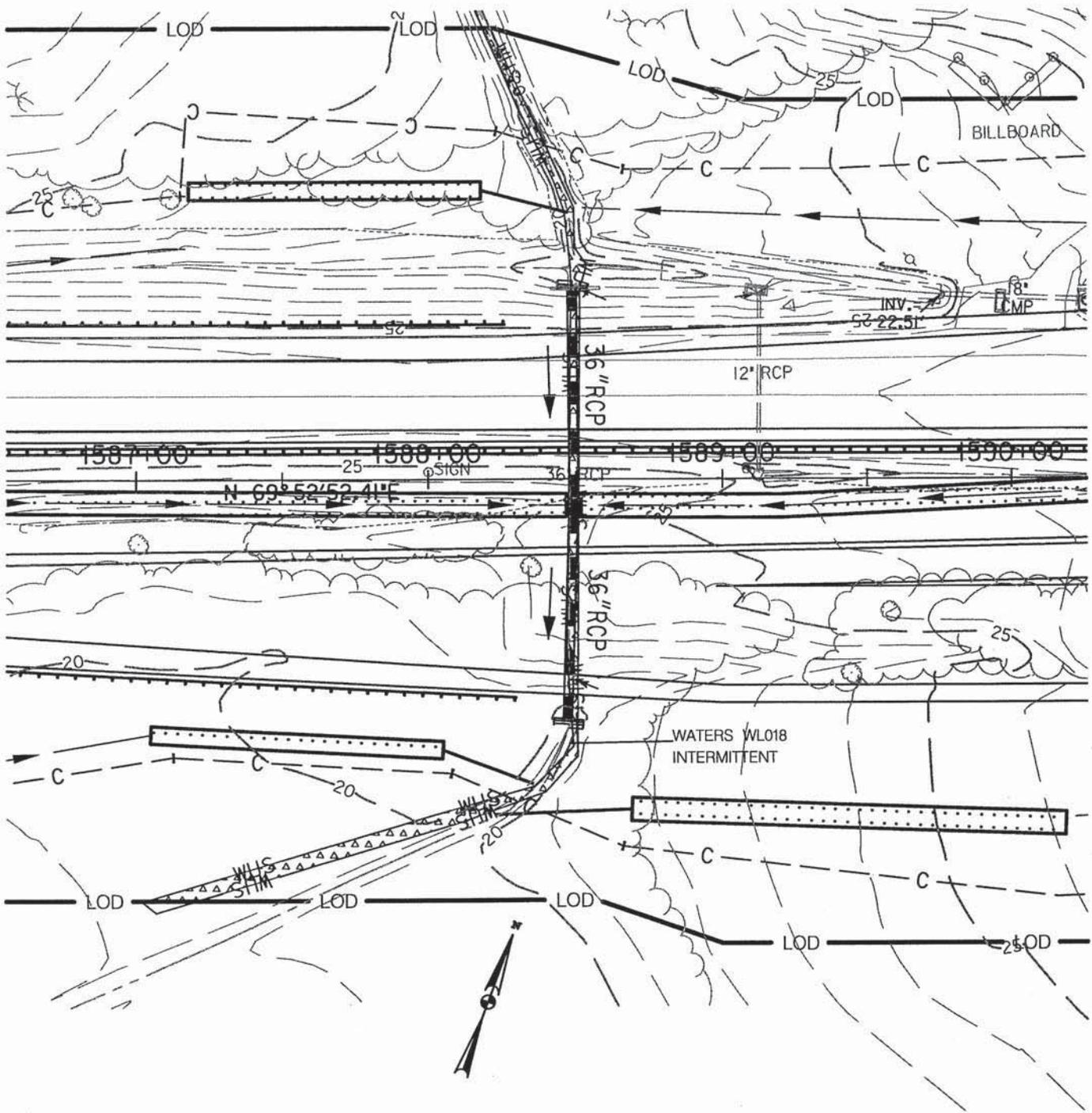
SCALE: 1" = 50'



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

WETLAND IMPACT PLATE

PROJECT: US 113 - PHASE 3
COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSA
WETLAND PLATE NO. IP-11
SHEET 14 OF 15 DATE: JUNE 2014
SHA PROJECT NO.: WO6365170



PERMANENT WATERS IMPACTS
1,473 S.F./0.034 AC/404 L.F. (MDEUSACE)



NON-TIDAL WETLAND

WUS ——— WATERS OF THE U.S.

B ——— 25-FOOT WETLAND BUFFER

LOD ——— LIMIT OF DISTURBANCE **SHEET 15 OF 17**



SCALE: 1" = 50'



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

WETLAND IMPACT PLATE

PROJECT: US 113 - PHASE 3
COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSHA
WETLAND PLATE NO. IP-12
SHEET 15 OF 15 DATE: JUNE 2014
SHA PROJECT NO.: WO6365170

SHA: US 113 Improvements Phase III, North of Five Mile Branch to South of Massey Branch
 Summary of Impact Plates; May 29, 2014

Plate No.	Community (Sq. Ft.)			Total Permanent Wetland Impacts		Permanent 25' Wetland Buffer		Permanent Waters Impacts		Permanent Floodplain Impacts (MDE)	
	PFO	PSS	PEM	Sq. Ft.	Acres	Sq. Ft.	Acres	Sq. Ft.	L.F.	Sq. Ft.	Acres
IP-01			1,063	1,063	0.024	3,196	0.073				
IP-02		132	1,424	1,556	0.036	18,745	0.430				
IP-03	2,644			2,644	0.061	8,898	0.204				
IP-04			4,295	4,295	0.098	19,388	0.445	336	56	16,080	0.369
IP-04A		2,516		2,516	0.058	12,822	0.294				
IP-05			3,988	3,988	0.092	23,247	0.534	178	94		
IP-06			3,863	3,863	0.089	16,171	0.371	232	65		
IP-07								857	132		
IP-07A			2,172	2,172	0.05	15,314	0.352				
IP-08								2,493	370		
IP-09			1,209	1,209	0.028	15,228	0.350	473	92		
IP-10		2,534	2,056	4,590	0.105	34,506	0.792	200	100		
IP-11								2,992	365		
IP-12								1,473	404		
Total	5,160	2,666	20,070	27,896	0.641	167,515	3.845	9,234	1,678	16,080	0.369

SHEET 16 OF 17

SHA: US 113 Improvements Phase III, North of Five Mile Branch to South of Massey Branch Summary of Wetlands, Waters and Floodplain Impacts- Permanent; May 29, 2014													
Wetlands	Waters	Plate No.	Community (Sq. Ft.)			Total Wetland Impacts		25' Wetland Buffer Impacts (MDE)		Waters Impacts		Floodplain Impacts (MDE)	
			PFO	PSS	PEM	Sq. Ft.	Acres	Sq. Ft.	Acres	Sq. Ft.	L.F.	Sq. Ft.	Acres
WP001		IP-01			1,063		1,063	0.024	3,196	0.073			
WP002*		IP-02		132	386		518	0.012	7,559	0.173			
WP003		IP-03			1,038		1,038	0.024	11,186	0.257			
WP004		IP-04	2,644				2,644	0.061	8,898	0.204			
WP005		IP-04			2,235		2,235	0.051	11,647	0.267			
WP006		IP-04			2,060		2,060	0.047	7,741	0.178			16,080
	In Culvert	IP-04									336	56	
WP007		IP-05			814		814	0.019	6,025	0.138			
WP008		IP-05			3,174		3,174	0.073	17,222	0.395			
	In Culvert	IP-05									178	94	
WP009		IP-06			3,863		3,863	0.089	16,171	0.371			
	In Culvert	IP-06									232	65	
	WL010	IP-07									857	132	
	WL011	IP-08,-09									2,966	462	
WP012		IP-09,-10		2,276	2,917		5,193	0.119	44,116	1.014			
WP013		IP-10		258	348		606	0.014	5,618	0.129			
	In Culvert	IP-10									200	100	
	WL014	IP-11									2,992	365	
WP015*		IP-04A					2,516	0.058	12,822	0.294			
WP017*		IP-07A			2,172		2,172	0.050	15,314	0.352			
	WL018	IP-12									1,473	404	
	Total		5,160	2,666	20,070		27,896	0.641	167,515	3.845	9,234	1,678	16,080
													0.369

*Indicates Isolated Wetland regulated by MDE only.

SHEET 17 OF 17

STATE OF MARYLAND
DEPARTMENT OF THE ENVIRONMENT
WATER MANAGEMENT ADMINISTRATION

WATER QUALITY CERTIFICATION
for
WETLANDS AND WATERWAYS

CERTIFICATION NUMBER: 14-NT-2027/201460434

ISSUED TO: Maryland Department of Transportation
State Highway Administration
707 N. Calvert Street, Baltimore, MD 21202
Attn: Mr. Todd Nichols



EFFECTIVE DATE: August 20, 2014

EXPIRATION DATE: August 20, 2017

Description of Certified Project:

For the US 113 Phase 3 Improvements Project from North of Five Mile Branch to South of Massey Branch. The project involves removing and reconstructing portions of US 113 including installation of new service roads, J-turn intersections, and a modified Maryland T-intersection. The proposed work includes new roadway construction, pavement resurfacing and improvements, tree replacements, drainage improvements, culvert extensions, stormwater management improvements, signage and pavement markings, intersection lighting, and bicycle accommodations. The project is located in Worcester County along US 113 and extends from north of the Five Mile Road to south of Massey Branch. The project will result in 27,896 square feet of permanent impacts to nontidal wetlands (5,160 square feet of palustrine forested, 2,666 square feet of palustrine scrub-shrub, and 20,070 square feet of palustrine emergent), 167,515 square feet of permanent impact to nontidal wetland buffer, 1,678 linear feet (9,234 square feet) of permanent impacts to unnamed tributaries to Five Mile Branch and Marshall Creek and disturbance in the 100-year floodplain of an unnamed tributary to Five Mile Branch. The applicant has mitigated for nontidal wetland impacts associated with all phases of the US 113 dualization project by creating and enhancing nontidal wetlands in the Pocomoke River, Newport Bay, and Isle of Wright Bay watersheds.

This water quality certification is issued under authority of Section 401 of the Federal Water Pollution Control Act and its Amendments and the Environment Article, Sections 9-313 - 9-323, inclusive, Annotated Code of Maryland. A copy of this required certification has been sent to the Corps of Engineers. This certification does not relieve the applicant of responsibility for obtaining any other approvals, licenses or permits in accordance with federal, State, or local requirements and does not authorize commencement of the proposed project. The Maryland Department of the Environment has determined from a review of the plans that the project described above will not violate Maryland's water quality standards, provided that the following conditions are satisfied.

The certification holder shall comply with the conditions listed on the following pages:

GENERAL CONDITIONS

1. X The proposed project shall be constructed in a manner which will not violate Maryland's Water Quality Standards as set forth in COMAR 26.08.02. The applicant is to notify the Water Management Administration's Compliance Program, at 410-537-3510, ten (10) days prior to commencing work. If project is part of a mining site, please contact the Land Management Administration's Mining Program at 410-537-3557 at least ten (10) days prior to commencing work. Verbal notification is to be followed by written notice within ten (10) days.
2. X The proposed project shall be constructed in accordance with the approved final plan and its revisions.
3. X All fill and construction materials not used in the project shall be removed and disposed of in a manner which will prevent their entry into waters of this State.
4. X The certification holder shall notify the Water Management Administration, Nontidal Wetlands and Waterways Division, in writing, upon transferring property ownership or responsibility for compliance with these conditions to another person. The new owner/operator shall request, in writing, transfer of this water quality certification to his/her name.
5. X The certification holder shall allow the Water Management Administration or its representative to inspect the project area at reasonable times and to inspect records regarding this project.

SPECIAL CONDITIONS

1. The conditions of Nontidal Wetlands and Waterways Permit No. **14-NT-2027/201460434** incorporated, by reference, into this Water Quality Certification.
2. X The disturbance of the bottom of the water and sediment transport into adjacent State waters shall be minimized. The Permittee shall obtain and certify compliance with a grading and sediment control plan, which has been approved by the, **Maryland Department of the Environment**. The approved plans shall be available at the project site during all phases of construction.
3. X Work in waters may not be conducted as detailed below:
Unnamed Tributaries to Fivemile Branch and Marshall Creek are Use I waterways; in-stream work may not be conducted from **March 1st** through **June 15th**, inclusive, of any year.
4. X Stormwater runoff from impervious surfaces shall be controlled to prevent the washing of debris into the waterway. The natural vegetation shall be maintained and restored when disturbed or eroded. Stormwater drainage facilities shall be designed, implemented, operated, and maintained in accordance with the applicable approving authority.
5. Stormwater Management Plan: The certification holder shall provide to the Administration a stormwater management plan including cross sections, and other applicable drawings which incorporates effective pollutant removal strategies in uplands to treat the required volume of runoff from impervious surfaces prior to the release of stormwater into state waters, tidal wetlands, or nontidal wetlands. There shall be no discharge of untreated stormwater to State waters and tidal and nontidal wetlands. The plan shall be provided by and shall be implemented by .
6. X Nontidal Wetland/Waters Mitigation Requirement: The Permittee has completed mitigation for nontidal wetland impacts associated with all phases of the US 113 through the creation and enhancement of nontidal wetlands in the Pocomoke River, Newport Bay, and Isle of Wright Bay watersheds in accordance with the Phase II Mitigation Plan approved by the Administration. The Phase II Mitigation Plan shall govern in the event of discrepancy with the mitigation requirements in the Permit.
7. The certification holder shall provide a stream restoration plan for review and approval by . The approved plan shall be implemented by .

8. ___ At least one culvert in every culverted stream crossing shall be depressed at least one foot below the existing stream bottom under the low flow condition. A low flow channel shall be provided through any riprap structures. The culvert shall be constructed and any riprap placed so as not to obstruct the movement of aquatic species.
9. ___ Stormwater Discharges: Stormwater discharges from ponds, stormwater management outfalls, and stormwater facilities shall have a velocity of no greater than four feet per second for the two year storm in order to prevent erosion in the receiving water or wetland.
10. ___ Future Stormwater Discharges: Future stormwater discharges to authorized pond(s) are prohibited unless the required volume of stormwater runoff from impervious surfaces is managed in uplands for effective pollutant removal.
11. ___ Stormwater Detention Ponds: Authorized stormwater detention or extended detention ponds shall have a maximum detention time of ___ for temporarily impounded stormwater volumes in excess of any permanent pool elevations or pond bottom.
12. ___ Integrated Pest Management: An Integrated Pest Management Plan for any proposed golf course shall be developed in accordance with the University of Maryland Department of Entomology.
13. ___ Stormwater Drainage Facilities: Stormwater management and drainage facilities shall be maintained in accordance with the requirements of the applicable approving authority.
14. ___ Use of Stormwater Management Facility: Stormwater management facility may not be used until all stabilization is completed and all temporary sediment control devices have been removed.
15. ___ Maintenance of Stormwater Management Facility: If maintenance of a stormwater management facility is the responsibility of a homeowner's association, maintenance shall be conducted according to County specifications.

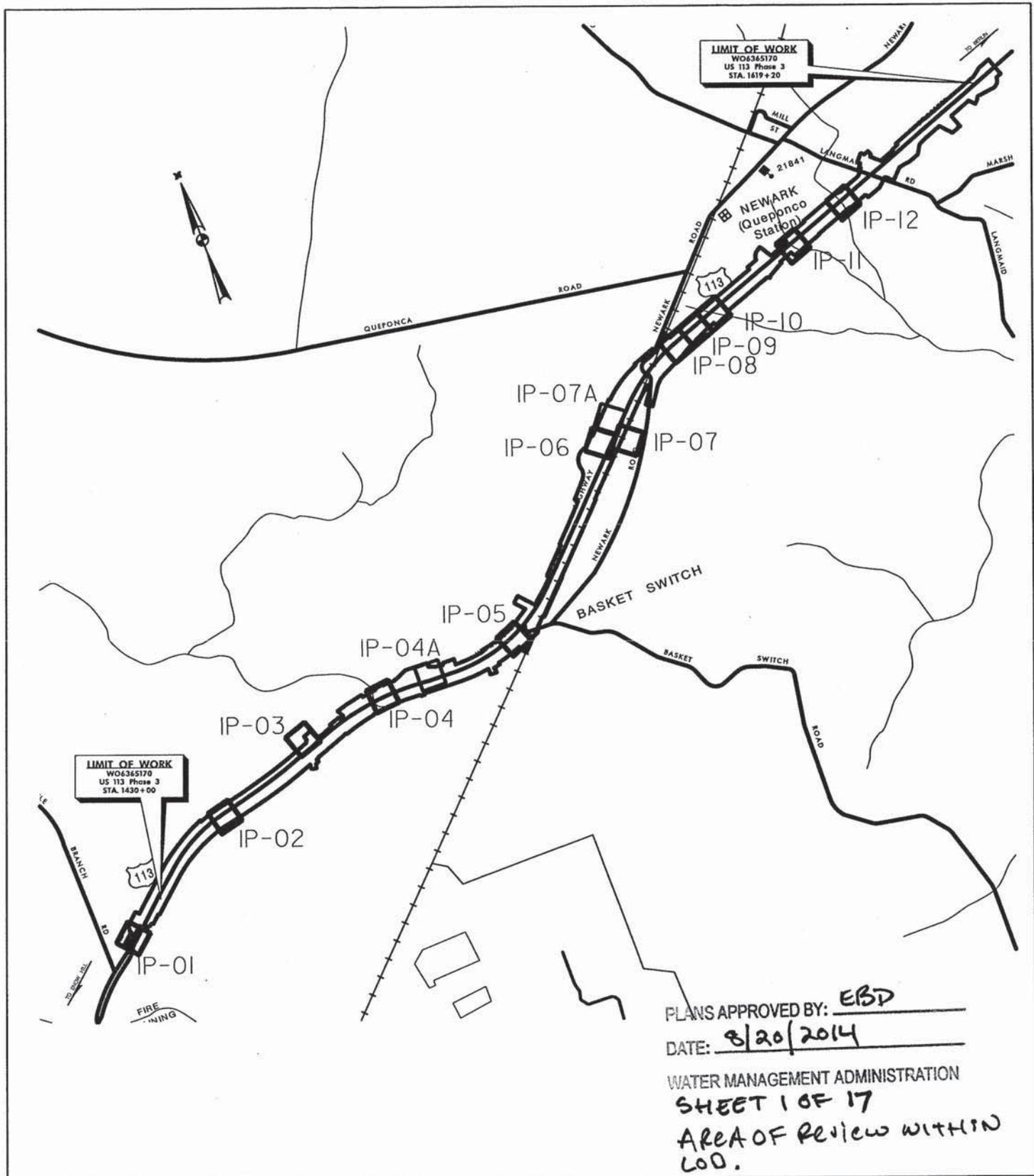
Failure to comply with these conditions shall constitute reason for suspension or revocation of the Water Quality Certification and legal proceedings may be instituted against the certification holder in accordance with the Annotated Code of Maryland. In granting this certification, the Department reserves the right to inspect the operations and records regarding this project at anytime.

CERTIFICATION APPROVED



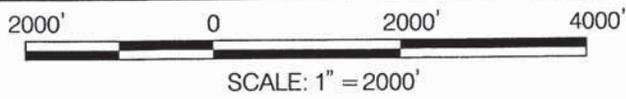
Amanda Sigillito, Chief
Nontidal Wetlands Division

cc: Jack Dinne, MD SHA Liaison, US Army Corps of Engineers
WMA, Compliance Program w/ file



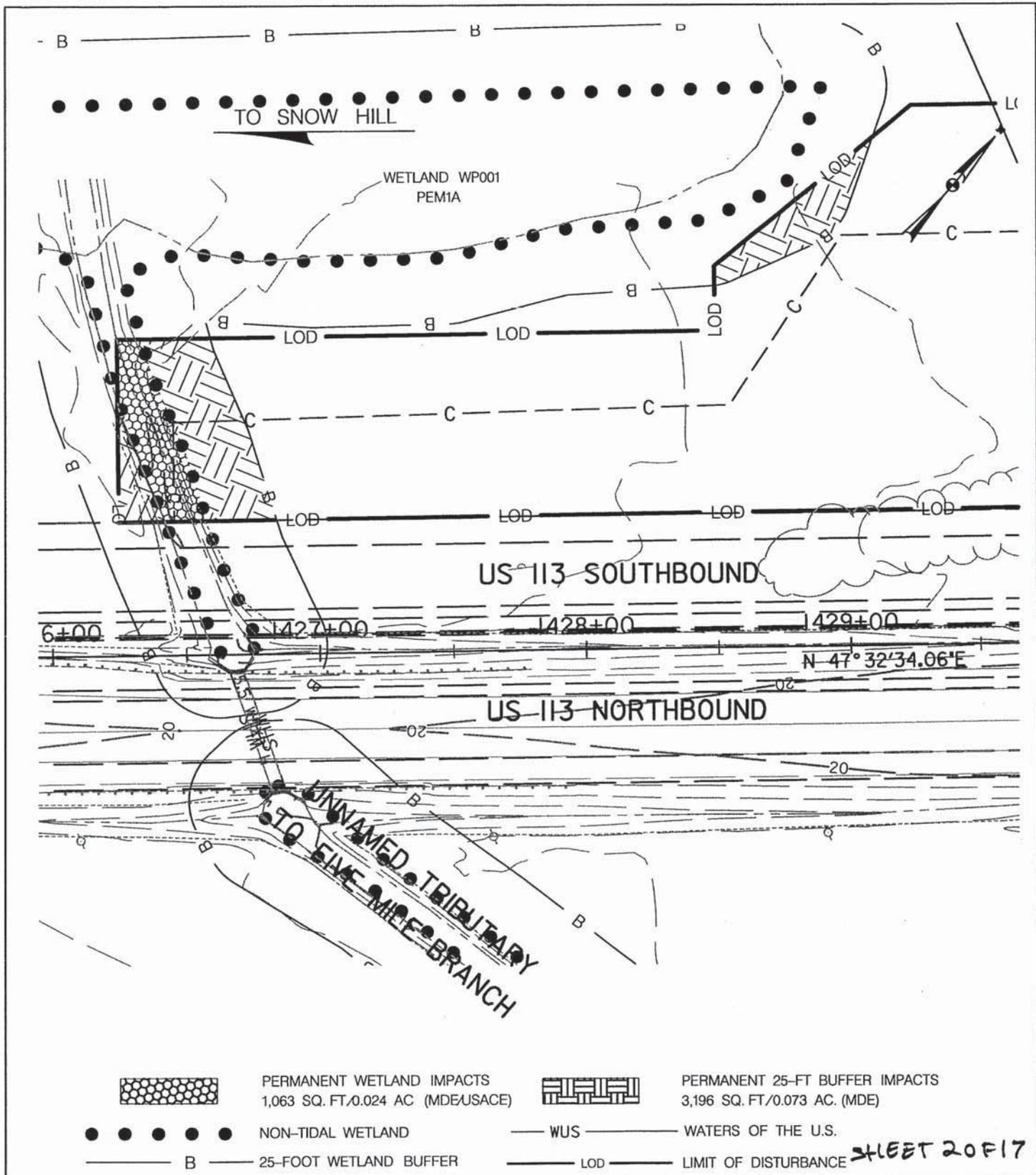
PLANS APPROVED BY: EBD
 DATE: 8/20/2014

WATER MANAGEMENT ADMINISTRATION
SHEET 1 OF 17
 AREA OF REVIEW WITHIN
 LOD.



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

WETLAND IMPACT PLATE INDEX
 PROJECT: US 113 - PHASE 3
 COUNTY: WORCESTER
 STATE: MARYLAND
 APPLICATION BY: MDSA
 WETLAND PLATE NO. IP-INDEX
 SHEET 1 OF 15 DATE: JUNE 2014
 SHA PROJECT NO.: WO6365170



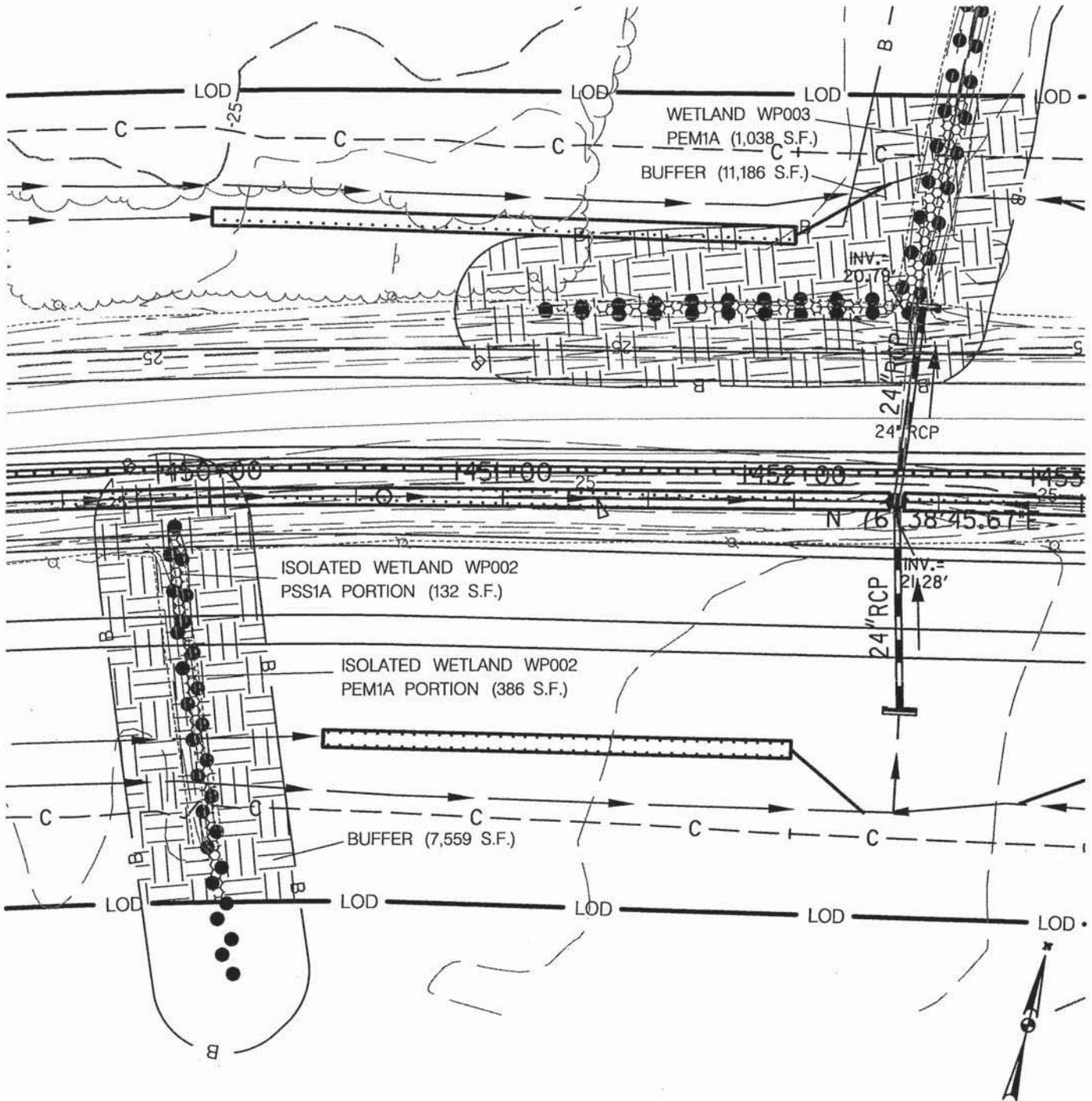
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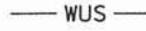


MARYLAND STATE HIGHWAY ADMINISTRATION
707 NORTH CALVERT ST.
BALTIMORE, MARYLAND 21202

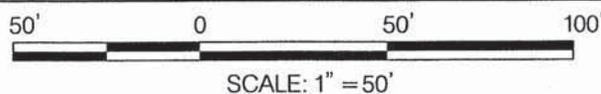
WETLAND IMPACT PLATE

PROJECT: US 113 - PHASE 3
COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSA
WETLAND PLATE NO. IP-01
SHEET 2 OF 15 DATE: JUNE 2014
SHA PROJECT NO.: WO6365170



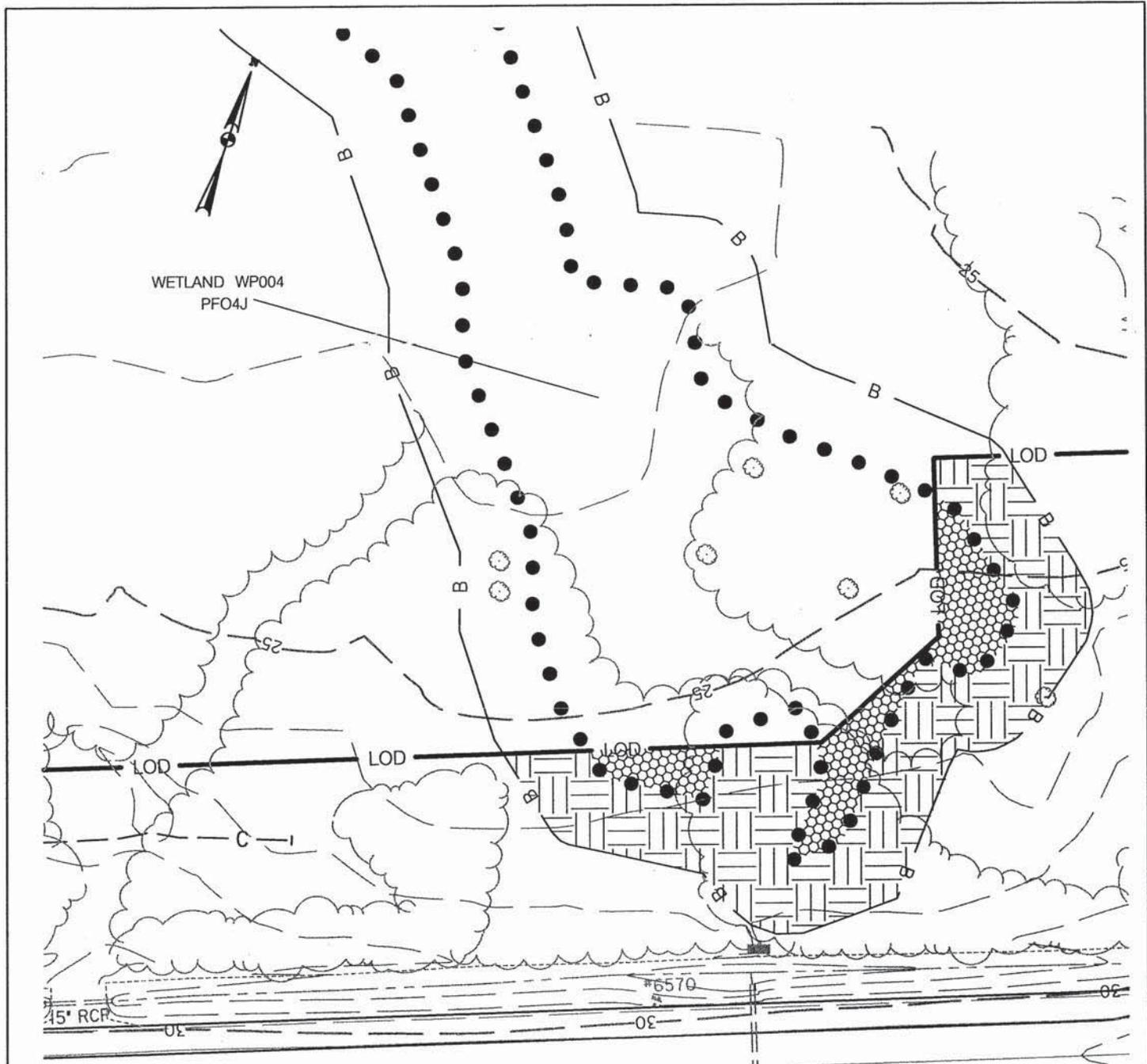
-  PERMANENT WETLAND IMPACTS
1,038 SQ. FT./0.024 AC. (MDE/USACE)
ISOLATED 518 S.F./0.12 AC. (MDE)
-  PERMANENT 25-FT BUFFER IMPACTS
18,745 SQ. FT./0.430 AC.
-  NON-TIDAL WETLAND
-  WUS ——— WATERS OF THE U.S.
-  B ——— 25-FOOT WETLAND BUFFER
-  LOD ——— LIMIT OF DISTURBANCE

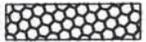
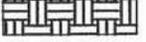
SHEET 3 OF 17



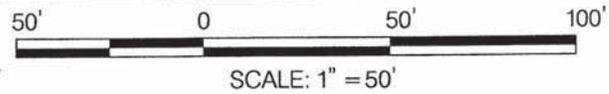
SHA
MARYLAND STATE HIGHWAY ADMINISTRATION
707 NORTH CALVERT ST.
BALTIMORE, MARYLAND 21202

WETLAND IMPACT PLATE
PROJECT: US 113 - PHASE 3
COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSA
WETLAND PLATE NO. IP-02
SHEET 3 OF 15 DATE: JUNE 2014
SHA PROJECT NO.: WO6365170



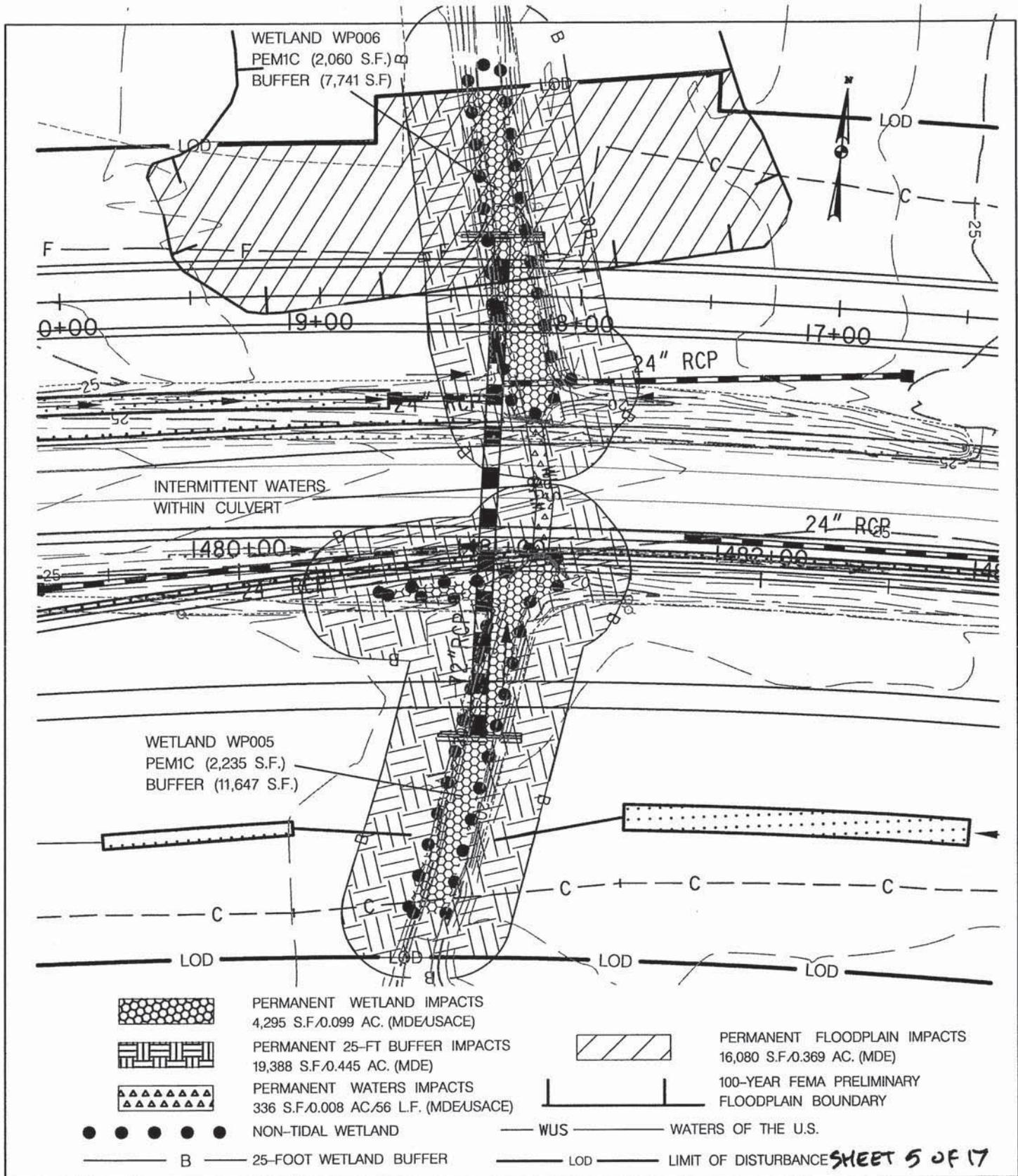
-  PERMANENT WETLAND IMPACTS
2,644 SQ. FT./0.061 AC.
-  PERMANENT 25-FT BUFFER IMPACTS
8,898 SQ. FT./0.204 AC.
-  NON-TIDAL WETLAND
-  WUS — WATERS OF THE U.S.
-  B — 25-FOOT WETLAND BUFFER
-  LOD — LIMIT OF DISTURBANCE

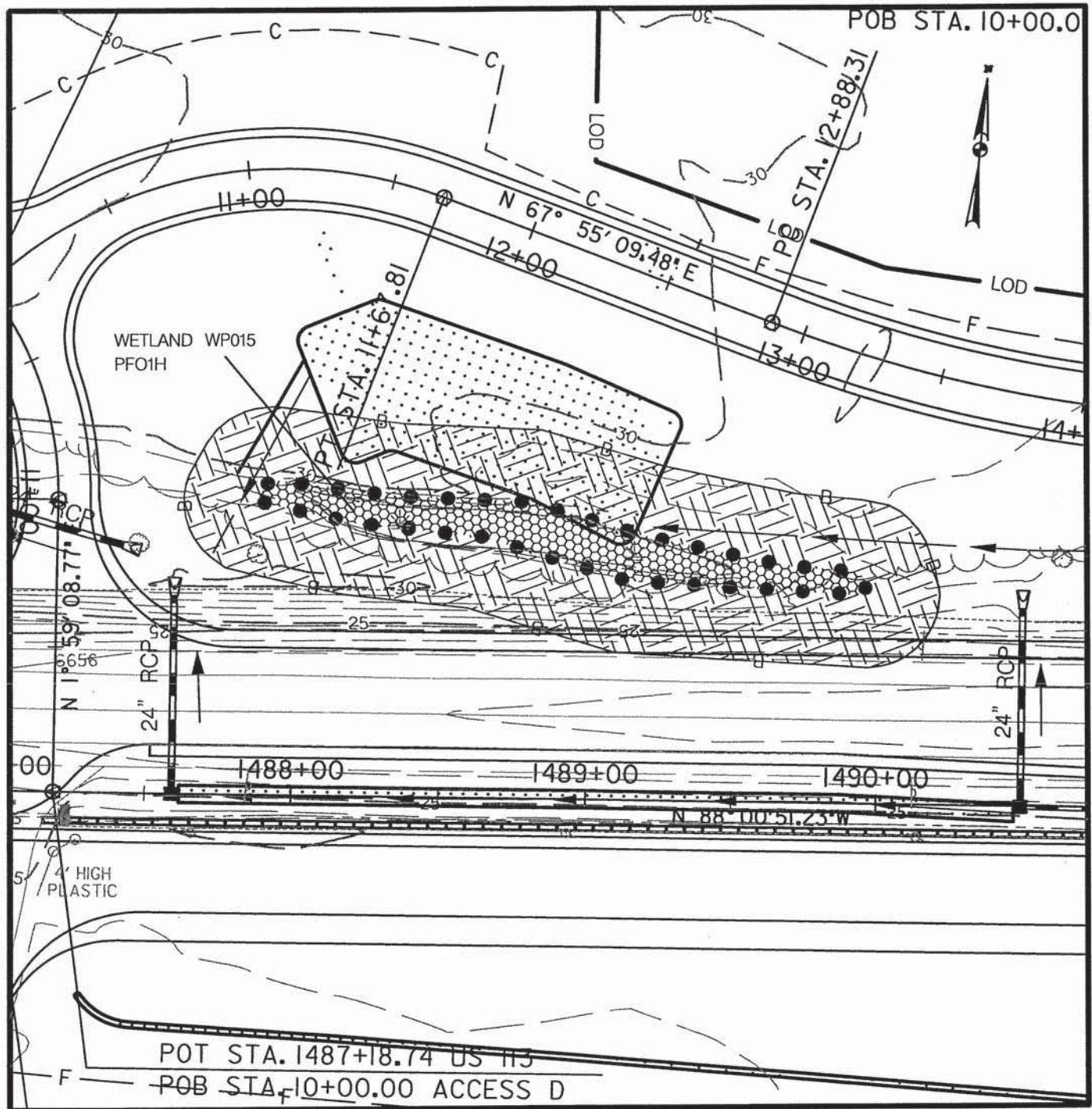
SHEET 4 OF 17

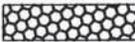
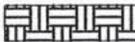
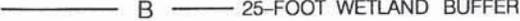
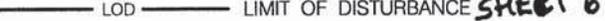


MARYLAND STATE HIGHWAY ADMINISTRATION
707 NORTH CALVERT ST.
BALTIMORE, MARYLAND 21202

WETLAND IMPACT PLATE
PROJECT: US 113 - PHASE 3
COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSHA
WETLAND PLATE NO. IP-03
SHEET 4 OF 15 DATE: JUNE 2014
SHA PROJECT NO.: WO6365170





-  PERMANENT WETLAND IMPACTS
2,516 S.F./0.058 AC. (MDE)
-  PERMANENT 25-FT BUFFER IMPACTS
12,822 S.F./0.294 L.F. (MDE)
-  NON-TIDAL WETLAND
-  WUS ——— WATERS OF THE U.S.
-  B ——— 25-FOOT WETLAND BUFFER
-  LOD ——— LIMIT OF DISTURBANCE

SHEET 6 OF 17

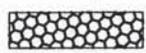
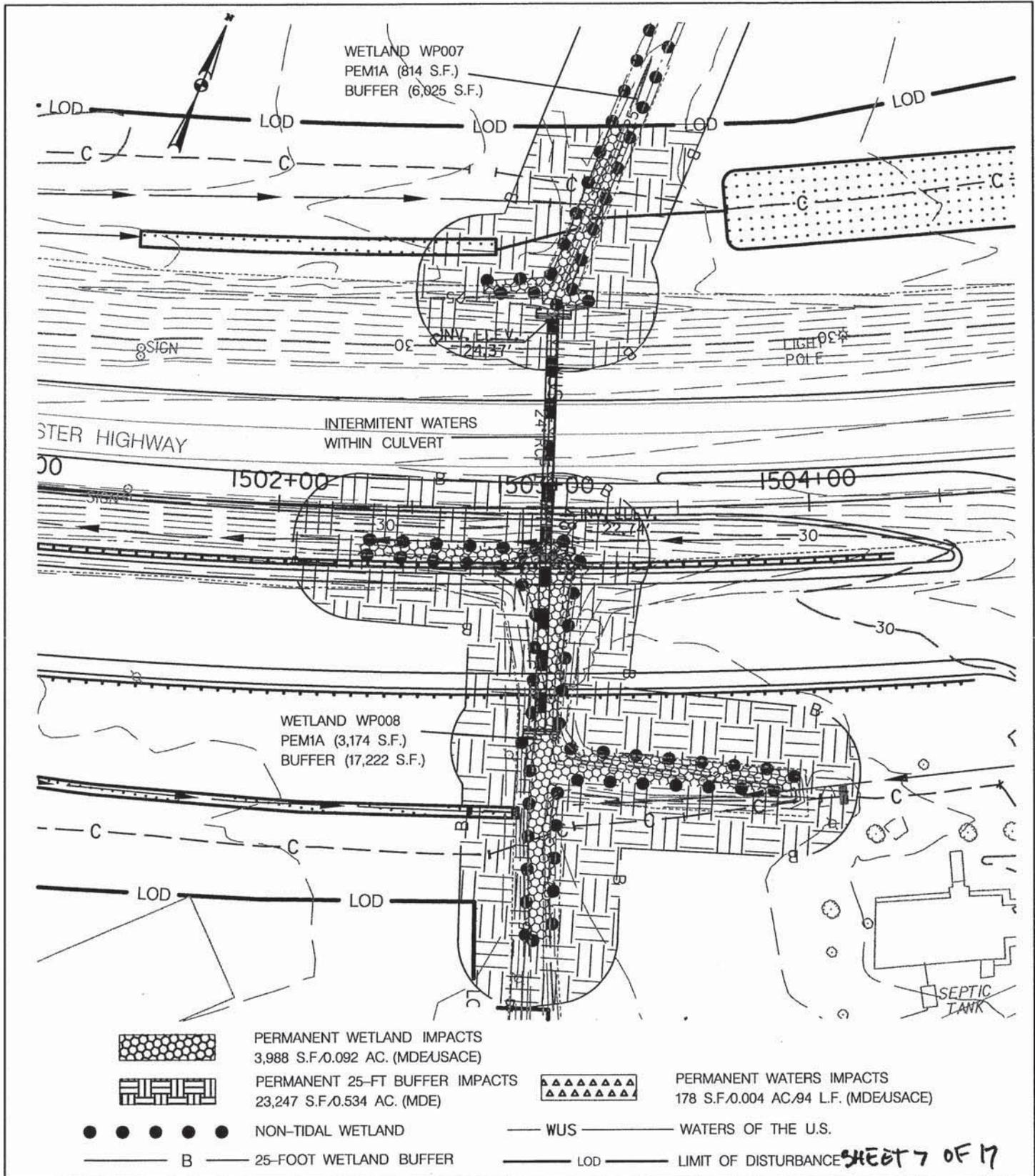


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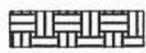


MARYLAND STATE HIGHWAY ADMINISTRATION
707 NORTH CALVERT ST.
BALTIMORE, MARYLAND 21202

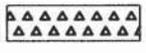
WETLAND IMPACT PLATE
PROJECT: US 113 - PHASE 3
COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSA
WETLAND PLATE NO. IP-04A
SHEET 6 OF 15 DATE: JUNE 2014
SHA PROJECT NO.: WO6365170



PERMANENT WETLAND IMPACTS
3,988 S.F./0.092 AC. (MDE/USACE)



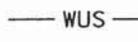
PERMANENT 25-FT BUFFER IMPACTS
23,247 S.F./0.534 AC. (MDE)



PERMANENT WATERS IMPACTS
178 S.F./0.004 AC./94 L.F. (MDE/USACE)



NON-TIDAL WETLAND



WUS — WATERS OF THE U.S.



B — 25-FOOT WETLAND BUFFER



LOD — LIMIT OF DISTURBANCE



SCALE: 1" = 50'



MARYLAND STATE HIGHWAY ADMINISTRATION
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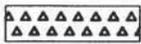
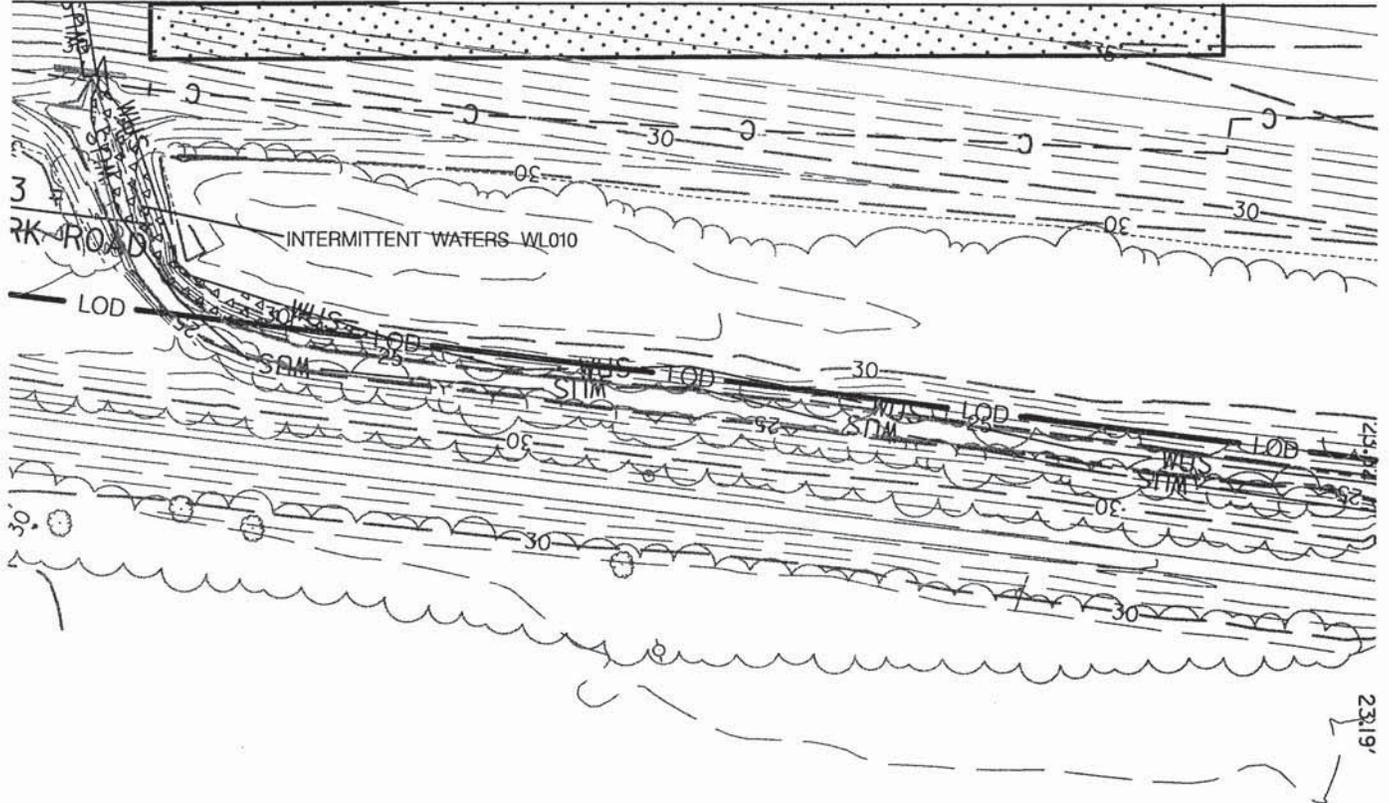
WETLAND IMPACT PLATE

PROJECT: US 113 - PHASE 3
COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSHA
WETLAND PLATE NO. IP-05
SHEET 7 OF 15 DATE: JUNE 2014
SHA PROJECT NO.: WO6365170

SHEET 7 OF 17



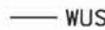
MATCH LINE - SEE PLATE IP-06



PERMANENT WATERS IMPACTS
857 S.F./0.020 AC/132 L.F. (MDEUSACE)



NON-TIDAL WETLAND



WUS ——— WATERS OF THE U.S.



B ——— 25-FOOT WETLAND BUFFER



LOD ——— LIMIT OF DISTURBANCE

SHEET 9 OF 17



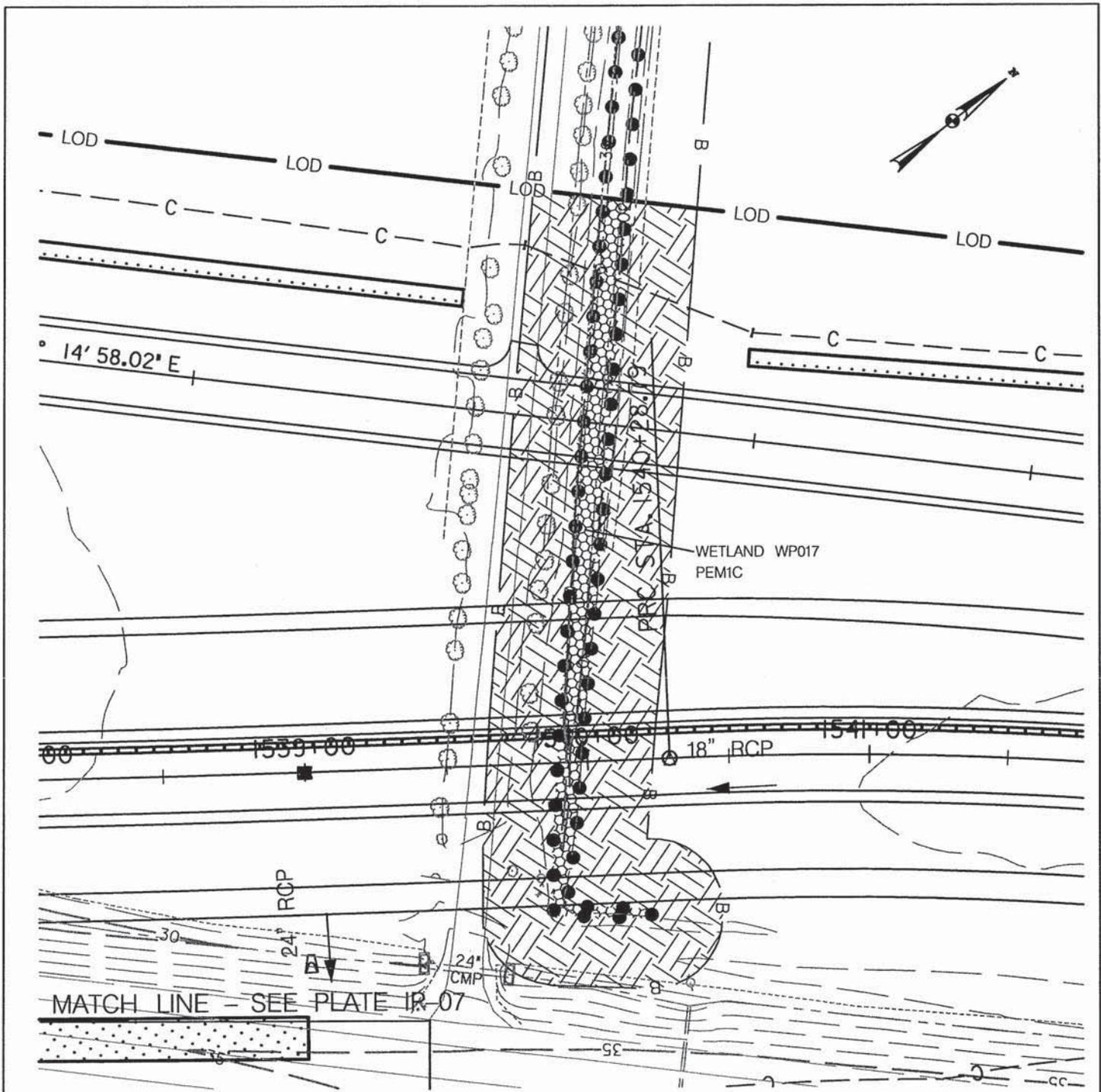
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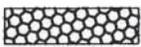
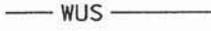
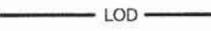


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BALTIMORE, MARYLAND 21202

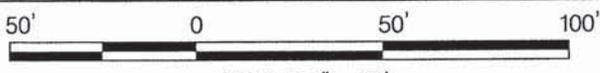
WETLAND IMPACT PLATE

PROJECT: US 113 - PHASE 3
COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSA
WETLAND PLATE NO. IP-07
SHEET 9 OF 15 DATE: JUNE 2014
SHA PROJECT NO.: WO6365170



-  PERMANENT WETLAND IMPACTS
2,172 S.F./0.050 AC. (MDE)
-  PERMANENT 25-FT BUFFER IMPACTS
15,314 S.F./0.352 AC. (MDE)
-  NON-TIDAL WETLAND
-  WUS ——— WATERS OF THE U.S.
-  B ——— 25-FOOT WETLAND BUFFER
-  LOD ——— LIMIT OF DISTURBANCE

SHEET 10 OF 17

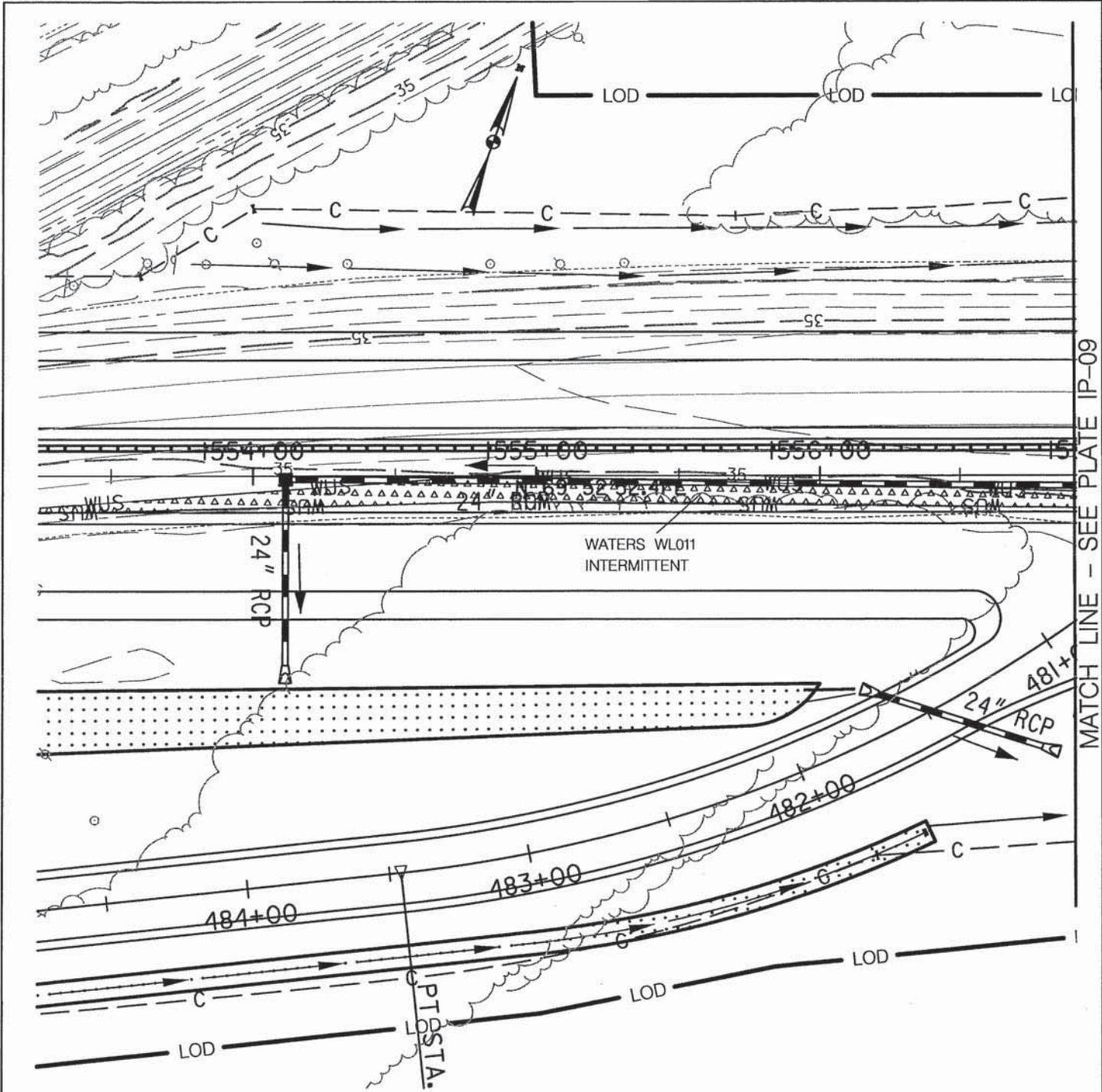


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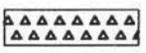


MARYLAND STATE HIGHWAY ADMINISTRATION
707 NORTH CALVERT ST.
BALTIMORE, MARYLAND 21202

WETLAND IMPACT PLATE
PROJECT: US 113 - PHASE 3
COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSA
WETLAND PLATE NO. IP-07A
SHEET 10 OF 15 DATE: JUNE 2014
SHA PROJECT NO.: WO6365170



MATCH LINE - SEE PLATE IP-09



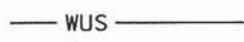
PERMANENT WATERS IMPACTS
2,493 SQ. FT./0.057 AC./370 L.F. (MDE/USACE)



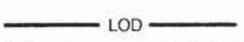
NON-TIDAL WETLAND



B 25-FOOT WETLAND BUFFER

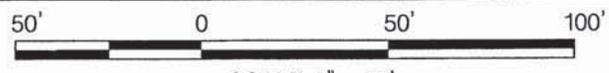


WUS WATERS OF THE U.S.



LOD LIMIT OF DISTURBANCE

SHEET 11 OF 17

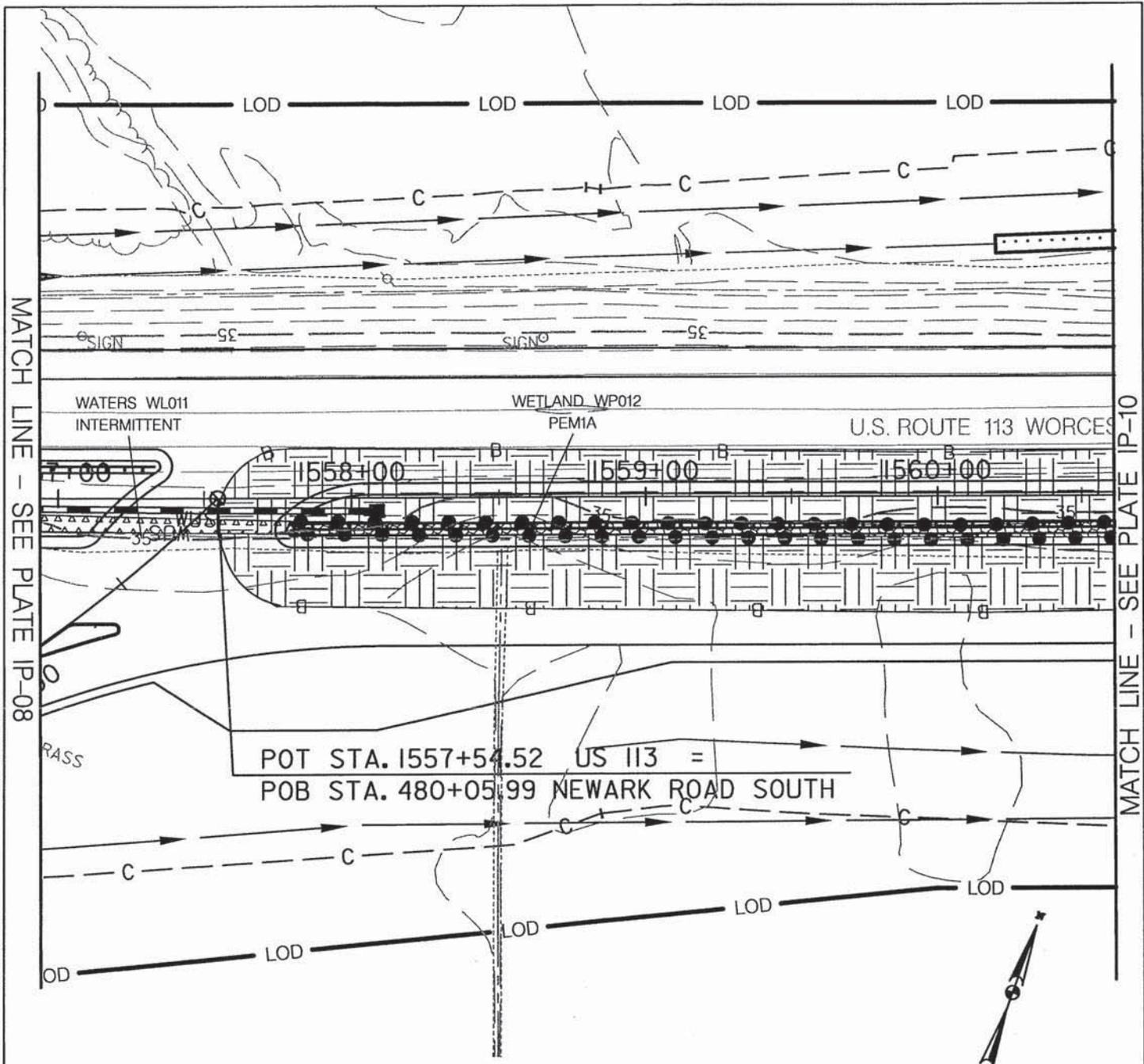


SCALE: 1" = 50'



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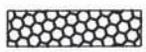
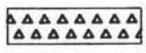
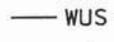
WETLAND IMPACT PLATE
PROJECT: US 113 - PHASE 3
COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSA
WETLAND PLATE NO. IP-08
SHEET 11 OF 15 DATE: JUNE 2014
SHA PROJECT NO.: WO6365170



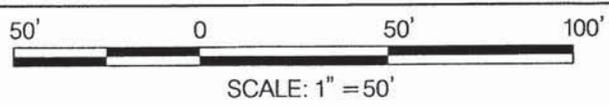
MATCH LINE - SEE PLATE IP-08

MATCH LINE - SEE PLATE IP-10

LEGEND

-  PERMANENT WETLAND IMPACTS
1,209 SQ. FT./0.028 AC. (MDEUSACE)
-  PERMANENT 25-FT BUFFER IMPACTS
15,228 SQ. FT./0.350 AC. (MDE)
-  PERMANENT WATERS IMPACTS
473 SQ. FT./0.011 AC./92 L.F. (MDEUSACE)
-  NON-TIDAL WETLAND
-  WUS — WATERS OF THE U.S.
-  B — 25-FOOT WETLAND BUFFER
-  LOD — LIMIT OF DISTURBANCE

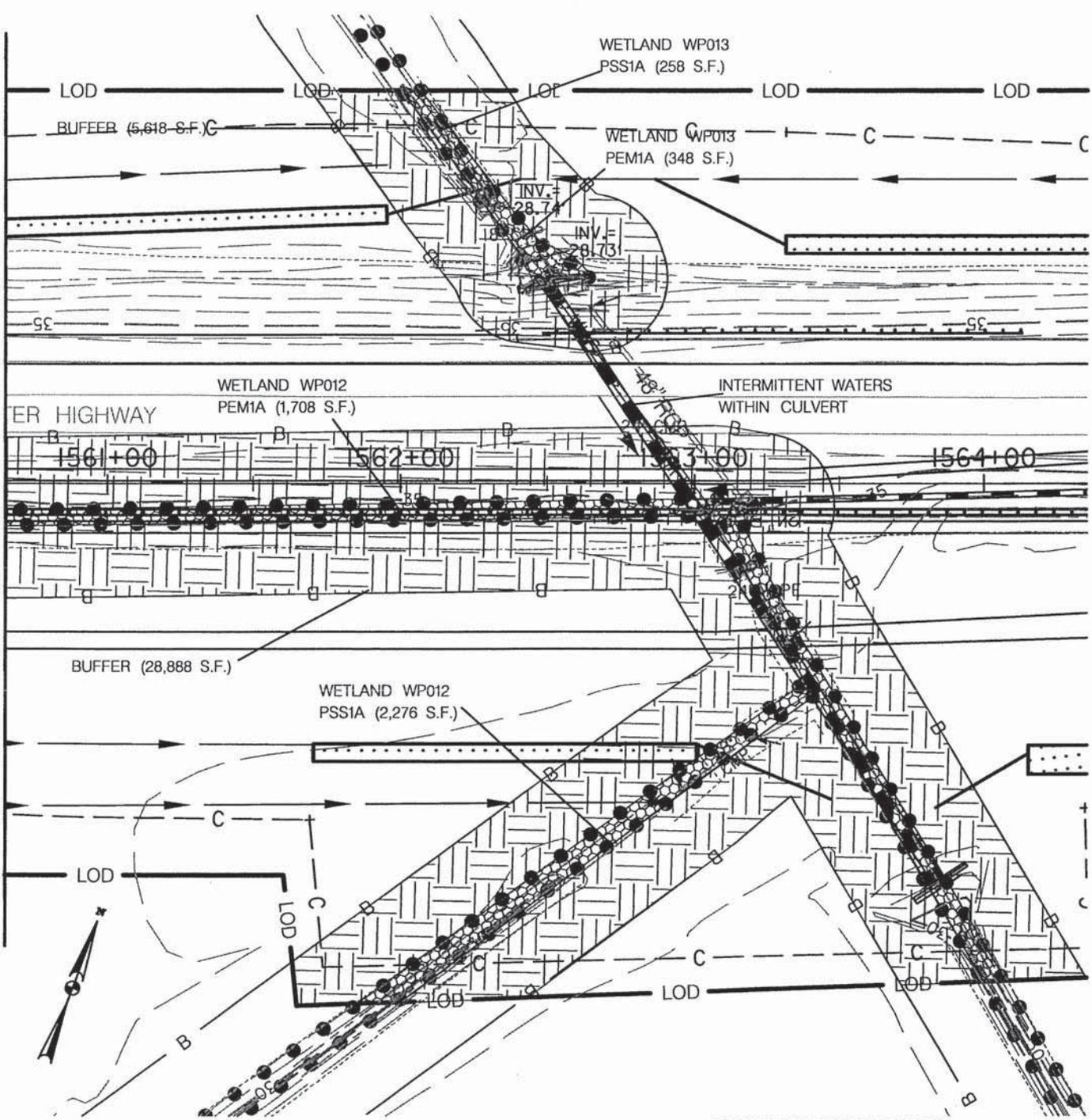
SHEET 12 OF 17

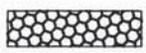
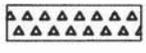
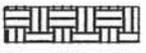
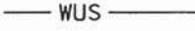
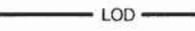


SHA
MARYLAND STATE HIGHWAY ADMINISTRATION
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BALTIMORE, MARYLAND 21202

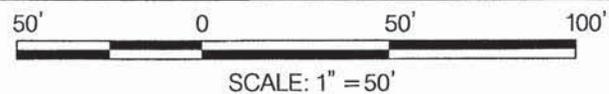
WETLAND IMPACT PLATE
PROJECT: US 113 - PHASE 3
COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSHA
WETLAND PLATE NO. IP-09
SHEET 12 OF 15 DATE: JUNE 2014
SHA PROJECT NO.: WO6365170

MATCH LINE - SEE PLATE IP-09



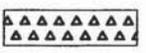
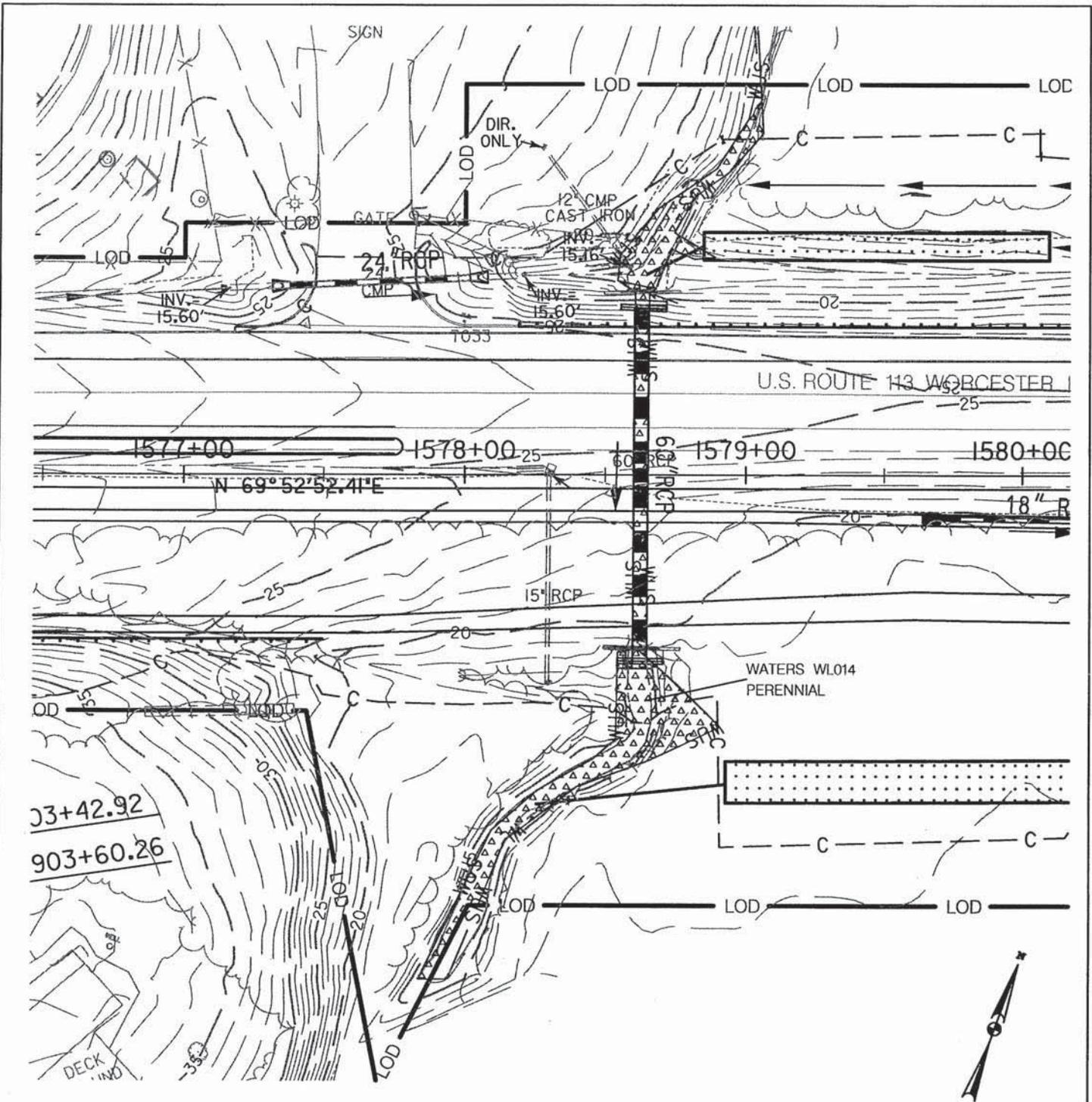
-  PERMANENT WETLAND IMPACTS
4,590 S.F./0.105 AC. (MDE/USACE)
-  PERMANENT WATERS IMPACTS
200 S.F./0.005 AC/100 L.F. (MDE/USACE)
-  NON-TIDAL WETLAND
-  PERMANENT 25-FT BUFFER IMPACTS
34,506 S.F./0.792 AC. (MDE)
-  B 25-FOOT WETLAND BUFFER
-  WUS WATERS OF THE U.S.
-  LOD LIMIT OF DISTURBANCE

SHEET 13 OF 17



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

WETLAND IMPACT PLATE
PROJECT: US 113 - PHASE 3
COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSA
WETLAND PLATE NO. IP-10
SHEET 13 OF 15 DATE: JUNE 2014
SHA PROJECT NO.: WO6365170



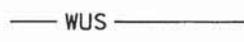
PERMANENT WATERS IMPACTS
2,992 S.F./0.069 AC/365 L.F. (MDEUSACE)



NON-TIDAL WETLAND



25-FOOT WETLAND BUFFER



WUS — WATERS OF THE U.S.



LOD — LIMIT OF DISTURBANCE



SCALE: 1" = 50'

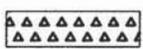
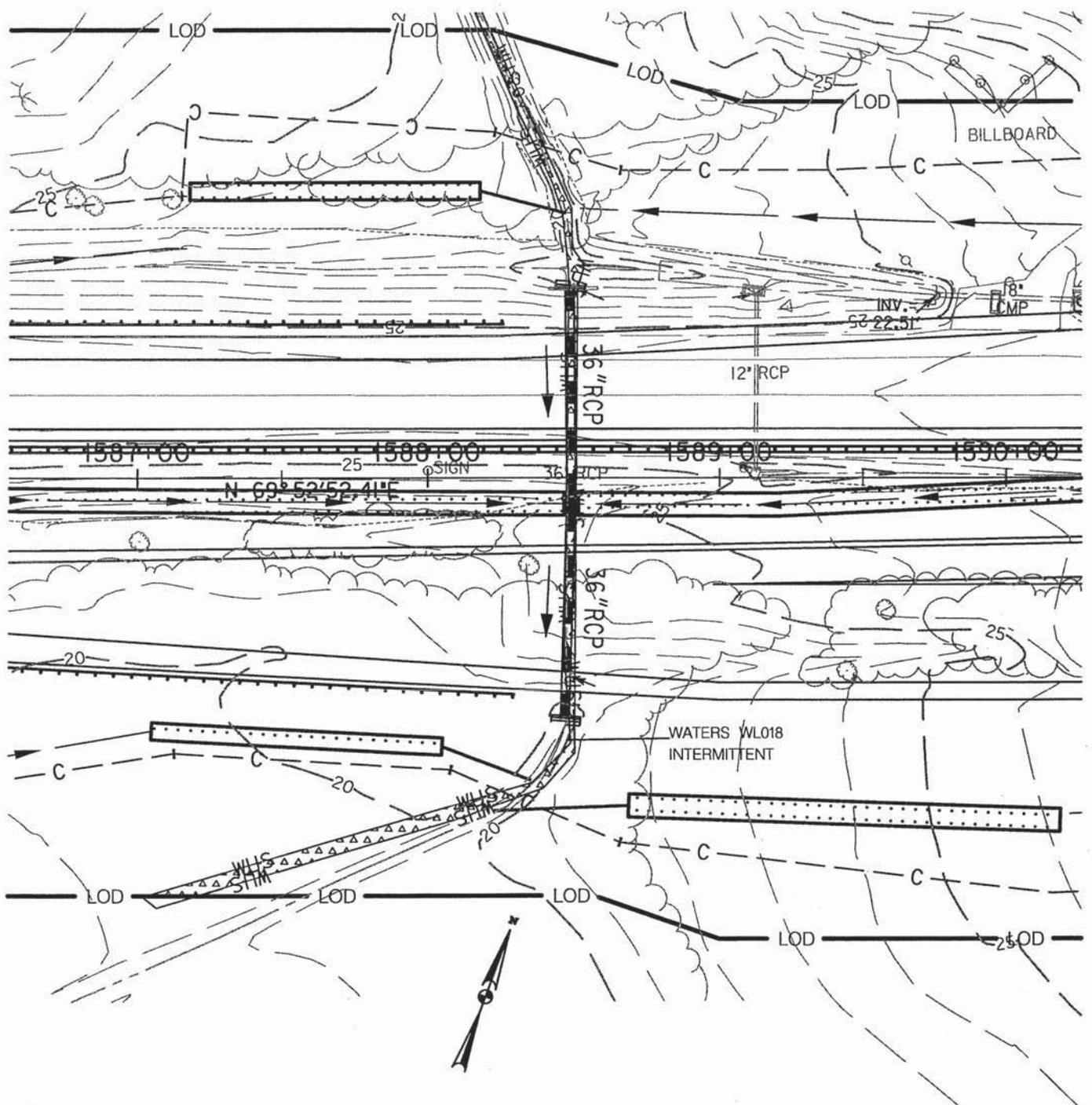


MARYLAND STATE HIGHWAY ADMINISTRATION
707 NORTH CALVERT ST.
BALTIMORE, MARYLAND 21202

WETLAND IMPACT PLATE

PROJECT: US 113 - PHASE 3
COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSA
WETLAND PLATE NO. IP-11
SHEET 14 OF 15 DATE: JUNE 2014
SHA PROJECT NO.: WO6365170

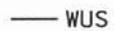
SHEET 14 OF 17



PERMANENT WATERS IMPACTS
1,473 S.F./0.034 AC/404 L.F. (MDEUSACE)



NON-TIDAL WETLAND



WUS ——— WATERS OF THE U.S.



B ——— 25-FOOT WETLAND BUFFER



LOD ——— LIMIT OF DISTURBANCE

SHEET 15 OF 17



SCALE: 1" = 50'



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

WETLAND IMPACT PLATE

PROJECT: US 113 - PHASE 3
COUNTY: WORCESTER
STATE: MARYLAND
APPLICATION BY: MDSHA
WETLAND PLATE NO. IP-12
SHEET 15 OF 15 DATE: JUNE 2014
SHA PROJECT NO.: WO6365170

SHA: US 113 Improvements Phase III, North of Five Mile Branch to South of Massey Branch
 Summary of Impact Plates; May 29, 2014

Plate No.	Community (Sq. Ft.)			Total Permanent Wetland Impacts		Permanent 25' Wetland Buffer		Permanent Waters Impacts		Permanent Floodplain Impacts (MDE)	
	PFO	PSS	PEM	Sq. Ft.	Acres	Sq. Ft.	Acres	Sq. Ft.	L.F.	Sq. Ft.	Acres
IP-01				1,063	0.024	3,196	0.073				
IP-02		132		1,556	0.036	18,745	0.430				
IP-03	2,644			2,644	0.061	8,898	0.204				
IP-04			4,295	4,295	0.098	19,388	0.445	336	56	16,080	0.369
IP-04A		2,516		2,516	0.058	12,822	0.294				
IP-05				3,988	0.092	23,247	0.534	178	94		
IP-06				3,863	0.089	16,171	0.371	232	65		
IP-07								857	132		
IP-07A				2,172	0.05	15,314	0.352				
IP-08								2,493	370		
IP-09				1,209	0.028	15,228	0.350	473	92		
IP-10		2,534		4,590	0.105	34,506	0.792	200	100		
IP-11								2,992	365		
IP-12								1,473	404		
Total	5,160	2,666	20,070	27,896	0.641	167,515	3.845	9,234	1,678	16,080	0.369

SHEET 16 OF 17

SHA: US 113 Improvements Phase III, North of Five Mile Branch to South of Massey Branch Summary of Wetlands, Waters and Floodplain Impacts- Permanent; May 29, 2014													
Wetlands	Waters	Plate No.	Community (Sq. Ft.)			Total Wetland Impacts		25' Wetland Buffer Impacts (MDE)		Waters Impacts		Floodplain Impacts (MDE)	
			PFO	PSS	PEM	Sq. Ft.	Acres	Sq. Ft.	Acres	Sq. Ft.	L.F.	Sq. Ft.	Acres
WP001		IP-01			1,063	1,063	0.024	3,196	0.073				
WP002*		IP-02		132	386	518	0.012	7,559	0.173				
WP003		IP-02			1,038	1,038	0.024	11,186	0.257				
WP004		IP-03	2,644			2,644	0.061	8,898	0.204				
WP005		IP-04			2,235	2,235	0.051	11,647	0.267				
WP006		IP-04			2,060	2,060	0.047	7,741	0.178			16,080	0.369
	In Culvert	IP-04								336	56		
WP007		IP-05			814	814	0.019	6,025	0.138				
WP008		IP-05			3,174	3,174	0.073	17,222	0.395				
	In Culvert	IP-05								178	94		
WP009		IP-06			3,863	3,863	0.089	16,171	0.371				
	In Culvert	IP-06								232	65		
	WL010	IP-07								857	132		
	WL011	IP-08,-09								2,966	462		
WP012		IP-09,-10		2,276	2,917	5,193	0.119	44,116	1.014				
WP013		IP-10		258	348	606	0.014	5,618	0.129				
	In Culvert	IP-10								200	100		
	WL014	IP-11								2,992	365		
WP015*		IP-04A	2,516			2,516	0.058	12,822	0.294				
WP017*		IP-07A			2,172	2,172	0.050	15,314	0.352				
	WL018	IP-12								1,473	404		
	Total		5,160	2,666	20,070	27,896	0.641	167,515	3.845	9,234	1,678	16,080	0.369

*Indicates Isolated Wetland regulated by MDE only.

SHEET 17 OF 17



Martin O'Malley, Governor
Anthony G. Brown, Lt. Governor
Joseph P. Gill, Secretary
Frank W. Dawson III, Deputy Secretary

Forest Service
 2 South Bond Street, Suite 101
 Bel Air, Maryland 21014

REFORESTATION LAW: PROJECT REVIEW

CONTRACT #: BCS 2005-13D PDMS #: N/A
 COUNTY: Worcester REVIEWED BY: T. Ericson
 TO: Mayra Filippone DATE: October 2, 2014
 AGENCY: 800 Wyman Park Drive PROJECT: Dualization of US 113 from N of Five
 ADDRESS: Baltimore, MD 21211 Mile Branch Rd to S of Massey Branch

This memorandum is to inform you that the above referenced contract was reviewed by this office on: October 2, 2014

Our review of this project indicated that 13.39 acres of forest land will be cleared. The following conditions are to apply to this project:

- XX 1. Reforestation of 5.64 acres must be conducted on site within one year of this project's official construction completion date. Further determination of on-site reforestation will be done at the time this project is completed.
- XX 2. Reforestation of 7.75 acres must be conducted off site on public lands within the same county or watershed in which the clearing occurred. This reforestation must be completed within one year of the construction completion of the project.
- 3. Other conditions: Pay fee-in-lieu of planting of \$00.00 into the State Reforestation Fund 0.0 acres at \$4,356.00 an acre (\$0.10 per square foot) = \$00.00

All reforestation that is carried out by you or your agency must have the planting plans approved by the Department of Natural Resources-Forest Service. As stated earlier in the review process, state agencies who are unable to locate public lands for mitigation planting must provide a detailed explanation of why they cannot fulfill the planting obligations before any payment (in lieu of planting) will be accepted into the reforestation fund. This explanation must be submitted prior to construction completion. If the fee-in-lieu is approved, billing will be based on a fee of 10 cents per square foot of forest cleared for construction projects for which bids were let out July 1, 1992 or later.

The review of this project indicated that a total of 13.39 acres of forest land is to be cleared. So the resulting bill, if no reforestation is carried out by you or your agency, would be \$58,326.84. Please note that this dollar amount is an estimate; final determination is pending final review of the project.

Attached is a copy of our completed review form for your records. A copy of this form has also been placed on file with our Reforestation Law Compliance Section. If you should have any questions, please contact:

Tod Ericson phone #: 410-836-4568



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 2, 2014

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

Re: MDE No. 15-SF-0029
No. WO636E21
US 113 From North of Massey Branch to Fiver Mile Branch Road - Phase 3
LETTER OF INTENT – Stormwater Management Concept Approval

Dear Ms. Pujara:

The Water Management Administration (WMA) has reviewed the submittal received September 11, 2014 for the above referenced project in Worcester 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 following comments are a result of the review:

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 11, 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, though requires additional detailed design to complete.**

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

Point of Investigation	Proposed SWM Measure
11	ESDv/WQv, CPv provided by three submerged gravel wetlands and one grass swale ESD practices. Q2 management provided through curve number reduction within the ESD practices.
12	ESDv/WQv, CPv provided by four submerged gravel wetlands and two grass swale ESD practices. Q2 management provided through curve number reduction within the ESD practices.
13	ESDv/WQv, CPv provided by three submerged gravel wetlands and two grass swales ESD practices. Q2 management provided through curve number reduction within the ESD practices.
14	ESDv/WQv, CPv provided by five submerged gravel wetlands and two grass

	swale ESD practices. Q2 management provided through curve number reduction within the ESD practices.
LOI 15	ESDv/WQv, CPv provided by three infiltration ESD practices. Q2 management provided through curve number reduction within the ESD practices.
16	ESDv/WQv, CPv provided by one infiltration berm and one dry well ESD practices. Q2 management provided through curve number reduction within the ESD practices.
17	ESDv/WQv, CPv provided by two submerged gravel wetlands and two grass swales ESD practices. Q2 management provided through curve number reduction within the ESD practices.
18	This study point is redevelopment, WQv is provided in other POIs. Q2 is not required due to decrease in discharge under proposed conditions.
19	ESDv/WQv, CPv provided by five submerged gravel wetlands and one grass swale ESD practices. Q2 management provided through curve number reduction within the ESD practices.
20	ESDv/WQv, CPv provided by one submerged gravel wetland ESD practice. Q2 management provided through curve number reduction within the ESD practices.
21	ESDv/WQv, CPv provided by one grass swale ESD practice. As shown, Q2 management provided through curve number reduction within the ESD practices.
22	ESDv/WQv, CPv provided by one submerged gravel wetland ESD practices. Q2 management provided through curve number reduction within the ESD practices.
23	ESDv/WQv, CPv provided by one submerged gravel wetland ESD practices. Q2 management provided through curve number reduction within the ESD practices.
LOI 24	ESDv/WQv, CPv not required as in proposed conditions there is no impervious area. Q2 is not required due to decrease in drainage area.
25	ESDv/WQv, CPv provided by two grass swales and five submerged gravel wetlands. Q2 management provided through curve number reduction within the ESD practices.
28	ESDv/WQv, CPv is provided by two submerged gravel wetlands, and 1 micro bioretention. Q2 management provided through curve number reduction within the ESD practices.
LOI 29	ESDv/WQv, CPv not required as in proposed conditions there is no impervious area. Q2 is not required due to decrease in drainage area.
30	ESDv/WQv, CPv provided by two bioretention ESD practices, two grass swales, and three submerged gravel wetlands. Q2 management provided through curve number reduction within the ESD practices.
31	This study point is redevelopment, WQv is provided in other POIs. Due to decrease in overall drainage area and less than 500 sqft of new impervious, CPv variance is provided for the new pavement. Q2 not required due to decrease in drainage area
LOI 32	ESDv/WQv, CPv not required as in proposed conditions there is no impervious area. Q2 is not required due to decrease in drainage area.
LOI 33	ESDv/WQv, CPv not required as in proposed conditions there is no impervious area. Q2 is not required due to decrease in drainage area.
POI 34	ESDv/WQv, CPv provided by 1 bioretention ESD practices. Q2 management provided through curve number reduction within the ESD practices.

2. Design of submerged gravel wetlands shall retain 100% of the ESD volume within the combination of the surface and subsurface storage as discussed with MDE. The submerged gravel wetlands shall be designed with an orifice to provide 36 hour discharge rate for CPv management. The drainage area to the submerged gravel wetlands shall not exceed 20,000 sq. ft, drainage areas exceeding this limit shall utilize a flow diversion structure.
3. SHA shall confirm and receive approval for Q2 management from Worcester County for all POIs where there is an increase in the 2 year discharge.
4. The submitted Stormwater Management Concept Summary Sheets for the Pocomoke River Watershed (02-13-02) and Coastal Area Watershed (02-13-01) (dated 9/11/14) will be used as the basis for evaluating the final design for water quality and channel protection volume.
5. Water Quality Banking Summary Sheets must be submitted with the final design.
6. Attenuation of the 2-year peak discharge shall be provided, for the 2 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.
7. Approval from MDE's Wetlands and Waterways Program will be required for all work impacting wetlands or waterways.
8. 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.
9. Stormwater Management and Erosion/Sediment Control Plans shall be submitted for final review and approval.
10. 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

NOTICE TO CONTRACTOR

EARLY SUBMISSIONS. The last sentence of the first paragraph of TC-5.02, “No work shall be started before receipt of the Notice to Proceed” shall not apply to the following:

After notification to the Contractor from the Administration that the Contractor is the apparent low bidder, the Contractor will be permitted to provide a written request to the Engineer to submit documentation for materials sources and working drawings for any items of work that have a long lead time and could jeopardize the project schedule. Upon written approval from the Engineer the Contractor may submit the applicable documentation to the Engineer.

Should the Contract not be awarded to the apparent low bidder who meets the requirements of the Contract, GP-8.10 will apply for all costs accrued for the preparation and approval of the working drawings and any resultant material purchase approved by the District Engineer and steel fabricated in conformance with the approved working drawings between the date the Contractor received notice of apparent low bidder and the date of notice that the apparent low bidder will not be awarded this Contract.

Should this Contract not be awarded to the apparent low bidder due to failure of the Contractor to comply with all award and execution requirements, all costs accrued for the preparation of the specific items and any resultant material purchased and steel fabrication shall be borne by the Contractor.

Failure of the Contractor to submit the early submissions will not be basis for delaying issuance of the Notice to Proceed or be considered a reason for a time extension.

GENERAL PROVISIONS

GP SECTION 2
BIDDING REQUIREMENTS AND CONDITIONS FOR DESIGN-BUILD –
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:

Bids 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 to US 113 from North of Massey Branch to Five Mile Branch Road. This project is located in Worcester 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:

- Whitman, Requardt & Associates, LLP (WRA)
- Whitney Bailey Cox & Magnani, LLC (WBCM)
- AECOM
- J. A. Rice, Inc. (JAR)
- STV Incorporated
- NMP Engineering Consultants, Inc.

- Mahan Rykiel Associates (MRA)
- McCormick, Taylor and Associates, Inc. (MTA)

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 pendancy 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 is located in Worcester County and begins North of Massey Branch and continues to Five Mile Branch Road. The project consists of the design and construction of two additional lanes along the existing US 113 alignment to create a dual divided highway. The project also includes design and construction of new service roads to maintain access to residential and commercial properties. Roadway improvements include new pavement construction and pavement rehabilitation of existing roadways and shoulders, reforestation, closed/open drainage systems, stormwater management quality and quantity facilities, signing, lighting, pavement markings, and culvert extensions and/or replacement.

The project's conceptual design has been described herein.

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

The SHA initiated a project planning study in early 1996 along the two-lane portions of US 113 extending from the Delaware state line to south of Snow Hill, Maryland (MD). On February 12, 1998 Federal Highway Administration (FHWA) approved the *Final Environmental Impact Statement (FEIS)*, prepared for the US 113 Planning Study. The Record of Decision was approved and Location Approval was granted on May 28, 1998. Improvements identified in the FEIS included upgrading the existing two-lane undivided highway to a four-lane limited-access divided highway. The FEIS identified two Preferred Alternatives: one for the Northern Study Area and one for the Southern Study Area.

The Northern Study Area extends from the Delaware state line south to Berlin, MD, a distance of approximately 7.5 miles. The Southern Study Area extends along US 113 from south of Berlin, MD to Snow Hill, MD, a distance of approximately 13.5 miles. The Southern Study Area dualization was broken into several construction phases as cited below:

- Phase 1 from Market Street to Public Landing Road – Construction was completed in December 2006.
- Phase 2A from north of Hayes Landing Road to north of Goody Hill Road – Construction was completed in September 2009.
- Phase 2B from north of Goody Hill Road to South of Massey Branch – Construction was completed in September 2011.
- Phase 3 from south of Massey Branch to north of Five Mile Branch
- Phase 4 from north of Five Mile Branch to north of Public Landing Road
- A Phase 5 was later added to provided a new interchange at US 113 at the MD 12 intersection.

The SHA has completed an Environmental Reevaluation of the Southern Study Area FEIS. This Environmental Reevaluation was approved by FHWA June 25, 2014.

2.07.02.03 Project Goals

1. To provide a safe facility and maintain mobility for all roadway users.
2. To provide access control while minimizing delay to roadway users

3. To provide safe access to all roadways for Emergency Response that minimizes the delay for Emergency Response as much as possible.
4. To provide a facility that is able to be adequately maintained.
5. To construct the dualization at the US 113 and Maryland and Delaware Railroad in the time allotted
6. To Minimize impacts to Forest Interior Dwelling Bird Species (FIDS)

2.07.02.04 Project Key Issues

Emergency Response

- As part of the US 113 Phase 3 project, access and intersection control measures will be implemented to increase safety. This, however, has the potential to add additional delay time to Emergency Response and the functions of the Emergency Responders at each access point. These delays should be minimized as much as possible.
- The various emergency response vehicles that may utilize this section of US 113 have specific characteristics and limitations (turning ability, vehicle clearance, ability to clear obstacles, etc.). In some cases, such as with fire trucks full of water, those characteristics and limitations change.
- The main fire truck fill up location is at the Newark Water Tower.
- The local community has requested a traffic signal at the intersection of US 113 and Langmaid Road be installed to alleviate the potential for emergency response issues. The Administration has performed a signal warrant study which determined that a signal is not warranted at this location. The State Highway Administration will not be installing a signal at the US 113 and Langmaid Road intersection as part of this project.

Access/Delay Issues

- As part of the US 113 Phase 3 project, access and intersection control measures will be implemented to increase safety. This, however, has the potential to add additional delay for each intersection.
- Concerns raised by the local community with J-Turns is that the various types of non-typical vehicles (Combines, tractor trailers, school buses, farm equipment, chicken hauling trucks, etc.) that utilize this section of US 113 will have difficulty effectively navigating the J-Turns. This is due to due to the specific special characteristics and limitations (turning ability, vehicle clearance, width, length, etc.) of those vehicles.

Schedule

- The Maryland Delaware Railroad crosses US 113 South of Langmaid Road. This crossing shall only be taken out of service as defined in TC 3.09. Construction will need to be phased to maximize the work time

available prior to the outage, and construct all improvements at the crossing location prior to the dates noted in TC 3.09.

- 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.
- 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.
- Construction schedule will need to be coordinated to minimize impacts to FIDS

Bicycle Accommodation

- The current concept design provides for a 4' inside shoulder, 2 - 12' through lanes, a 10' auxiliary lane, and a 6' outside shoulder at intersections. The intent of the concept design was to terminate the marked bicycle lanes prior to a right turn lane and allow a bicyclist to continue along the outside shoulder through the intersection. However, with a recent change in Maryland vehicle law on roadways with a posted speed limit of greater than 50 miles per hour, the provision of pocket bicycle lanes is required. The current concept design does not provide adequate width to meet all design criteria and provide for 6' pocket lanes as a minimum 2' outside shoulder would be required outside the auxiliary lane. The Administration's strong preference would be to provide a typical section with a 6' pocket lane which is fully compliant with all RFP design requirements. Alternative Technical Concepts are encouraged to address this situation.

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.

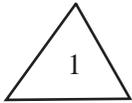
These studies were performed with reasonable care and recorded in good faith. The Administration considers the information Engineering Data and will stand behind its accuracy at the location it was taken. The Administration assumes no responsibility in respect to the sufficiency of the studies for design. 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. 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

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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.



2.07.02.05.6 Right of Way

The Administration will clear Right-of-way in a phased approach.

The Right-of-way on the following plats is anticipated to be cleared on or before April 30, 2015:

Plat No.	From Approximate STA	To Approximate STA
59766	1612+50	Beginning of Project
59767	1612+50	1601+00
59768	1601+00	1590+50

The Right-of-way on the following plats is anticipated to be cleared on or before May 29, 2015:

Plat No.	From Approximate STA	To Approximate STA
59769	1590+50	1577+40
59770	1577+40	1564+40
59771	1564+40	1552+00
59772	1552+00	1538+40

The Right-of-way on the following plats is anticipated to be cleared on or before June 30, 2015:

Plat No.	From Approximate STA	To Approximate STA
59773	1538+40	1524+75
59774	1524+75	1511+50
59775	1511+50	1483+25
59776	1483+25	1497+94

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59777	1497+94	1483+25
59778	1483+25	1469+50
59779	1469+50	1456+00
59780	1456+00	1442+00

All right of way is anticipated to be cleared on or before on or before June 30, 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 and Section 404 Individual Permit (from MDE and USACE)
- Reforestation Site Review Permit (from DNR)
- Stormwater Management Permit (from MDE)
- Erosion and Sediment Control Approval (from MDE)
- NPDES Construction Activity Permit (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 submittal of Technical Proposals 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 Request for Proposals.

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 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 will submit a Notice of Intent (NOI) form to MDE for this project. 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. Request for Proposals.

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

1. Topographic files
2. Text files
3. Existing Contour files
4. Triangle files
5. Environmental Features file
6. Existing Surface files
7. Intergraph Output/Coordinate files

C. Utility Files

1. Utility designation files

D. Right-of-Way

1. Existing Right-of-way file
2. Proposed Right-of-Way Line file
3. Right-of-way Plats

E. Landscaping, Reforestation Permit & Wetland Plates

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1. Forest Impact Plans
2. Forest Impact Design Files
3. Wetland Impact Plates
4. Wetland Impact Plates Design Files
5. Wetland Delineation Memorandum



6. Original COE Permit 97-63647-9

F. NEPA Environmental Document

1. Environmental Reevaluation of the Southern Study Area FEIS

G. Railroad Criteria

1. Railroad Horizontal Alignment
2. Railroad Vertical Alignment

H. Appendices

1. Pavement Details
2. Pavement and Geotechnical Data (Appendices A to E)
3. Existing and Proposed Traffic Data



4. Traffic Control Device Design Request

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.

I. Conceptual Plan Sheets

1. Title Sheet
2. Typical Section Sheets
3. Geometry Sheets
4. Roadway Plan Sheets
5. Roadway Profile Sheets
6. Landscape Planting Zone Concept Plans



7. Cross-Sections

J. Design Files

**SPECIAL PROVISIONS
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CONTRACT NO. WO6365170

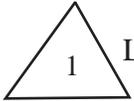
13 of 42

1. Roadway Design File
2. Horizontal Baseline
3. Vertical Alignment file
4. Shading file
5. Border files
6. Conceptual/Potential SWM area file
7. InRoads files



K. Utility Concept Plans

1. Verizon Concept Plans



L. As-built Plans

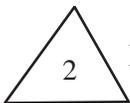
1. WO332-002-120
2. WO685-501-176

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 their design.



M. Stormwater Management and Surface Drainage Information

1. NOI Form (and attachment)
2. Concept Stormwater Management Report (.pdf file)
3. Concept Stormwater Management Report Appendix G Files
4. BMP Checklists and As-Built Certification Formats
5. SWM Report Format Guidelines
6. SHA BMP Identification Form
7. Water Quality Summary Sheet Format and Definitions
8. Geotextile Guidelines
9. MD SHA SWM Site Development Criteria, prepared by Highway Hydraulics Division, Revised January 2011.



N. Office of Structures, Draft Policy and Procedures Manual

1. Design

2. Plans

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

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

Proposers are also provided with a file index provided on Projectwise. The file is a Word Document describing all the files and 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 and Construction for All Bridges, Culverts, Walls and any and all other incidental structures specifically required for this project.
- 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.
- 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 1 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 may require additional survey or topographic information (including utility locations). The Design-Builder must account for these services within their project schedule and design submittals. It is the responsibility of the Prospective Proposer at its expense to obtain all additional information and the Administration accepts no responsibility for the lack of this information.

2.08.01.4 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

2.08.02.1 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:

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- a. The meetings are intended to provide Proposers with a better understanding of the RFP.
- b. The Administration will not discuss any Proposal or ATC with any Proposer other than its own.
- c. Proposers are not permitted to seek to obtain commitments from the Administration in the meetings or otherwise seek to obtain an unfair competitive advantage over any other Proposer.
- d. No aspect of these meetings is intended to provide any Proposer with access to information that is not similarly available to other Proposers, and no part of the evaluation of Proposals will be based on the conduct or discussions that occur during these meetings.

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

2.08.02.2 Letter of Interest

A Letter of Interest (LOI), on official letterhead of the Design-Build Team, notifying the Administration whether or not the DB Team intends to submit a Price Proposal must be delivered no later than **October 29, 2014 prior to 12 noon** (EST). The LOI must be delivered to the following email address:

WO6365170_US_113@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.

2.08.02.3 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

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single contact and source of information for this procurement.

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

The specific rules of contact are as follows:

1. Section 11-205 of the State Finance and Procurement Article, Annotated Code of Maryland, prohibits and penalizes collusion in the State procurement process.
2. Unless otherwise specifically authorized by the Procurement Officer, a Proposer may contact the Administration only through the Procurement Officer and only in letter format via e-mail and not orally. The Proposer's contacts with the Administration will be only through a single representative authorized to bind the Proposer.
3. The Procurement Officer normally will contact a Proposer in writing through the Proposer's designated representative.
4. Neither a Proposer nor its agents may contact Administration employees, including Administration heads, members of the evaluation committee(s) and any other person who will evaluate SOQs, regarding the PROJECT, except through the process identified above.
5. Any contact by a Proposer determined to be improper may result in disqualification of the Proposer.
6. The Administration will not be responsible for or bound by: (1) any oral communication, or (2) any other information or contact that occurs outside the official communication process specified herein, unless confirmed in writing by the Procurement Officer.

All requests for additional information or clarification of the RFP and any other communication concerning this Project shall be submitted via e-mailed with return confirmation receipt. No verbal requests or personal visits will be honored. All written contacts shall be addressed to:

Mr. Jason A. Ridgway, Director
Office of Highway Development
State Highway Administration
e-mail address: WO6365170_US_113@sha.state.md.us

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. The Administration will deliver copies of each question and response to all Proposers by e-mail. Each Proposer must acknowledge receipt of the e-mail communication. The Administration may rephrase questions as it deems appropriate and may consolidate similar questions. Multiple responses are anticipated. The last response will be posted not later than 7 days prior to the Proposal due date.

Only requests received by 4:00 p.m. EST on **October 22, 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.

2.08.02.4 Addenda

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

2.08.02.5 Request for Information (RFI)

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

2.08.02.6 Substitutions

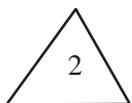
Proposers are advised that, in order for a Proposer to remain qualified to submit a Proposal after it has been placed on the Reduced Candidate List, its organization, its organization and Key Staff identified in the Statement of Qualifications (SOQ) must remain intact for the duration of the procurement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

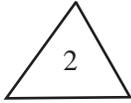
2.08.02.7 Compliance with Applicable Law

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

2.08.02.8 ATC Submittal and Review

The Administration has chosen to use the alternative technical concept (ATC) process to allow innovation and flexibility to be incorporated into the Technical and Price Proposals submitted by the Reduced Candidate List (RCL) and to avoid delays and potential conflicts in the design associated with deferring 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 Technical and Price Proposals, 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.

The Proposer may submit an ATC for review by the Administration on or before **October 1, 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 WO6365170_US_113@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 WO6365170_US_113@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.

2.08.02.9 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.

2.08.02.10 Determination By The Administration

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

A) The ATC is 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.

2.08.02.11 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 in the Proposal. Proposals with or without ATCs will be evaluated against the same technical evaluation factors, and the inclusion of an ATC, including an ATC that provides technical enhancements, may or may not receive a higher technical rating.

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

2.08.02.12 ATC Confidentiality

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

2.08.02.13 One-On-One Meetings

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

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 a Price Proposal as described in TC Section 2.10.

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

US 113 (Phase 3) - From North of Massey Branch To Five Mile Branch Road – WO6365170

Container ____ of ____

c. Location and deadline for submittal of Technical Proposal Submittal



Technical Proposals must be delivered no later than **November 10, 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 and copies of the Administration's ATC approval letters for each incorporated ATC

e. Price Proposals

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

US 113 (Phase 3) - From North of Massey Branch To Five Mile Branch Road – WO6365170

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

US 113 (Phase 3) - From North of Massey Branch To Five Mile Branch Road – WO6365170

g. Location and deadline for submittal of Price Proposal Submittal



Price Proposals must be delivered no later than **November 19, 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. The Lump Sum Cost Breakdown shall also be submitted as outlined in TC Section 7.10.

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.

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 PROPOSALS

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

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 six parts, meet the specified page limitation, and correspond to the outline as follows:

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- Cover Letter
- Project Technical Elements & Approach
- Project Schedule & Project Management
- Environmental Approach
- Legal and Financial Information

Format:

- Paper. The Technical Proposal submittal shall be submitted on 8.5”-by-11” paper printed back to back where practical. Charts, exhibits, and other illustrative and graphical information may be on 11”-by-17” paper, but must be folded to 8.5”-by-11”, with the title block showing.
- Type Font and Margins. The type face of all narrative text shall be at least 12-pt, either Arial or Times New Roman font, and all page margins must be at least ½” from sides and 1” from top and bottom. All pages shall be sequentially numbered not including the cover letter.
- Page Limits. The Technical Proposal submittal shall be limited to the number of pages defined below. No page limit will be imposed on the appendices, although the size of the appendix should be kept within reason.
- Finding tools, such as tables of contents and page dividers shall be utilized to make the submittals easily usable.

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

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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 Technical Elements & Approach (Limit 12 Pages) -
CRITICAL**

- Technical Elements of the Scope of Work: In words, graphic illustrations and drawings, and technical data necessary for the Administration to evaluate, present a summary of your proposed project improvements addressing the following elements:
 - Emergency Response - Technical Elements that will minimize delay to emergency responders while ensuring safety for the emergency responders and the traveling public and how you will consider emergency responder vehicle characteristics and limitations and the need to access the Newark Water Tower - **CRITICAL**
 - How the Design-Builder would propose to accommodate bicycles at intersections including any design exceptions or waivers which would be necessary and the engineering justification that you would propose for the design exception or waiver. – **CRITICAL**
 - Maximize Operations and Safety – Technical Elements that will maximize safety, minimize delay and minimize the number of access points on US 113 and how you design will incorporate considerations for the various types of non-typical vehicles at each access point. – **SIGNIFICANT**
 - Construction sequencing, methods and innovation proposed - **SIGNIFICANT**
 - Maintenance Benefits - Technical elements that will reduce future maintenance by increasing the life cycle of project elements within the project limits, that increase the ease of future maintenance activities or that do not create a detriment to future maintenance. – **IMPORTANT**
 - Value added to the project above the minimum project scope – **IMPORTANT**

Your discussion shall be guided not only by this RFP Section and the Scope of Work, but also by the guidelines, performance requirements, and design and construction criteria set forth throughout other parts of the RFP Documents.

2.09.03 Project Schedule & Project Management (Limit 14 Pages) - SIGNIFICANT

A. Project 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 detailing any perceived benefits of the Design-Builder's schedule to the Administration and detailing methods to expedite the construction of critical path items on or before the date(s) located elsewhere in this RFP.

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 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 date(s) and events critical to this project cannot exceed the dates located elsewhere in this RFP. An earlier completion date, for either the contract completion or critical schedule date(s) indicated elsewhere in this RFP, which provides benefit to the Administration, will be given positive consideration in the technical evaluation. Upon execution of the contract, the Design-Builder will be held to the critical schedule dates presented in its technical proposal for the calculation of any deductions including, but not limited to, liquidated damages and disincentives.

B. Project Management – CRITICAL

General: Provide an overall description of your Design-Build Team’s Project Management Plan addressing the following elements:

- Project communication plan including how you will communicate internally within the Design-Build team, and how and when you will communicate, through design and construction, externally with the Administration, MD/DE Railroad, utility companies and externally with the public including roadway users, impacted stakeholders, community officials and the general public. Discuss how you will document and control this communication.
- Coordination management plan through design and construction, including how and when you will coordinate the phased acquisition of right-of-way, concurrent utility work and relocations, permit restrictions, and concurrent MD/DE Railroad work.
- 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.
- 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.
- Safety management including for workers, roadway users, site visitors, and others.

2.09.05 Environmental Approach (Limit 6 Pages) – IMPORTANT

General: 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.

2.09.06 Legal & Financial Information (Limit 8 Pages Maximum, excluding copies of underlying team agreements)

The structure of the Legal and Financial information shall include:

A. Design - Build Team Organization. Briefly describe the proposed legal structure of the Design-Build Contractor and team, and provide copies of underlying agreement(s). Confidential price data may be excluded or eradicated from the organizational legal documents provided.

B. Liability: State whether Major Participant firm(s) who will be party to the prime design – build contract with the Administration will have joint and several liability, and how liability is being apportioned between other firms of the design- builder team. Provide documentation that you have met the requirements for Professional Liability Insurance including agreements between participants.

C. Bonding Capability: Provide evidence that the Design-Builder entity is capable of obtaining a Performance Bond and a Payment Bond in accordance with the requirements in Maryland’s July 2008 Standard Specifications for Construction and Materials, GP – Section 3 and appropriate for the upper range of a Project Classification I as defined in Maryland’s Standard Specifications for Construction and Materials, Section TC 2.01.

Such evidence shall take the form of a letter from a surety company indicating that such capacity is anticipated to be available for the contracting entity. Letters indicating “unlimited” bonding capacity are not acceptable. The surety company providing such letter must be rated at least A- by two nationally recognized credit rating agencies or at least A-VII by A.M. Best & Company. The letter should recognize the firm’s backlog and work in progress in relation to its bonding capacity.

TC-2.10 PRICE PROPOSAL

2.10.01 General

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

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



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

2.10.02 Reforestation Incentive Procedure

The Design-Build Team is advised that upon final acceptance of the constructed project, completion of as-built plans and approval of permit modification by DNR, the contractor will be reimbursed for any additional on-site upland reforestation, which meets DNR requirements, that is accomplished beyond the specified on-site reforestation in increments of 0.50 acre. See TC 3.20.08.05.03 Forest Mitigation contained within this RFP for the contract requirements.

2.10.03 Wetland and/or Waterway Impact Reduction Incentive

The Design-Build Team is advised that upon final acceptance of the constructed project, completion of as-built plans and approval of permit modification by USACE/MDE, the contractor will be reimbursed for any permanent wetland or waterway impact reduction in increments of 0.10 acre. See TC Section 3.20.08.04.03 Wetland and/or Waterway Impact Reduction Incentive contained within this RFP for the contract requirements.

2.10.04 Erosion Sediment Control Incentive/Liquidated Damages Payment

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

2.10.05 Bid Irrevocable

The Contractor's prices are irrevocable for 180 days following receipt of the Price Proposal.

2.10.06 Proposal Guarantee

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

2.10.07 Liquidated Damages

In the event a complete usable facility is not provided by the calendar date, a liquidated damage will be charged in accordance with the provisions of GP 8.09. The dollar amount of liquidated damages is stated on page 44 of 45 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 2.11 EVALUATION OF PROPOSALS, OPENING AND SELECTION

2.11.01 Best Value Process

The Technical Proposal will be evaluated on the pass/fail and technical evaluation factors identified in TC Section 2.09. An evaluation committee (Committee) will determine the pass/fail status and overall technical rating of each Proposal. Once the overall technical rating is determined for each Technical Proposal, the Price Proposal results will be provided to the Committee and a tradeoff analysis will be performed. The Evaluation Committee will prepare a recommendation to the Selection Official indicating which Proposal is the most advantageous to the State (i.e., represents the best value). The Selection Official, together with the Selection Committee, will then assess the Evaluation Committee's recommendation and make a final determination as to which Proposal is the most advantageous to the State considering the technical and price factors set forth in this document.

When determining which D-B Teams submittal is the most advantageous to the State, the Technical and Price Proposals are approximately equal in importance.

2.11.02 Evaluation of Technical Proposals

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

- Project Technical Elements & Approach - CRITICAL
- Project Schedule & Project Management - SIGNIFICANT
- 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.

The following will be evaluated on a Pass/Fail basis and will be based on the clarity and completeness of information provided, as well as the stability and collective capabilities of the Design - Build team relative to this Project to perform as an integrated team. Each

Proposal must achieve a rating of “Pass” on any “Pass/Fail” factor listed in Section 2.09.06 to receive further consideration. Failure to achieve a “Pass” rating on any “Pass/Fail” factor will result in the Proposal being rated UNACCEPTABLE, the price proposal will not be rated and the Proposer will be disqualified.

o Legal & Financial Information

2.11.02.1 Other

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

2.11.02.2 Technical Proposal Evaluation Committee

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

2.11.02.3 Evaluation Process

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

2.11.02.4 Evaluation Results

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

EXCEPTIONAL – The Proposer has demonstrated 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.

2.11.03 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

2.11.04 Communications

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

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

2.11.05 Competitive Range

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

Technical Proposal and evaluation of each Price Proposal against all evaluation criteria.

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

- A) Any Proposal that, even after review of supplemental information or clarification provided by the Proposer in response to an Administration request does not pass the pass/fail evaluation factors;
- B) A Proposal that, after the initial evaluation, is rated lower than “SUSCEPTIBLE TO BECOME ACCEPTABLE” for any technical evaluation factor;
- C) Any Proposal that includes a Price Proposal that is considered unacceptable.

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

2.11.06 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.

2.11.06.1 Purpose

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

- A) Advising the Proposers of weaknesses, significant weaknesses, and/or deficiencies in their Proposals (relative to the RFP);
- B) Attempting to resolve any uncertainties and obtaining any significant additional understanding concerning the Proposal;
- C) Resolving any suspected mistakes by calling them to the attention of the Proposers as specifically as possible without disclosing information concerning other competing Proposals or the evaluation process;
- D) Providing the Proposers a reasonable opportunity to submit any further technical or other supplemental information to their Proposals;
- E) Facilitating execution of a contract that is most advantageous to the State, taking into consideration the technical and price factors discussed above.

2.11.06.2 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.

2.11.06.3 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.

2.11.07 Proposal Revisions

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

At the conclusion of Discussions (if held), the Administration will request a proposal revision or BAFOs from all Proposers in the Competitive Range to provide Proposers an opportunity to revise their Proposals (both the Technical Proposal and Price Proposal),

including correction of any weaknesses, minor irregularities, errors, and/or Deficiencies identified to the Proposers by the Administration following initial evaluation of the Proposals. The request for proposal revision or BAFOs will allow adequate time, as determined by the Administration, for the Proposers to revise their Proposals. Upon receipt of the proposal revisions or BAFOs, the process of evaluation will be repeated. The process will consider the revised information and re-evaluate and revise ratings as appropriate.

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

2.11.08 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 with the best combination of the Technical Proposal and Price which the Administration determines provides the best opportunity to obtain the right Design-Build Team to ensure a successful project.

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

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 concept ideas provided to the Administration are expected to be included in the price proposal, final plan, design and construction phases. The Administration or successful proposer may use ideas and approaches excluding proprietary or protected information.

NOTE: All materials, conferences, proposals and other matters related to this project shall remain confidential until the contract is executed with the successful DB Team. However, the Administration does reserve the right to use the knowledge of good ideas of one team in discussions with the successful Team.

TC-2.12 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

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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.

TC-2.13 STIPEND

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

A stipend in the amount of \$68,000.00 will be paid to each Proposer meeting at least one of the following terms and conditions:

- A) Its Proposal (including any BAFO) has achieved a rating of Pass on all “Pass/Fail” evaluation factors and an overall qualitative rating of at least “ACCEPTABLE –“ for all technical factors; or
- B) Its Proposal (including any BAFO) 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.

A stipend in the amount of \$68,000.00 may be paid to a Proposer not meeting either of the above conditions if:

- An Alternative Technical Concept (ATC) is approved by the Administration and the Administration wishes to utilize the ATC in the final design.

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

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

Three completed, signed originals of the enclosed Agreement must be submitted to 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 be returned and not processed for payment.

Invoices shall contain the following information:

Invoice # - created by the Design-Build Team

Federal Tax I.D. number

Remittance Address

FMIS # - WO636B51

Contract Description – US 113 (Phase 3) - From North of Massey Branch to Five Mile Branch Road

Construction # - WO6365170

Payment Amount - \$68,000.00

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

STIPEND AGREEMENT

Contract No. WO6365170

Project Description: US 113 (Phase 3) - From North of Massey Branch to Five Mile Branch Road

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 US 113 (Phase 3) - From North of Massey Branch to Five Mile Branch Road 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 US 113 (Phase 3) - From North of Massey Branch to Five Mile Branch Road will be owned and operated by the State Highway Administration (SHA or Administration), which owns all non-tolled state highways and bridges in the State of Maryland ("State"). The Administration is responsible for administration of design and construction of the Project.

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

NOW, THEREFORE, Proposer hereby agrees as follows:

1. Work Product.

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

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

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

1.4 In consideration for the SHA's agreement to make payment hereunder, Proposer agrees that the SHA shall be entitled to use all Work Product, without any further compensation or consideration to the Proposer, in connection with the RFP, the Contract Documents,

the Project and future procurements by the SHA. Notwithstanding the foregoing, SHA shall not be entitled to use information submitted by Proposer to the SHA in which the SHA determines is exempt from disclosure under the Maryland Public Information Act (“PIA”), Title 10, Subtitle 6, Part III of the State Government Article of the Annotated Code of Maryland, unless the RFP otherwise provides.

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

2. Compensation And Payment.

- 2.1 Compensation payable to Proposer for the Work Product described herein shall be \$68,000.00 if all of the following conditions are met:

Proposer’s Proposals, was not the most advantageous to the State 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 \$68,000.00 and will be subject to audit of the costs incurred by the Proposer in preparing its Technical Proposal and Price Proposal. Auditors shall have access to all books, records, documents and other evidence and accounting principles and practices sufficient to reflect properly all direct and indirect costs of whatever nature claimed to have been incurred. Failure of the Proposer or its team members to maintain and retain sufficient records to allow the auditors to verify all or a portion of the claim or to permit the auditors access to the books and records of Proposer and its team members shall constitute a waiver of the right to be paid a stipend and shall bar any recovery hereunder.

Any Proposer wishing to apply for a stipend under this subparagraph (a) shall submit the completed Agreement to the SHA concurrently with the price proposals being submitted. Eligibility of receipt of a stipend is dependent upon meeting the conditions set forth in Section 2.1. of this Agreement and TC Section 2.13 of the RFP.

- (b) If the procurement is cancelled prior to the Proposal Due Date.

Proposers will be provided the opportunity, at their option, of delivering to the SHA the Work Product of their Proposal preparations to date. There is no specific format required for such Work Product. Those Proposers that choose to

deliver their Work Product may be paid an amount that the SHA deems to be appropriate consideration for the Work Product. No portion of the stipend amount will be paid in the event a Proposer chooses not to deliver its Work Product. Any amount paid under this subparagraph (b) will not exceed the amount identified in Section 2.1 and will be subject to the audit criteria in Section 2.2 (a).

- 2.3 Any payment of compensation owing hereunder will be made (i) within 30 days after receipt of a proper invoice submitted to the SHA under this Section 2.3 or (ii) if an award is made, 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

Statement of Qualifications 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 Statement of Qualifications 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 Statement of Qualifications 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 Reports, 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 the all bridges, culverts (those meeting MD SHA criteria for classification of a Small Structure), retaining walls, and any other incidental structure specifically design 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 be responsible for all pavement engineering for all Roadway Elements for the Project as outlined in TC 3.10.

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 Design- Build Team shall prepare the necessary documents to obtain final reforestation site review approval from the Maryland Department of Natural Resources (MDNR). The Design-Build Team shall submit all documents to the Administration for review and to MDNR for approval. Should the Design-Build Team's submittals not be approved by the MDNR, the Design-Build Team is responsible for modifying submittals at no additional cost to the Administration.

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. 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. 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 H&H 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 Design Engineer. 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.

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 was 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.

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.

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 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 MDE for approval with final approval being issued by the Administration's Highway Hydraulics Division. 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.

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.

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

If the total earth disturbance is one acre or more, the Design-Build Team must submit to the Administration's Highway Hydraulic Division a complete Notice of Intent (NOI) form in accordance with the NPDES General Permit for Construction Activities. No disturbance is allowed until this form is accepted by MDE. The Design-Build Team shall be responsible for any fines, shutdowns, or fees associated with non-compliance, at no cost to 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 ProjectWise. 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 ProjectWise 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 bridges, 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 determines that additional trees must be removed, the Design-Build Team shall request a field review with the SHA LAD/LOD and is responsible for providing the Administration with all information requested. If the Administration concurs with the request, it shall be the responsibility of the Design-Build Team to obtain and comply with the terms of the modified permit(s) from MDNR at no additional cost.

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

- 1) Nontidal Wetlands & Waterways Permit and Section 404 Individual Permit (from MDE and USACE)
- 2) Reforestation Site Review 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; and

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 of Qualifications 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 Statement of Qualifications. The format for replacement staff must be the same format as required for the Statement of Qualifications 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 Statement of Qualifications 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-201, 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 navigatable 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 TIF and PDF files, both at 200 DPI, of the As-Built Plans on CD ROM or via ProjectWise. 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 numbering order of the As-builts as described above. This number is followed by another (.) and then the TIF and PDF extension. Example: WO6365170.1001.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, Worcester County; Maryland & Delaware Railroad, 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 various utility companies will relocate their underground and overhead facilities prior to and during the construction operations. See the Section 3.15 – Utility Design and Relocation Criteria.

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. 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 created by the Design-Build Team 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
- SHA Traffic Engineering Design Division
- District Utility Engineer
- District Traffic Engineer
- MD/DE Railroad representatives

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 protections devices of forested areas.
- Stake out and approval of tree protection devices and fence locations.
- Progress schedule (design and construction);

- Critical work sequencing;
- Permits and licenses;
- Submission schedule;
- Submittal of Shop Drawings, project data and samples;
- Itemized schedule listing dates by which other submissions will be forwarded to the Administration;
- Major equipment, deliveries and priorities;
- Site utilization plans;
- Office and storage area;
- Construction constraints;
- Coordination of all interface activities;
- Training;
- Availability of utilities/need for temporary services;
- Procedures for maintaining Record Documents;
- Material submittals and approvals;
- Processing of field decisions and change orders;
- Close-out procedures;
- Review of miscellaneous procedures;
- Safety;
- Railroad Coordination
- Utility relocations and coordination, 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, Maryland & Delaware Railroad 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
- 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
- Stormwater Management Plans and Details
- Culvert Extension Plan, Elevation and Details
- Stream Diversion Plans
- Signing and Pavement Marking Plans
- Cross Sections
- Landscape/Reforestation/SWM Planting Plans
- Lighting 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.

3.08.01.5 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 3.06.16.3). 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.

3.08.01.6 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 1 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, NGVD 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 by 11 inch, 3-hole binder that allows for insertion of revisions and removal of old data.
- Revisions to report as required. The date of the revision shall be placed on all 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.
- SHA Water Quality Summary Sheet (WQSS) submitted to Administration, Highway Hydraulics Division, for signature. Maps detailing the impervious areas added, impervious areas treated, pavement removed, redevelopment areas, and areas where existing treatment is lost.
- MDE SWM Waiver Applications that differ from those submitted with the Concept SWM Report. These shall be submitted to the Administration, Highway Hydraulics Division, for signature.
- SHA BMP Identification Forms (included in this package) with SHA BMP numbers indicated. The Design-Build Team is responsible to obtain BMP numbers for all SWM facilities from the Administration, Highway Hydraulics Division.

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 by 11 inch, 3-hole binder that allows for insertion of revisions and removal of old data.

- Revisions to report as required. The date of the revision shall be placed on all revised pages. Pages which are added or removed shall be indicated as such. Revisions shall be 3-hole punched for easy placement in the reports.
- 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 (3.08.03.1.1).

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 Geotechnical Reports

3.07.03.4.01 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.

3.07.03.4.02 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.

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.

3.07.03.6 Pavement Report(s)

Interim Pavement Report(s) and FWD Result Report(s) shall be prepared as outlined in TC 3.10

3.07.04 Engineers Office

The Design-Build Team shall supply one (1) Engineer's Office Type D, for use by - Administration personnel, conforming to the requirements of Section 103 of the Standard

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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, and four (4) cellular phones, and 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.

08/14/2014

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

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
AASHTO	A Policy on Geometric Design of Highways and Streets, 2001
AASHTO	Roadside Design Guide, 2011
SHA	Maryland Manual on Uniform Traffic Control Devices (MD MUTCD) – 2011 Edition
FHWA	Manual on Uniform Traffic Control Devices, 2009
AASHTO	Guide for the Development of Bicycle Facilities, 2012
SHA	Highway Design Policy and Procedure Manual
ADA	ADA Guidelines Americans with Disabilities Act
SHA	Standard Specifications for Construction Materials
SHA	Book of Standards Highway and Incidental

Table 1
Guidelines for Roadway

Author or Agency	Title
	Structures
SHA	Guidelines for Traffic Barrier Placement and End Treatment Design, dated 2006 Bicycle Policy and Design Guidelines, dated 2013

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 these specifications, 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 geometrics including horizontal alignment, vertical alignment, superelevation, cross slopes, lane widths, shoulder widths, medians, and clear zone grading in accordance with the requirements of this section and the 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

US 113 Mainline Criteria	
Design Speed	60 mph
Posted Speed	55 mph
Functional Classification	Arterial
Terrain	Flat
Minimum length of Horizontal Curve	Per AASHTO
Maximum Superelevation	6%

Maximum Grade	4%
Minimum Grade	0.5%
Superelevation Transition Design	Per AASHTO

County and Service Roadway Criteria	
Design Speed	40 mph
Functional Classification	Minor Collector/Local
Posted Speed	35 mph
Terrain	Flat
Minimum length of Horizontal Curve	Per AASHTO
Maximum Superelevation	6%
Maximum Grade	8%
Minimum Grade	0.5%
Superelevation Transition Design	Per AASHTO

Driveway Criteria	
Design Speed	20 mph
Functional Classification	Local Road
Posted Speed	N/A
Terrain	Flat
Minimum length of Horizontal Curve	Per AASHTO
Maximum Superelevation	N/A
Maximum Grade	11%
Minimum Grade	0.5%
Superelevation Transition Design	N/A

- 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:

US 113 Typical Section Vehicular Lanes								
Station*			Southbound			Northbound		
Begin	End		Right Turn/ Accel Lanes	Thru Lanes	Left Turn Lanes / Accel Lanes	Left Turn Lanes / Accel Lanes	Thru Lanes	Right Turn/ Accel Lanes
1430+00	1433+82	No. of Lanes	0	2	0	0	2	0

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US 113 Typical Section Vehicular Lanes								
Station*			Southbound			Northbound		
Begin	End		Right Turn/ Accel Lanes	Thru Lanes	Left Turn Lanes / Accel Lanes	Left Turn Lanes / Accel Lanes	Thru Lanes	Right Turn/ Accel Lanes
1441+00	1466+90	Width of Each Lane	N/A	12'	N/A	N/A	12'	N/A
1475+18	1479+20							
1514+59	1541+00							
1556+35	1557+69							
1565+36	1572+06							
1584+00	1586+48							
1619+04	1619+19							
1433+82	1441+00	No. of Lanes	0	2	1	0	2	1
1466+90	1473+00	Width of Each Lane	N/A	12'	12'	N/A	12'	10'
1498+50	1512+00							
1557+69	1565+09							
1572+06	1579+61							
1473+00	1475+18	No. of Lanes	0	2	1	0	2	0
1512+00	1514+59	Width of Each Lane	N/A	12'	12'	N/A	12'	N/A
1565+09	1565+36							
1579+61	1584+00							
1479+20	1479+50	No. of Lanes	0	2	0	1	2	0
1541+00	1542+60	Width of Each Lane	N/A	12'	N/A	12'	12'	N/A
1605+52	1608+20							
1610+83	1610+90							
1479+50	1487+52	No. of Lanes	1	2	0	1	2	0
1542+60	1549+11	Width of Each Lane	10'	12'	N/A	12'	12'	N/A
1602+70	1605+52							
1610+90	1619+04							
		No. of Lanes	1	2	0	0	2	0
1487+52	1489+88	Width of Each Lane	10'	12'	N/A	N/A	12'	N/A
1549+11	1556+35							
1489+88	1498+50	No. of Lanes	1	2	1	0	2	0



US 113 Typical Section Vehicular Lanes								
Station*			Southbound			Northbound		
Begin	End		Right Turn/ Accel Lanes	Thru Lanes	Left Turn Lanes / Accel Lanes	Left Turn Lanes / Accel Lanes	Thru Lanes	Right Turn/ Accel Lanes
		Width of Each Lane	10'	12'	12'	N/A	12'	N/A
1586+48	1588+26	No. of Lanes	0	2	0	1	2	1
		Width of Each Lane	N/A	12'	N/A	12'	12'	10'
1588+26	1602+70	No. of Lanes	1	2	0	1	2	1
		Width of Each Lane	10'	12'	N/A	12'	12'	10'
** 1608+20	1610+83	No. of Lanes	0	2	0	1	2	0
		Width of Each Lane	N/A	12'	N/A	10'	12'	N/A

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

** US 113 Phase III, SHA Contract Number WO63654170 Sta. BK 1609+58.71 = US 113 Phase IIB, SHA Contract Number WO6345270 Sta. AHD 1609+00.00



Minimum width 10' outside shoulders shall be provided throughout the project limits where right turn lanes or acceleration lanes are not provided. Where right turn lanes or acceleration lanes are provided, outside shoulders shall have a minimum 6' paved width with 2' of traversable grading. A 34' minimum width median shall be provided except when tying into the previously constructed US 113 Phase IIB, SHA Contract Number WO6345270.

An 8' gore area between the southbound left turn lane / acceleration lane and the southbound travel lanes shall be provided at the following locations:

- Sta. 1466+90 to Sta. 1475+18
- Sta. 1498+50 to Sta. 1512+95
- Sta. 1572+06 to Sta. 1584+00

An 8' gore area between the northbound left turn lane / acceleration lane and the northbound travel lanes shall be provided at the following locations:

- Sta. 1479+20 to Sta. 1487+52
- Sta. 1588+98 to Sta. 1607+00
- Sta. 1610+83 to Sta. 1619+04

A minimum 4' paved inside shoulder shall be provided adjacent to open section medians except

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when adjacent to left turn lanes at intersections. A minimum 2' paved inside shoulder shall be provided adjacent to left turn lanes at intersections adjacent to open section medians.

Basket Switch Road Typical Section Vehicular Lanes				
Station*			Westbound	Eastbound
Begin	End		Thru Lanes	Thru Lanes
10+62	12+38	No. of Lanes	1	1
		Width of Each Lane	Varies	Varies

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

Minimum width 5' outside shoulders shall be provided. A minimum of 3' of the shoulder width shall be paved.

Langmaid Road Typical Section Vehicular Lanes						
Station*			Westbound		Eastbound	
Begin	End		Right Turn Lane	Thru Lanes	Thru Lane /Left Turn Lane	Right Turn Lane
630+00	632+54	No. of Lanes	1	1	1	1
		Width of Each Lane	11'	11'	11'	11'
632+54	635+36	No. of Lanes	1	0	1	0
		Width of Each Lane	11'	N/A	11'	N/A

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

Minimum width 5' outside shoulders shall be provided. A minimum of 3' of the shoulder width shall be paved.

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Newark Road Typical Section Vehicular Lanes				
Station*			Northbound	Southbound
Begin	End		Thru Lanes	Thru Lanes
	500+51	503+10	No. of Lanes	1
			Width of Each Lane	Varies
	503+10	504+45	No. of Lanes	1
			Width of Each Lane	12'-6"
	504+45	508+10	No. of Lanes	1
			Width of Each Lane	12'-6"

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

Minimum width 5' outside shoulders shall be provided. A minimum of 3' of the shoulder width shall be paved.

Newark Road South Typical Section Vehicular Lanes				
Station*			Northbound	Southbound
Begin	End		Thru Lanes	Thru Lanes
480+74	492+65	No. of Lanes	1	1
		Width of Each Lane	11'	11'

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

Minimum width 5' outside shoulders shall be provided. A minimum of 3' of the shoulder width shall be paved.

Access Roads Typical Section Vehicular Lanes				
Station*			Westbound	Eastbound
Begin	End		Thru Lanes	Thru Lanes
		No. of Lanes	1	1
**	**	Width of Each Lane	11'	11'

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

** Beginning and ending stations vary by Access Road. See Concept Plans for station limits.

Minimum width 5' outside shoulders shall be provided. A minimum of 3' of the shoulder width shall be paved.

Driveway Typical Section Vehicular Lanes			
Station*			
Begin	End		Lanes
		No. of Lanes	1
**	**	Width of Each Lane	15'***

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

** Beginning and ending stations vary by Driveway. See Concept Plans for limits for station limits.

***Width is 10' Driveway H, Driveway S, and Driveway U
 Width is 18' Driveway V

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 Worcester's County.

The Design-Builder shall design and construct smooth transitions to tie into the existing roadways at the limit of road work.

3.09.06 Cross Street Improvements

The Plans include improvements to local owned roadways crossings with US 113. The general extent and limits of these improvements are shown in the Concept Plans and typical sections. 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 then be tapered to meet the existing typical section.

3.09.07 Design Vehicle

The design vehicle for turning movements shall accommodate the WB-67 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 W-beam and end treatments within the project limits shall be replaced if not compliant with current standards or if warranted based on 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

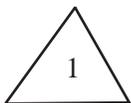
3.09.08.02 Median Traffic Barrier

Median traffic barrier shall be placed throughout the project limits. Only traffic barrier W-beam median barrier or 42" F-shape concrete median barrier may be installed on this project. Concrete median traffic barrier shall be installed at locations where the median width is 16' 0" or less.

Traffic barrier w-beam median barrier shall be galvanized steel.

Concrete barrier shall include two 3" diameter PVC conduits.

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

Vertical curb will not be allowed on any roadway with a posted speed greater than 40 mph. Asphalt curb will not be allowed.

3.09.09 Pedestrian and Bicycle Facilities

No sidewalks or other pedestrian facilities are required as part of this project.

Continuous bicycle lanes, through the marking of shoulders and provision of 6' pocket bicycle lanes, with appropriate signing and marking shall be placed throughout the project limits unless the Administration provides a waiver.

3.09.10 J-Turns

If J-turns are used, J-turns should be placed at approximately the following locations: 1438+30, 1467+00, 1487+00, 1557+50, 1572+50 and 1618+50. The Design-Builder may propose new locations or modified locations for J-turns if it is determined to minimize delay while ensuring safety for the traveling public. The determination of the minimization of delay while ensuring safety for the traveling public shall be at the sole discretion of the Administration.

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 Maryland Delaware Railroad crossing at US 113, approximate Station 1551+50, will be replaced By Others and occur during this project. The Design-Builder shall coordinate their efforts with this project.

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 has 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 damaged shall be replaced by the Design-Builder in-kind with the new fence of the same material and aesthetics.

3.09.15 Southbound Lane Drop with Southbound Roadway Crossover

The Design-Build Team shall design the southbound lane drop and southbound roadway crossover at the southern project limit for a design speed of 60 mph. The horizontal alignment shall provide a transition from the two lane southbound section to a single lane, prior to a roadway cross-over that matches the existing southbound lane. The southbound roadway crossover within the future median shall provide for a 4 foot left shoulder and a 10 foot right shoulder. Roadway runoff in this area shall not drain onto the northbound lane.

The pavement section for the cross-over shall be the same section as used for the US 113 – New Construction.

Signing and pavement markings for the southbound lane drop and southbound roadway crossover shall be in accordance with the latest edition of the MUTCD, the MD MUTCD and SHA standards as provided by OOTS.

3.09.16 Sight Distance at Intersections and Crossings of US 113

It is the Design-Build Teams responsibility to ensure adequate sight distance is provided on the project. The Design-Build Team's sight distance calculations shall be provided as part of the Design-Build Team's roadway plan submittal for all intersection, U-turn movements, and/or crossings of US 113 at no additional cost to the Administration. At a minimum Location/Description of intersection or crossing type, design speed(s), AASHTO Case used, sight distance required and sight distance provided for a car and for the design vehicle. Additional information on the Design-Build Team's sight distance calculations may be requested by the Administration at no additional cost to the Administration.

3.09.16.01 J-Turn Sight Distance Calculation

Due to the fact that the driver is making a U-turn movement at J-turns of US 113, and requires more time than a direct left turn movement, the DBT shall calculate the sight distance for any J-turns with the vehicle crossing two lanes of opposing traffic for AASHTO Intersection Control case B-1.

3.09.17 Maryland Delaware Railroad

The use of the term "Railroad" within the Contract Documents furnished by the Administration, shall be taken to mean the employees of the Maryland and Delaware Railroad, their contractors and designees.

The Maryland and Delaware Railroad (MD/DE) will place a temporary Railroad Embargo on the at grade railroad crossing of US 113 south of Langmaid Road and the at grade railroad crossing of Newark Road South. This embargo will take effect on September 8, 2016 and will end on September 8, 2017. Until this embargo takes effect, no work shall take place on US 113 Southbound and Northbound between Sta 1548+00 to 1553+00 or 100 feet either side of the centerline of the existing railroad tracks until the embargo begins without express written authorization from the Administration. The Design-Build Team shall design and phase construction in such a way to maximize the work to be done north and south of these limits in preparation for this outage.

To ensure that the Maryland and Delaware Railroad is able to install and open the at grade railroad crossing of proposed dualization of US 113 south of Langmaid Road before the end of the embargo period, the Design-Builder shall exercise extreme care when considering resource requirements and work durations so as to complete the required task in the time allotted. The following shall be considered:

- (a) All sediment and erosion controls necessary for the construction shall be designed and approved by MDE and in place to the fullest possible extent.
- (b) All required equipment and materials shall be at a nearby staging area and be ready for use.
- (c) The Contractor shall have an approved detailed schedule of operations. This schedule shall outline the sequence of design, procurement and construction and how the work will be completed in the time allotted.

3.09.17.01 Railroad Coordination

DBT coordination between this contract and the Railroad is paramount. It is the DBT's responsibility to provide good, clear and continuous coordination and communication with the Railroad and the Administration.

3.09.17.01 Railroad Pre-Design Coordination Meeting

A Pre-Design meeting shall be held once Notice to Award has been issued. This meeting will be scheduled by the Administration Design Project Manager upon request by the Design-Build Team and will include at a minimum the: Design-Builder's Project Design Manager, Highway Engineer, Traffic Engineer and Geotechnical Design Engineer, Design-Build Project Manager, and Construction Manager, SHA Design

Project Manager, SHA Construction Project Manager and Railroad. The Pre-Construction Conference discussed in TC 3.06.05 shall not replace this meeting. The purpose of the meeting is to:

- Develop the coordination plan for the coordination between the Design-Builder, SHA and the Railroad. This plan should include how the types of coordination that will take place, when each type of coordination should take place and the frequency it should take place if applicable.
- Preview and discuss the preliminary maintenance of traffic and construction sequencing concepts developed by the Design-Build Team for this area and the project in general as they relate to this work.
- Discuss MD/DE railroad requirements and needs
- It shall be the Design-Builder's responsibility to take minutes of this meeting and submit them to the Administration for review, comment and acceptance.

3.09.17.02 Railroad Design Submission Coordination Meeting

A Pre-Design Submission meeting should be held after the Pre-Design Coordination Meeting and before the fourteen day notice is given for the submittal including the Maintenance of Traffic and Construction Sequencing plans. This meeting will be scheduled by the Administration Design Project Manager upon request by the Design-Build Team and will include at a minimum the: Design-Builder's Project Design Manager, Highway Engineer, Traffic Engineer and Geotechnical Design Engineer, Design-Build Project Manager, and Construction Manager, SHA Design Project Manager, SHA Construction Project Manager and Railroad. The purpose of the meeting is to review the submittal plans created by the Design-Build Team for the work to take place in this area.

3.09.17.03 Railroad Pre-Construction Coordination Meeting

A Pre-Construction meeting shall be held in July 2016. This meeting will be scheduled by the Administration Design Project Manager upon request by the Design-Build Team and will include at a minimum the: Design-Builder's Project Design Manager, Highway Engineer, Traffic Engineer and Geotechnical Design Engineer, Design-Build Project Manager, and Construction Manager, SHA Design Project Manager, SHA Construction Project Manager and Railroad. The purpose of the meeting is to review the approved plans by the Design-Build Team for this area and the project in general and coordination the start of Embargo and the resulting construction that will take place.

3.09.17.02 Design and Construction Requirements

Design-Build Team shall design and construction the US 113 improvements in such a way as to meet the Railroad Horizontal and Vertical Alignments provided as part of the additional information on ProjectWise.

It is the Design-Builder's responsibility to remove the existing US 113 and Newark Road South railroad crossings. The Design-Builder shall remove the US 113 crossing to a limit of 100 feet past the outside edge of the proposed outside shoulders of the US 113 improvements or as directed by the engineer. The Design-Builder shall:

- Take care in removal so as to limit damage to all iron and metal materials
- Dispose of all material other than iron and metal materials.
- All iron and metal materials including but not limited to rail, spikes, bars, bolts and plates shall be taken to the MD/DE's storage yard in Bishop, MD. This shall be coordinated with the Railroad.
- Cut welded rail if needed for transport.

All existing crossing signal equipment will be removed by the Railroad. It is the Design-Builder's responsibility to coordinate this with the Railroad.

It is the Design-Builder's responsibility to provide all Maintenance of Traffic for construction of the US 113 project improvements and for the placement of the railroad crossing and various other related construction activities being performed by the Railroad.

It is the Design-Builder's responsibility to coordinate their sequence of construction closely with the Railroad and provide for their requirement and needs within the Design-Builder's sequence of construction.



The Railroad is using the Old Castle Concrete crossing system that is made up of individual panels that are approximately 8 foot wide by 7.5 feet long.



Prior to the Railroad setting any track crossing panels for a roadway element, the Design-Builder shall place only the GAB base outlined in TC 3.10.06 for the roadway and all associated work as need. The DBT shall coordinate this effort closely with the Railroad. GAB pavement outlined in TC 3.10.06 shall be placed 100 feet either side of the centerline of the railroad for the north and southbound roadways. Since the crossing will be one continuous crossing, the Design-Builder shall place the GAB base outlined in TC 3.10.06 for the entire length of the crossing, including the median, and extend the GAB 50 feet either side of the outside shoulders of US 113 or as directed by the Railroad. This GAB shall act as the ballast for the railroad crossing panels.



Once the DBT has placed the ballast for a roadway The Railroad will place the required crossing panels. Once all panels have been placed, the Railroad will pull rail through those panels.



Once the railroad has placed all the panels for a roadway it shall be the Design-Builder's responsibility to perform the final paving for the roadway to the track crossing and to ensure



a smooth transition from that pavement to the crossing. The DBT shall coordinate this effort with the Railroad.

The Design-Build Team shall place a single continuous run of 4 inch schedule 80 conduit. This conduit shall be place parallel to the crossing placed by the Railroad at an offset of two feet to the south of the crossing or as directed by the engineer. The conduit shall extend horizontally 5 feet beyond the outside paved shoulder of the north and south bound roadways and shall be placed at a depth of 24" below roadway surface elevation. The ends of the conduit shall be left in such a way as to allow the MD/DE railroad easy access.

3.09.17.02 Disincentive

In an effort to avoid unnecessary delays in service for the Railroad and their customers and the resulting financial impacts to the Railroad, the railroad must be open to rail traffic on or before September 8, 2017. In order to provide the Railroad with sufficient time to make final rail tie-ins and other needed final work once the crossing of US 113 is complete, the at-grade crossing of US 113 must be installed and the crossing must be ready for rail traffic to use **on or before July 1, 2017**. Ready for rail traffic is defined for the crossing as having all US 113 crossing panels and rail placed in those panels so that a train can pass from one side of the crossing to the other as certified in writing by the Railroad.

Disincentive. The disincentive will be a **\$2,448.00 assessment per calendar day**, without limit, based on the number of calendar days the at-grade crossing of US 113 is not ready for rail traffic as certified in writing by the Railroad after the Administration's established date.

The daily assessment of **\$2,448.00** will be deducted from the Contractor's monthly billing and will continue until the at-grade crossing of US 113 is ready for rail traffic to use as certified in writing by the Railroad. **No consideration for additional time will be given for unanticipated inclement weather or other delays. The Administration assumes that the Contractor will have to 'work overtime and / or multiple shifts and weekends as permitted by the contract to complete the work within the allotted time.** The



Administration and the Design-Builder anticipate that delays may be caused by or arise from any number of events during the course of the Contract, including, but not limited to, work performed, work deleted, extra work, delays, disruptions, differing site conditions, utility conflicts, design changes or defects, right-of-way issues, permitting issues, actions by third parties, design approval process delays, weather, weekends, holidays, suspension of the Design-Builder's operations, or other such events, forces or factors sometimes experienced in highway construction work. Such delays and events and their potential impacts on the performance by the Design-Builder are specifically contemplated and acknowledged in entering into this Contract, and shall **NOT** extend the time period for the "Disincentive". Further, any and all costs or impacts whatsoever incurred by the Design-Builder in accelerating its work to overcome or absorb such delays or events in an effort to complete the work within the "Disincentive" time period, regardless of whether the Design-Builder successfully does so or not, shall be the sole responsibility of the Design-Builder in every instance."



3.09.17.03 Additional Work to Be Done By the Railroad

Other than the 4 inch schedule 80 conduit to be done by the DBT discussed in TC Section 3.09.17.02, the railroad shall be responsible for the installation of any crossing signalization.

In addition to the US 113 railroad crossing, the Railroad will be constructing additional rail geometric modifications and adjustments to their rails within their Right-of-way outside of the US 113 railroad crossing.

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.

TABLE 1
GUIDELINES FOR PAVEMENT

Priority	Author or Agency	Title
1	SHA	2006 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 (M_r) 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. FWD testing results and field notes shall be required to confirm the minimum subgrade strength was achieved and shall be included in the FWD Results Report. Falling-Weight-Deflectometer (FWD) testing is only

required for design subgrade resilient modulus values greater than 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, other than temporary pavement marking tape, on the final roadway surface.

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 and pavement sections, and criteria for design. This section shall control any conflicts between TC 3.10.03 and this section.

3.10.06.02 Scope of Work

Based on the project concept plans, the current scope of the project includes the following items of work:

- Full-Depth construction of US 113
- Full-Depth construction of access roads and entrances
- Widening on US 113
- Utility patching.
- Resurfacing of existing road within the project limits

3.10.06.03 Roadway Elements

The following Roadway Elements have been identified:

SHA Standards apply:

1. US 113 Northbound and Southbound (New Construction). This includes the new two travel lanes and shoulders.
2. US 113 Northbound and Southbound (Widening) This includes all widening on US 113
3. Access Roads, Driveways and Entrances. This includes all access roads, Basket Switch Road, Newark Road, Newark Road South, Langmaid Road and any other road within the project limits.



3.10.06.04 Pavement Sections

There are three Roadway Elements: US 113 new construction of two travel lanes and shoulders, US 113 widening, Access Roads and Driveways and Entrances. For Roadway Element 1 and 3, a Hot Mix Asphalt (HMA) pavement section and Jointed Portland Cement Pavement (JPCP) section have been provided. For Roadway Element 2, a Hot Mix Asphalt (HMA) only pavement section is been provided. The Design-Builder shall choose a pavement type for each of the roadway elements. Note that for all provided sections, details from corresponding standards in the Book of Standards that are missing from the provided sections still apply.

The Design-Builder may choose to design the pavement for each Roadway Element in accordance with 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 US 113 Travel Lanes and Shoulder (HMA Section): (Roadway Element 1)

If HMA is the chosen pavement type, the following HMA minimum pavement section shall be placed for the construction/widening of US 113 within the project limits:

2" Hot Mix Asphalt Superpave 12.5 mm for Surface, HDFV, PG 64-22, Level 4

11" Hot Mix Asphalt Superpave 19.0 mm for Base, PG 64-22, Level 2 (Two 4" Lifts and one 3" Lift)
12" Capping Borrow (Two 6" Lifts)

3.10.06.04.01.01 US 113 Railroad Crossing

In the vicinity of the Delaware Railroad crossing, the 12 inch capping borrow base material shall be replaced with Graded Aggregate Base. For the limit of this see section TC.3.09.

3.10.06.04.02 US 113 Travel Lanes and Shoulder (JPCP Section): (Roadway Element 1)

If concrete is the chosen pavement type, the following JPCP minimum pavement section shall be placed for the construction of US 113 within the project limits:

10" Jointed Portland Cement Concrete pavement, Mix No. 7
12" Capping Borrow (Two 6" Lifts)

3.10.06.04.03 US 113 Widening (HMA only): (Roadway Element 2)

The following HMA minimum pavement section shall be placed for the construction/widening of US 113 within the project limits:

2" Hot Mix Asphalt Superpave 12.5 mm for Surface, HDFV, PG 64-22, Level 4
11" Hot Mix Asphalt Superpave 19.0 mm for Base, PG 64-22, Level 2 (Two 4" Lifts and one 3" Lift)
12" Capping Borrow (Two 6" Lifts)

3.10.06.04.04 Access Roads, Driveways and Entrances (HMA Section): (Roadway Element 3)

If HMA is the chosen pavement type, the following minimum pavement section shall be placed for the construction of Access Roads, driveways and entrances within the project limits.

2" Hot Mix Asphalt Superpave 12.5 mm for Surface, PG 64-22, Level 2
5" Hot Mix Asphalt Superpave 19.0 mm for Base, PG 64-22, Level 2
(Two 2.5" Lifts)
12" Capping Borrow (Two 6" Lifts)

3.10.06.04.05 Access Roads, Driveways and Entrances (JPCP Section): (Roadway Element 3)

If concrete is the chosen pavement type, the following minimum pavement section shall be placed for the construction of Access Roads, driveways and entrances within the project limits.

8" Jointed Portland Cement Concrete pavement, Mix No. 7
12" Capping Borrow (Two 6" Lifts)

3.10.06.04.06 Maintenance of Traffic (MOT):

The following pavement section shall be placed for the construction of temporary MOT lanes within the project limits:

2" Hot Mix Asphalt Superpave 12.5 mm, PG 64-22, Level 2

4" Hot Mix Asphalt Superpave 19.0 mm for Base, PG 64-22, Level 2
12" Capping Borrow (Two 6" Lifts)

3.10.06.04.07 Patching

3.10.06.04.07.01 Partial-Depth Patching

It is estimated that 125 Tons (300 yd²) of HMA Superpave 19.0 mm will be required for partial-depth patching of US 113 within the project limits. After removal of material and proper preparation, place the following:

7" Hot Mix Asphalt Superpave 19.0 mm for Partial-Depth Patching, PG 64-22, Level 2
(2" minimum and 4" maximum lift thickness)

3.10.06.04.07.02 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 (Composite Pavement):

Variable Depth Hot Mix Asphalt Superpave 19.0 mm for Full-Depth 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 (Flexible Pavement):

Variable Depth Hot Mix Asphalt Superpave 19.0 mm for Full-Depth Patching, PG 64-22, Level 2
12" Graded Aggregate Base (Two 6" Lifts)



3.10.06.04.08 Grinding:

Grinding is not necessary for this project except for tie-in purposes only or for the removal of existing rumble strips

3.10.06.04.09 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
(Minimum 1" and maximum 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
(Minimum 2" and maximum 4")

3.10.06.04.10 Resurfacing of existing US 113:

The following surface layer shall be placed for the resurfacing of existing US 113.

2” Hot Mix Asphalt Superpave 12.5 mm for Surface, HDFV, PG 64-22, Level 4

3.10.06.05 Traffic Data

The Design-Builder shall use the following traffic data if developing alternate pavement designs for this Project

	Roadway Element #1 and 2: US 113		Roadway Element #3: Access Roads, Driveways & Entrances	
	2013	2034	2013	2034
Year	2013	2034	2013	2034
Average Daily Traffic (ADT)	9,200	16,150	1,050	1,395
Percent Trucks	16%	16%	16%	16%
Truck Factor - HMA	0.81	0.81	0.81	0.81
Truck Factor - PCC	1.37	1.37	1.37	1.37
Directional Distribution	50%	50%	50%	50%
Lane Distribution	90%	90%	100%	100%

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.

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	Flexible	Rigid
Roadway Element	1, 2	1	3	3
New Construction Design Life	25 years	25 years	25 years	25 years
Rehabilitation Design Life	15 years	15 years	15 years	15 years
Initial Serviceability	4.2	4.5	4.2	4.5
Terminal Serviceability	2.9	2.9	2.7	2.7
Reliability	90%	90%	85%	85%
Overall Standard Deviation	0.49	0.39	0.49	0.39
Load Transfer Coefficient	N/A	3.2	N/A	3.2
PCC Modulus of Rupture	N/A	750 psi	N/A	750 psi
PCC Elastic Modulus	N/A	3,000,000 psi	N/A	3,000,000 psi
Overall Drainage Coefficient	1.0	1.0	1.0	1.0
Minimum Modulus of Subgrade Reaction (static) *	N/A	230 psi/in	N/A	230 psi/in

Maximum Modulus of Subgrade Reaction (static) *	N/A	550 psi/in	N/A	550 psi/in
Maximum Resilient Modulus of Subgrade *	10,500 psi	N/A	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 3.10.03.02.05.04.01 of the Pavement Performance Specification and is approved by the Office of Materials Technology.

3.10.06.07 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 10 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.

3.10.06.08 Geotechnical Design Criteria

Refer to the Geotechnical Performance Specification (TC 3.14) for Geotechnical Design Criteria.

3.10.06.09 Soils Laboratory Test Results and Soil Samples Availability (Appendix A)

Soils in jar samples from SPT boring are available for review 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 for selected soil samples recovered from the split barrel sampler and auger cuttings:

- Soil Classification
- Natural moisture content
- Gradation
- USDA Soil Mortar %
- Atterberg Limits
- T-180
- Soil PH
- Modified Proctor

All laboratory results are in Projectwise.

3.10.06.10 Boring Logs

3.10.06.10.01 SPT Boring Logs for Head Walls (Appendix D)

Twelve (12) SPT borings were drilled for Head walls, roadway embankment foundation and slopes. Jar samples were obtained from split barrel sampler for soil classification, Atterberg Limits and Coefficients tests and the test results are included in Appendix A of this report.

3.10.06.10.02 Soil/Pavement Auger Boring Logs (Appendix B)

Eighty Three (83) soil borings and pavement borings were drilled for foundation of the new pavement and existing pavement investigation. Bulk samples were obtained from auger cuttings for

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soil classification and Proctor testing.

All soil boring and pavement boring logs are placed in Projectwise.

3.10.06.10.03 SWM-Boring Logs (Appendix C)

Fifty Six (56) SWM-Borings were drilled for Storm Water Management facilities. Jar samples were obtained from auger cuttings for soil classification testing. Field infiltration testing was performed at some SWM boring locations.

All SWM boring logs are placed in Projectwise.

3.10.06.11 Top Soil (Appendix E)

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 in available Projectwise.

TC 3.11 STRUCTURAL DESIGN PERFORMANCE SPECIFICATION

3.11.01 General

Design and construct all structures in accordance with requirements of this specification 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 replacement structures for the Small Structures listed below. If the Design-Build Team proposes to eliminate, or introduce new structures or structure types not covered by this specification, the proposed changes shall be submitted in writing to the Administration's Office of Structures for review and development of any site specific requirements beyond those provided by the Design-Build Team. Approval must be given by the Administration before a TS&L submittal can be made by the Design-Build Team.

Structure S1: Small Structure No. 23069X0, US 113 over Coonfoot Branch.

Existing Small Structure No. 23069X0, a single cell 6'-2"± X 4'-8"± concrete box culvert located at approximate Station 1481+00 shall be replaced as part of the US 113 dualizing.

Structure S2: Small Structure No. 23070X0, US 113 over Branch to Marshall Creek.

Existing Small Structure No. 23070X0, a single 60"± reinforced concrete pipe located at approximate Station 1578+50 shall be replaced as part of the US 113 dualizing.

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.

Table 1

Guidelines for Structures

Priority	Author or Agency	Title
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1	SHA	Office of Structures, Policy and Procedure Manual (PPM) including Draft PPMs included in the Appendix which shall be considered final for this Contract
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	SHA	Office of Structures Manual on Hydrologic and hydraulic Design
6	SHA	ABSCOUR Program
7	AASHTO	AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications
8	ACI	Building Code Requirements for Structural Concrete, ACI 318
9	AASHTO	D1.5M/D1.5: Bridge Welding Code
10	AASHTO	Standard Specifications for Transportation Materials and Methods of Sampling and Testing
11	AASHTO	Roadside Design Guide
12	AASHTO	A Policy on the Geometric Design of Highways and Streets
13	AASHTO	Guide Specification for Horizontally Curved Steel Girder Highway Bridges
14	AASHTO	Guide Specifications for Highway Bridge Fabrication with HPS70W Steel
15	AASHTO	Manual on Subsurface Investigations
16	FHWA	FHWA Memorandum, Bridge Rails, Dated August 1986 and updated May 1997
17	MDE	Code of Maryland Regulations Title 26.08.02 Water Quality
18	MDE	Code of Maryland Regulations Title 26.17.4 Water Management
19	ACOE	HEC-RAS Software, Version 3.1.3
20	MDE	Maryland's Waterway Construction Guidelines

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
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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
Dunnicliff	Geotechnical Instrumentation for Monitoring Field Performance, Dunnicliff 1986
ASTM	Standards in Building Codes
SHA	Standard Specifications for Subsurface Explorations
OSHA	Occupational Safety & Health Administration (OSHA) Standards – 29CFR, Including Parts 1910 and 1926
FEMA	Code of Federal Regulations Title 44, Part 9 and 10

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 Structural Hydrology and Hydraulics

All structures along US 113 shall be designed to preclude overtopping by the 100 year flood. They shall be located and designed in accordance with the Office of Structures Manual on Hydrologic and Hydraulic Design and MDE regulation COMAR 26.17.04 "Construction on Nontidal Waters and Floodplains". Procedures within Federal Emergency Management Agency, Code of Federal Regulations Title 44, Part 9 and 10 shall be followed for approval of structures crossing FEMA regulated floodplains.

3.11.03.02 Design Methodology

The following references are for AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications, dated 2012, including all interims.

A. Concrete.

All reinforced concrete members shall be designed in conformance with AASHTO LRFD specifications, including all applicable provisions for service, fatigue, strength and extreme event limit states.

B. Load Ratings.

All vehicular superstructures shall be rated using the load factor and resistance factor rating (LRFR) method of analysis using the latest edition of the AASHTO "Manual for Bridge Evaluation, 1st edition, 2008.

The ratings shall consist of the following loadings:

1. AASHTO HL-93
2. AASHTO H-15 (GVW =30 kips)
3. Maryland (Type 3) (GVW = 66 kips)
4. 150 kip Permit Truck (GVW = 150 kips)
5. Maximum allowable live load moment (used for evaluating heavy moves)

The HL-93 inventory rating factor for all new structure construction shall be greater than 1.

3.11.03.03 Loads and Forces

All loads and forces applied to structures shall be in accordance with AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications except as modified below.

A. Dead Loads (DL)

- 1) Unit weights of materials shall conform to AASHTO specifications which includes the weight of embedded reinforcement.
- 2) All structures shall be designed to accommodate a loading of 25 psf for a future 2 inch wearing surface.

B. Highway Loads (LL)

- 1) Live loading, designated HL-93 shall be in accordance with AASHTO.
- 2) Retaining walls including wing walls and headwalls shall be designed to accommodate the horizontal surcharge caused by live load per AASHTO criteria.

C. Thermal Forces

- 1) Moderate Temperature Climate Changes shall be used per AASHTO criteria.
- 2) Normal Temperature shall be 60 degrees Fahrenheit.

D. Seismic Forces.

- 1) Structures are located within seismic zone 1.
- 2) No detailed seismic analysis need be performed.

E. Miscellaneous Lateral Forces.

Wind loads, longitudinal traction forces, stream flow forces, etc. shall be in accordance with AASHTO LRFD Specifications.

F. Construction Loads.

Where the Design-Builder, during construction, anticipates passing truck traffic in excess of the design load over structures designed and constructed under this Project, the

structure shall be designed for the higher truck load. The Inventory and Operating Rating Factors shall be greater than 1.0 for the higher truck load. The Design-Builder shall receive written concurrence from the Administration before developing a design using a live load in excess of that specified above.

3.11.03.04 Materials

A. Foundations

- 1) Piling
 - a) Steel H piles shall conform to A 36, Grade 36 or A 709, Grade 50 Steel.
 - b) Timber piles shall conform to Section 907.01.
 - c) Steel pipe piles and steel mini/pin piles shall conform to A252, Grade 3 steel (Fy = 45,000 psi.).
 - d) Concrete for steel pipe piles shall conform to Mix No. 3 with a slump range of 4-6 inches in accordance with Section 902.10 of the Administration's Standard Specifications for Construction and Materials.
 - e) Reinforcement for steel pipe piles shall conform to Section 908.01 of the Administration's Standard Specifications for Construction and Materials.
- 2) Drilled shaft materials shall conform to Section 412 of the Administration's Standard Specifications for Construction and Materials.

B. Concrete.

- 1) Mix No. 6 (4500 psi – Design for 4000 psi) normal weight concrete shall be used at the following locations:
 - Parapets on Bridges and Retaining Walls
 - Top Slab of Culverts with a minimum depth of fill 18 inches or less.
- 2) Mix No. 3 (3500 psi – Design for 3000 psi) normal weight concrete shall be used at the following locations:
 - Top Slab of Culverts with a minimum depth of fill greater than 18 inches.
 - Culvert bottom slab, sidewalls, toewalls, and headwalls
 - Concrete pipes
- 3) Subfoundation concrete shall be normal weight Mix No. 4 (3500 psi) concrete.
- 4) The use of lightweight concrete for structures is prohibited.

C. Reinforcement Steel

- 1) Reinforcement steel bars shall conform to 908.01.
- 2) Welded Wire Fabric (WWF) reinforcing shall conform to 908.05.
- 3) Epoxy coated reinforcement steel bars and WWF shall conform to 917.02 and shall be used at the following locations:
 - Barriers and Parapets
 - Parapet Portion of Wing Walls including Retaining Walls and Headwalls.

- Portions of Retaining Walls, including copings, located within 10 ft of the outside edge of shoulder measured vertically and/or horizontally.
 - Top mat of the top slab, including truss bars and any reinforcement extending into the top of the top slab, for box culverts with less than 18” of cover.
- 4) Unless noted otherwise minimum clear cover to reinforcement steel shall be as follows:

LOCATION	CLEAR COVER
Box Culvert Slabs Built to Grade	2-1/2 in.
Box Culvert Slab Not Built to Grade	2 in.
Toewall – Top, Bottom and Sides	3 in.
Culvert Bottom Slab – Bottom	3 in.
All Other Locations – Main Reinforcement	2 in.
All Other Locations – Stirrups	2 in.

- 5) Welding of reinforcement steel is prohibited.
- 6) Mechanical rebar couplers may be used.
- 7) Substructure units shall be designed so that the largest reinforcement steel bar utilized will be No. 11 bars.

D. Pipe Culverts

- 1) All new pipe culverts shall be constructed with the use of concrete pipe.
- 2) Existing culverts requiring replacement shall utilize concrete pipe regardless of the material used for the existing pipe.
- 3) Existing pipes requiring extension shall be extended with the use of a material that matches the original construction.

3.11.03.05 Foundations

The Design-Build Team shall prepare a Foundation Plan and Report for each new or replacement structure in conformance with the Administration’s Policy and Procedure Memorandum D-79-17(4) and the following requirements.

3.11.03.05.01 Foundation Boring Requirements.

Foundation borings for each structure were obtained for the preliminary engineering of this project and are included additional information on ProjectWise. 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, 1-866-926-8501. The Administration has evaluated the borings and recommendations and/or restrictions have been established for each structure as indicated in the Special Provisions.

The Design-Build Team shall determine the sufficiency of the borings provided for the final foundation design and obtain their own geotechnical data to supplement the data provided by the Administration. The Design-Build Team shall obtain supplemental borings in accordance with the Administration's Standards for Subsurface Exploration if the foundation borings provided by the Administration are more than 10 ft outside the proposed footprint of the structure foundation. Supplemental borings shall also be obtained by the Design-Build Team, if proposed pile tip elevations are below the foundation boring depths provided by the Administration. Any supplemental borings shall extend at least 10 ft below the proposed pile tip elevations. The location of supplemental borings shall be selected by the Design-Build Team in conformance with the Administration's Policy and Procedure Memorandum D-79-17(4). For bridges, at least two borings are required for each substructure unit. Both of the borings shall be within the above space limitations (i.e. if one boring is more than 10' outside the foundation footprint and one is within the footprint, at least one supplemental boring would be required). The Design-Build Team's geotechnical engineer may request in writing that the Administration reduce the number of required borings to one boring per substructure element provided the soil conditions at a particular structure appear to be consistent. Supplemental foundation borings, rock cores, laboratory testing, etc. shall be in conformance with appropriate Administration, AASHTO and ASTM policies and specifications.

3.11.03.05.02 Foundation Design Requirements.

Structures foundations shall be designed in accordance with AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications and as required below.

A. Spread Footings.

The bottom of a spread footing shall be placed so that the top of the footing is a minimum of 1 ft below the proposed ground line and the bottom of the footing is a minimum of 3 ft below the proposed ground line. If the footing is to be placed on rock as determined by the Engineer, it shall be keyed into the sound rock at least 1 ft. The Plans developed by the Design-Build Team shall specify the maximum allowable bearing pressure for each substructure element and its footing.

Setting spread footings in embankment or fill material is prohibited. Any spread footing shall be set into existing in-situ soil or sound rock.

The Design-Build Team shall meet all requirements of Section 10 of the AASHTO Specifications with regards to the design of spread footings, allowable foundation bearing pressures, and settlements.

The allowable bearing capacity for spread footings shall be established by the Design-Build Team based on additional site investigation, AASHTO Specifications and FHWA Geotechnical Engineering Circular No. 5 – Evaluation of Soil and Rock Properties. The proposed bearing capacity will be reviewed by the Administration as part of the

foundation evaluation.

The Design-Build Team 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.

Timber piles, Steel H-piles, steel pipe piles, or steel mini/pin piles are acceptable pile types for use on this project. No other driven pile type, including concrete piles, will be considered. Bottom of footings for the culverts or wing walls may be in approach embankments provided they sit on pile-supported foundations with the pile tip elevation set in competent in-situ soil or sound rock. Pile tips shall be applied to driven piles where warranted. Piles shall extend below the elevation of the roadway that is being crossed.

Only one type of pile shall be used on each individual substructure unit. However, different substructure units of the same structure may have different foundation types.

Any driven pile that reaches refusal with less than 20 feet of pile length embedment in original competent in-situ soils will be unacceptable and shall be extracted and holes shall be augered a minimum of 10 feet into competent rock or 5 feet into sound rock. The piles shall be embedded into the augered hole and the void area around the piles shall be filled with Mix No. 4 concrete.

The proposed pile spacing for design shall conform to the following:

1. Spacing in the front row of a pile group shall not exceed 8 ft.
2. Spacing for all other rows shall not exceed twice the spacing of the front row.
3. The Design-Build Team shall use battered piles to resist all horizontal loads
4. Pile patterns shall be designed so that no piles are in tension or uplift.

As-built pile foundation data should be documented in the final As-Built plans in conformance with the Administration'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 place drilled shafts (caissons), and steel H-piles placed in augered holes with voids filled with concrete, are acceptable for use on this project. No other augered or drilled pile type, including helical piles, will be considered. Any augered or drilled pile foundation that encounters rock shall have its final tip elevation a minimum of 10 ft into competent rock or 5 ft into sound rock. Steel mini/pin piles shall have a 5' deep grout bulb below the final tip elevation. Structural capacity of auger cast piles with steel H-pile cores shall be determined solely on the capacity provided by the steel H-pile core without any

contribution of the surrounding cast in place concrete. The augered or drilled pile spacing shall conform to the same criteria as driven piles, excluding mini/pin piles. Pile patterns shall be designed so that no piles are in tension or uplift. Design strength shall be maintained for the full length of the pile.

3.11.03.05.03 Rock Definition.

The definition of competent rock shall be material with a minimum Rock Quality Designation (RQD) of 80% and a minimum Rock Core Recovery (REC) of 80%. The Engineer shall determine, by observations of the exposed in-situ materials and the operation of the excavation equipment, if the competent rock has been encountered for spread footings and the bottom of caisson holes. For mini/pin piles, competent rock will be determined by the Engineer based on observations of the operation of the drilling equipment and the cuttings retrieved.

The Engineer shall determine, by observations of the exposed in-situ materials and the operation of the excavation equipment, if the sound rock has been encountered for spread footings and the bottom of caisson holes. For mini/pin piles, sound rock will be determined by the Engineer based on observations of the operation of the drilling equipment and the cuttings retrieved.

3.11.03.06 Aesthetic Criteria

No special aesthetic treatments are required for the structures in this contract.

3.11.04 Structure Specific Design Requirements

A. Outlet/Inlet Protection

- 1) Outlet and inlet protection shall be required at all culvert ends.

3.11.04.01 Box Culverts

3.11.04.01.01 Geometric Design Criteria for Box Culverts.

The Design-Build Team shall be responsible for determination of the final structure size, clearances, geometry, and details that meet or exceed the requirements of the performance specification. Vertically or horizontally kinked box culvert barrels will not be permitted.

3.11.04.01.02 Structural Details for Box Culverts.

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 Administration.

A. Foundation

- 1) Refer to 3.11.03.05 for foundation requirements. Box culvert shall be founded

on deep foundations (piles).

- 2) Anticipated scour depth information shall be developed by the Design-Builder and incorporated into the foundation design, when applicable.
- 3) Structures shall be designed and detailed for all forces that result from maximum calculated vertical, horizontal, and rotational movement of foundation elements.

B. Barrel

- 1) The bottom slab of the box culvert shall be cast-in-place. Precast or cast-in-place construction is permitted for the top slab and sidewalls. If the contractor elects to use precast reinforced concrete box sections, at least 15 ft. of all box culvert ends and footings, wing walls, headwalls, and toe walls shall be cast-in-place. Additionally, the precast sections shall terminate a minimum of 1 foot from all footings and toe walls. All lifting devices shall be filled with non shrink grout after the precast units are in place. The precast reinforced concrete box sections shall be placed tightly together and the joints shall be sealed and mechanically connected in conformance with the manufacturer's recommendations.
- 2) Contraction and expansion joints for the proposed box culvert barrel shall be in conformance with Structural Standard Nos. BC(6.03)-75-9 and BC(6.05)-76-36.
- 3) The typical section for the proposed box culvert shall be in conformance with Structural Standard No. BC(6.07)-76-38.

C. Headwalls and Wing Walls

- 1) Only cast-in-place concrete box culvert headwalls and wing walls shall be considered.
- 2) The proposed box culvert headwall and toewall details shall be in conformance with Structural Standard No. BC(6.01)-75-1.
- 3) Wing wall contraction and expansion joints shall be in conformance with Structural Standard Nos. BC(6.04)-75-10 and BC(6.06)-76-57.
- 4) Tie-in details for the proposed box culvert bottom slab and wing wall footing shall be in conformance with Structural Standard No. BC(6.09)-89-200.
- 5) All proposed box culvert wing walls shall have the appropriate details for drainage in conformance with Structural Standard No. RW(0.01)-80-100.

3.11.04.02 Pipe Culverts

3.11.04.02.01 Geometric Design Criteria for Pipe Culverts.

The Design-Build Team shall be responsible for determination of the final structure size, clearances, geometry, and details that meet or exceed the requirements of the performance specification. Vertically or horizontally kinked pipe culvert barrels will not be permitted.

3.11.04.02.02 Structural Details for Pipe Culverts.

D. Foundation

- 1) Refer to 3.11.03.05 for foundation requirements.
- 2) Anticipated scour depth information shall be developed by the Design-Builder and incorporated into the foundation design, when applicable.
- 3) Structures shall be designed and detailed for all forces that result from maximum calculated vertical, horizontal, and rotational movement of foundation elements.

E. Barrel

- 1) Only reinforced concrete pipes shall be used

F. Headwalls and Wing Walls

- 1) Where practicable, use the standard headwalls in the Administrations “Book of Standards for Highway and Incidental Structures” or approved equal(s).
- 2) For areas where standard headwalls cannot be used, refer to Section 3.11.04.01.02.

3.11.05 Structure Plan Development

The Design-Build Team shall prepare structure plans as part of the Contract using the latest SHA MicroStation CADD Standards and Plan Development Checklists. Each structure plan sheet shall be prepared on the Office of Structure’s standard border and title block sheet.

Plan Development Checklists included on the CD are developed for Box Culverts and indicate the minimum amount of information that is required on the Structure Contract Plans. If a checklist is not provided for the type of structure that is proposed by the Design-Build Team, the existing checklists shall be used as a general guide to provide similar information.

The development of views on all Structure Contract Drawings shall be in conformance with the Administration’s Office of Structure’s Policy and Procedure Memorandum P-75-7(4).

3.11.06 Submittals for Structures

All structures included in this Contract shall follow an independent review process. This process will be coordinated with the review and acceptance of the other articles (roadway, drainage, etc.) as appropriate.

The structure submission schedule shall be presented in the Design-Build Team’s original project schedule and updated as the project progresses. Submissions for the proposed structures’ Type, Size and Location (TS&L) or combined Type, Size and Location/Foundation review shall be made one at a time. This schedule shall be presented in the Design-Build Team’s original submission schedule.

The Design-Build Team shall include a minimum of two full size sets, two half-size sets and an electronic .pdf file of the structure plans, and all corresponding roadway plans, typical sections, profiles and cross sections with any plan review submission containing structures in addition to the requirements of TC 3.06.20. These plan sets are for review by the Office of Structures. Official review comments will be conveyed back to the Design-Build Team via correspondence and plans with comments noted (if applicable). The Design-Build Team shall provide a point-by-point written response to all official comments received and receive concurrence from 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.

3.11.06.01 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. It is recommended that the roadway alignment and profile be finalized and accepted prior to this submission. It is also recommended that any other pertinent information such as grading plans or drainage features that impact the proposed structures shall also be accepted prior to submitting the structure plans for review. Comments for TS&L submissions will be provided within 21 calendar days of receipt of the submission.

3.11.06.02 Foundation Report.

The Foundation Report and Plan submission shall be made in conformance with the Maryland Department of Transportation Policy and Procedure Memorandum D-79-17(4), the Structure Descriptions, and other requirements specified in the Special Provision. The submission of the foundation report can be made concurrently with the TS&L submission; however, it shall be noted that the foundation design may be impacted by comments received on the TS&L Plans. If the TS&L submission is provided separately, the Foundation Reports shall not be submitted until comments on the TS&L have been provided back to Design-Build Team and the Design-Build Team's responses are accepted by the Administration. Comments will be provided back to the Design-Build Team within 21 calendar days of receipt of the submission if the Foundation Report is submitted independently. If the Foundation Report is submitted concurrently with the TS&L submission, comments will be provided within 40 calendar days of the receipt of the submission.

3.11.06.03 Structural Detail Submissions.

Following acceptance of the TS&L Plans and Foundation Report, the Design-Build Team shall submit detailed plans for various structural elements. Structural details for an

individual structure may be submitted as a number of sub-plan set packages or as a complete set. The Design-Build Team shall submit a structure submission schedule that outlines the anticipated structural detail submissions. The Design-Build Team shall have adequately developed the load contributing elements prior to finalizing the design of any structural details that are impacted by these loads. If load conditions change during the design, previously submitted elements shall be resubmitted for acceptance. Comments for each structural detail submission will be provided back to the Design-Build Team within 21 calendar days of receipt of the submission

3.11.06.04 Modifications to Structure Plans.

Any modifications or revisions to the structural drawings after acceptance has been received shall be submitted in writing to the Administration and accepted prior to proceeding with any change to the approved structural drawings. If the request for modifications or revisions is accepted, revised structural drawings shall be submitted to the Administration along with a detailed list documenting all of the changes that have been made.

3.11.06.05 Working Drawing Review Process.

All working drawings relating to the structures shall be reviewed in accordance with Maryland Department of Transportation 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 shop drawings to the Administration. A secondary review shall be undertaken by the Administration. Once reviewed and approved by the Administration, the structural shop drawings shall be stamped as approved and returned to the Design-Build Team 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 the Administration. Refer to section TC-4.01 for further guidance regarding working drawing submittals.

3.11.06.06 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 two (2) full size paper print sets, two (2) half size paper print sets, and one set of .tiff files provided on CD. 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.

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.

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, who is a Professional Engineer registered in the State of Maryland with experience in bridge design, responsible for performing or oversight of the pertinent design work. A copy of the design calculations shall also be provided in .pdf format.

The Design-Build Team shall submit completed SIA and PONTIS information forms for each structure for use by SHA in entering the structure data into their structural inventory system.

TC 3.12 TRAFFIC PERFORMANCE SPECIFICATION

3.12.01 General

The Design-Builder shall be responsible for the design and construction of the Project signing, pavement markings, intersection lighting and traffic signals. 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 US 113 and Langmaid Road. The Design-Builder shall be responsible for the design and construction of sign structures, including foundations, protection (placement outside clear zone or traffic barrier), and access for maintenance.

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.). These shall be prepared in accordance with the latest accepted editions of the MUTCD, Maryland MUTCD, and SHA standards as provided by Office of Traffic and Safety.

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 US 113 and Langmaid Road.



The Design Builder shall be responsible for the design and construction of the shoulder rumble strips through out the project limits as approved by District 1 Traffic.

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 Administration has performed a signal warrant study which determined that a signal is not warranted at the intersection of US 113 and Langmaid Road. The State Highway Administration will not be installing a signal at the US 113 and Langmaid Road intersection as part of this project.

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 additional 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 additional 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

Priority	Author or Agency	Title
1	TRB	Highway Capacity Manual
2	ITE	Traffic Engineering Handbook
3	ITE	Manual of Transportation Engineering Studies
4	SHA	Office of Traffic and Safety Capacity/Queuing Analysis Procedures for Intersections
5	SHA	Maryland Manual on Uniform Traffic Control Devices (MD MUTCD)
6	FHWA	Manual on Uniform Traffic Control Devices (MUTCD)

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)

Priority	Author or Agency	Title
1	SHA	List of Qualified Permanent Pavement Markings
2	SHA	List of Qualified Loop Sealants

TABLE 2
STANDARDS FOR TRAFFIC DESIGN CRITERIA
(SIGNING, PAVEMENT MARKINGS & TRAFFIC SIGNALS)

Priority	Author or Agency	Title
3	SHA	List of Qualified Detectable Warning Surfaces
4	SHA	Standard Specifications for Construction and Materials
5	SHA	Maryland Manual on Uniform Traffic Control Devices (MD MUTCD)
6	FHWA	Manual on Uniform Traffic Control Devices (MUTCD)
7	AASHTO	Roadside Design Guide
8	SHA	Standard Office of Traffic and Safety Shelf Typicals
9	SHA	Book of Standards for Highway and Incidental Structures
10	SHA	Maryland State Highway Standard Sign Book
11	FHWA	Standard Highway Signs Book
12	AASHTO	Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*
13	SHA	Administration, Section VIII, of the "Specifications for Consulting Engineer's Services, Volume II
14	SHA	Maryland High Voltage Line Act
15	NFPA	National Electric Code
16	IEEE	National Electric Safety Code
17	SHA	Office of Traffic and Safety's Traffic Engineering Design Division's Traffic Control Devices Manual
18	SHA	Recommended Procedure for Determining Types of Left Turn
19	SHA	Phasing
		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 Guidelines
23	SHA	Accessibility Guidelines for Pedestrian Facilities along State Highways
24	ADA	Americans with Disabilities Act Accessibility Guidelines
25	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 LIGHTING

Priority	Author or Agency	Title
1	SHA	Standard Specifications for Construction and Materials
2	SHA	Maryland High Voltage Line Act
3	NFPA	National Electric Code
4	IEEE	National Electric Safety Code
5	SHA	Maryland Manual on Uniform Traffic Control Devices (MD MUTCD)
6	FHWA	Manual on Uniform Traffic Control Devices (MUTCD)
7	IES	RP-8-00, American National Standard for Roadway Lighting
8	IES	DG-5-94, Recommended Lighting for Walkways and Class 1 Bikeways
9	IES	RP-19-01, Roadway Sign Lighting
10	AASHTO	Roadway Lighting Design Guide
11	AASHTO	Roadside Design Guide
12	SHA	Book of Standards for Highway and Incidental Structures
13	AASHTO	Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 5 th Edition
14	SHA	Office of Traffic and Safety's Traffic Engineering Design Division's Traffic Control Devices Manual
15	AASHTO	Highway Safety Design and Operations Guide
16	SHA	Accessibility Policy and Guidelines for Pedestrian Facilities along State Highways
17	SHA	Maryland State Highway Administration lighting Guidelines
18	ADA	Americans with Disabilities Act Accessibility Guidelines
19	AASHTO	Guide for the Planning, Design and Operation of Pedestrian Facilities
20	AASHTO	Guide for the Development of Bicycle Facilities
21	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
SHA	2015 LOS Wiring Diagram – Design Forecast Volumes

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
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, Worcester 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 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.

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.

3.12.04.01.06 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 2015 Build Volumes to develop and test the final design plans. All modifications to the general geometric concept shall provide traffic operations equal to or exceeding the operational analysis completed by the Administration for the original design. 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 2015 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.

3.12.04.02 Preparation and Submittal of Administration's Office of Traffic and Safety's Traffic Control Device Request 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 Request 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 Guide Signing Requirements

Permanent guide signing for this Project shall have the following functional requirements:

- Signing at the intersection of US 113 with Langmaid Road shall be as defined in the MD MUTCD, Section 2D;
- Advance guide signing shall be provided along US 113.
- Advance guide signing shall be provided along Langmaid Road;

Route marker, regulatory, and warning signs shall be provided based on MD MUTCD requirements and the Administration's Traffic Control Devices Design Manual.

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 US 113, Langmaid Road, 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, Maryland 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 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 US 113 and Langmaid Road 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. 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 US 113 and 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.

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 retroreflective (all other colors) sheeting

background and copy. The retroreflective sheeting for sign copy shall comply with Section 950.03.07 of the Administration's Standard Specification for Construction and Materials. All retroreflective 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

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 the Design-Builder shall utilize the 5th 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.

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.

3.12.05.03 Submittals

The Design-Builder shall submit Definitive Design Signing Roll Plan prior to the Final Design Signing Review:

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 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.

Table 6
Roadway Pavement Markings

PAVEMENT MARKING MATERIAL TABLE				
CATEGORY	ROADWAY TYPE	LINE STRIPING MATERIAL		
		Center Lines	Lane Lines	Edge Lines
Portland Cement Concrete (PCC) (Including Bridge Decks)				
1	Highway (other than Interstate/Freeway) AADT < 50,000	PPPRP with RPM's	Contrast PPPRP with RPM's	PPPRP
HOT MIX ASPHALT (HMA)				
1	Multi-lane or Divided Highway (other than Interstate/Freeway) AADT < 50,000	Durable with RPM's	Durable with RPM's	Durable
2	2-Lane 2-Way Roadway AADT ≥ 30,000	Durable	-----	Durable
3	2-Lane 2-Way Roadway AADT < 30,000	Paint	-----	Paint

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 Lighting

3.12.07.01 Design and Construction Requirements

3.12.07.01 .02 Intersection Lighting

All intersections along US 113 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 ANSI - IESNA RP-8-00, Annex D for the design and photometric (and calculation zone) requirements of intersection lighting.

3.12.08 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.

3.12.09 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 ROADSIDE LANDSCAPE AND REFORESTATION DESIGN PERFORMANCE SPECIFICATIONS

3.13.01 Preservation of Trees and Woodlands

The SHA has imposed restrictions on construction activities that increase the removal of existing trees. The SHA will 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 in accordance with the requirements of the SHA's 2008 Standard Specifications Section 120 – Tree Preservation

- a. Trees removed or trimmed within this project shall be in accordance with the Roadside Tree Law and Section 120 – Tree Preservation of the SHA'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 total 13.39 acres, based on the Forest Impact Plans.
- b. On-site reforestation is intended to be applicable to a number of different planting zone categories and overlay planting zone categories illustrated in the Planting Zone Concept Plans. These planting zones described in this document, shall be made part of this contract. Any proposed revisions to the Reforestation Site review approval shall be coordinated with State Highway Administration (SHA), Landscape Operations Division (LOD) Landscape Architecture Division (LAD), and Department of Natural Resources (DNR). Any DNR requirements or conditions associated with the modification of the Reforestation Site Review approval shall be the responsibility of the Design-Builder as stated elsewhere. If the Design-Builder impacts forests in excess of the anticipated forest acres, the Design-Builder shall be responsible for locating additional off-site reforestation areas, and any necessary revisions to the State Reforestation Law approval. On-site reforestation is anticipated to be 5.64 acres.
- c. The order of preference for the location of reforestation is as follows:
 1. Cleared land within the project right of way or limits that is not otherwise allocated for reforestation due to other current or future SHA projects.
 2. Off-site area on adjacent SHA lands, within the same watershed, and with the coordination and approval of the SHA.
 3. Off-site area on adjacent public lands, within the same watershed, and with the coordination and approval of the SHA and property-owning agency.

- d. The Design-Builder shall employ the services of an individual who is an ISA-certified Arborist and a Maryland Licensed Tree Expert, to perform the following activities:
1. Conduct an on-site inspection to determine the presence and location of any specimen and/or significant trees within the limits of disturbance plus thirty feet beyond the limits of disturbance. Specimen trees are defined as trees with a Diameter at Breast Height (DBH) of thirty inches 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 as described under Deliverables consistent with the SHA's 2008 Standard Specifications Section 120 – Tree Preservation.

3.13.02 Guidelines and References

3.13.02.01 Guidelines

Design and construct the Landscape and Reforestation 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 issues 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.

Table 1
Guidelines for Landscape

Priority	Author or Agency	Title
1	SHA	Standard Specifications for Construction and Materials
2	SHA	MD SHA Landscape Design Guide
3	SHA	Integrated Vegetation Management Manual for Maryland Highways
4	MDE	2000 Maryland Stormwater Design Manual, Chapter 5 – Environmental Site Design, and Appendix A – Landscaping Guidance for Stormwater BMPs
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	NRCS	Pond Code 378, Visual Resource Design. Page 9
10	AASHTO	Roadside Design Guide Chapters 4, 5, 6 and 10
11	AASHTO	T88 and T194
12	SHA	Highway Hydraulic Division Stormwater Management Facility Safety Policy for Design
13	SHA	Environmental Guidelines for Construction Activities
14	SHA	Storm Water Management Safety Policy
15	SHA	Visual and Environmental Quality and Safety Criteria Review Guidelines

3.13.02.02 References

Use the references listed in Table 2 as supplementary materials for the design and construction of the Landscape and Reforestation. 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
DNR	Department of Natural Resources Article 5-401 – Roadside Tree Permits
Worcester County	Native Plants of Worcester County

3.13.03 General

The Design-Builder shall design and install Landscape and Reforestation plantings associated with the project in accordance with this specification. This project requires particular attention to the aesthetic and landscape architectural design elements of the highway corridor. The project corridor traverses through a variety of existing land use types that include: residential, agricultural, and commercial. Consideration of future land use shall be incorporated in the design concept developed. Tree plantings shall be in accordance with requirements of the property owner and local jurisdiction. It is the responsibility of the Design-Builder to determine tree locations based on existing and proposed signs, utility locations, AASHTO setback requirements, and adjacent land uses.

The Design-Build Team will address, in a collaborative, multi-disciplinary approach, the functional and aesthetic needs of the project, which includes the preparation and implementation of successful design responses to the commitments established for the project. The lead landscape architect shall have an understanding of the process of context sensitive design solutions; be knowledgeable of native vegetation of the coastal

region of Maryland; be experienced in the requirements of the Maryland Reforestation Law and the Maryland Forest Conservation Act; and be experienced in MDE and SHA requirements for Stormwater management and associated plantings.

The Design-Builder shall establish permanent turfgrass according to the MDOT/SHA Standard Specifications for Construction and Materials 2008, Section 705 – Turfgrass Establishment. The Design-Builder shall furnish and install specified seed mixes according to the MDOT/SHA Standard Specifications for Construction and Materials 2008, Section 920.06.

3.13.04 Planting Zones

3.13.04.01 Planting Zone Types

The Design-Builder shall prepare a planting plan for the Landscape and Reforestation plantings. The landscape planting concept shall be developed to use native plants and to revegetate disturbed areas within the project to the fullest extent reasonable based with allowance for non-native material in areas not intended for reforestation and as noted in the plant species herein.

General Aesthetic Intent: Plantings are to be designed in diverse random groupings of odd numbers of plants to achieve a naturalized appearance; stands of monoculture trees are to be avoided. Shrubs shall be planted in massings of 9 or more. Plantings shall be designed to provide continuity from one planting zone to the next, appropriate to their site context; multi-season aesthetic interest to the fullest extent possible, while reducing the need for intensive maintenance. Each planting zone has its own primary aesthetic intent, differentiating it from the other categories.

Reforestation: Reforestation requirements are to be applied within the project limits to the greatest extent possible, and are to be based upon Maryland Forestation Law; reference Table 4.6-C.4 in the SHA Landscape Design Guide for planting density (note: minimum densities required by SHA policy are higher than those required by Maryland Reforestation Law). Reforestation areas are to be a minimum of 50 feet deep in the narrowest dimension. The plantings shall be designed at a ratio of 70% overstory species (shade trees and evergreen trees), and 30% understory species (ornamental trees and shrubs). A minimum of 5 major tree species shall be selected for the overstory, and a minimum of 3 species shall be selected for each category of understory (ornamental trees and shrubs). Plants specified shall be native to the Coastal Plain region of Maryland's eastern shore, and shall be appropriate for the field environmental conditions of the planting site. Refer to the Forest Edge and Roadside Buffer planting zone sections for lists of acceptable plant species. Reforestation areas shall be underplanted with upland meadow seeding. Minimum requirements dictate that plantings are to be provided at the densities dictated by the SHA Landscape Design Guide Reforestation Area Planting Density.

If the Design-Builder proposes forest impacts that are greater than the forest impact

acres, the Design-Builder is responsible for providing the remaining mitigation. The Design-Builder is required to submit a Forest Impact Drawing to the SHA for review and approval.

The Design-Builder is to provide alternatives for stabilization strategies in areas designated as sheet flow to a conservation area. Alternatives provided shall meet the aesthetic standards for the project and have a naturalistic appearance.

Shade tree species and evergreen tree species shall not be planted within 30 feet of the C/L of overhead utilities. Only a random mix of ornamental tree species and shrub species shall be planted within 30 feet of the C/L of overhead utilities. Trees shall be offset from the edge of travel lanes in conformance with the appropriate roadway cross section in the AASHTO Roadside Design Guide and the Integrated Vegetation Management Design Manual for Maryland Highways; reference Section 7.6 of SHA's Landscape Design Guide for offsets associated with the posted/designed speed.

The approved plant species, minimum acceptable sizes, and minimum/maximum spacings for each planting zone type are listed in the following sections. Requests for substitution of other species shall be submitted in writing to the SHA for approval. The Design-builder shall provide tree guards for individual trees and or shrubs at edge of planting areas, as approved by SHA.

3.13.04.01.01 Agrarian Edge

Primary Aesthetic Intent: The intent is to provide loosely clustered groupings of trees adjacent to farmland allowing for open vistas of fields within the project limits of disturbance or Right of Way. Linear tree spacings, reminiscent of urban street trees, are to be avoided.

Reforestation: The low-density design intent of this planting zone precludes its use in contributing to reforestation quantities.

The Design-Builder shall prepare Landscape Plans for the areas identified as Agrarian Edge plantings. Areas of separation between groups of plants shall serve as the starting point for changing to a different plant species. Shade tree species shall be favored over ornamental tree species. Use a ratio of 70% shade trees, and 30% ornamental trees; plantings shall not exceed: 15 shade trees and 6 ornamental trees per acres. Ornamental tree species will be used when overhead utilities and other site constraints preclude the use of shade tree species.

Plant selections shall be appropriate for the field environmental conditions of the planting site. The design shall maintain sight lines at all times. This planting zone shall be underplanted with upland or lowland meadow seeding, as the site condition dictates. The approved plant species, minimum acceptable sizes, and minimum spacings are listed as follows:

PLANT MATERIAL: Agrarian Edge (87,719 SY/18.1 Acres)

Botanical Name (Common Name) Minimum Spacing Minimum Size

Shade Tree Species (Overstory)

Liquidambar styraciflua (Sweetgum)	35' OC	2" Cal. B&B
Liriodendron tulipifera (Yellow Poplar)	35' OC	2" Cal. B&B
Nyssa sylvatica (Black Gum)	35' OC	2" Cal. B&B
Quercus coccinea var coccinea (Scarlet Oak)	35' OC	2" Cal. B&B
Quercus phellos (Willow Oak)	35' OC	2" Cal. B&B
Quercus rubra (Red Oak)	35' OC	2" Cal. B&B
Quercus velutina (Black Oak)	35' OC	2" Cal. B&B
Tilia tomentosa (Silver Linden)	35' OC	2" Cal. B&B

Ornamental Tree Species (Understory)

Amelanchier laevis (Allegheny Serviceberry)	20' OC	5' Ht. #7 CG
Amelanchier canadensis (Shadblow Serviceberry)	20' OC	5' Ht. #7 CG
Cercis canadensis (Eastern Redbud)	20' OC	5' Ht. #7 CG
Chionanthus virginicus (White Fringetree)	20' OC	5' Ht. B&B
Hamamelis virginiana (Common Witchhazel)	20' OC	5' Ht. #7 CG
Magnolia virginiana (Sweetbay Magnolia)	20' OC	5' Ht. #7 CG
Sassafras albidum (Sassafras)	20' OC	5' Ht. #7 CG

Note: B&B indicates Balled and Burlapped. Cal. indicates Caliper inches. OC indicates On-center Spacing. CG indicates Container-grown.

3.13.04.01.02 Forest Edge

Primary Aesthetic Intent: The trees and shrubs should be designed such that they will provide both natural edge structure and multi-season interest, and will complement the remainder of the Forest Edge plantings.

Reforestation: While maximum plant spacings are listed in the following table, spacings can be reduced, where appropriate, to meet reforestation requirements. Refer to Planting Zone Types section for more detailed information on reforestation requirements, and to the Planting Zone Concept Plans for guidance regarding opportunities to implement these more densely planted areas. Areas within this planting zone that do meet the requirements of reforestation are to be indicated on the plans (e.g. outline of area, with callout).

The Design-Builder shall prepare Landscape Plans for the areas identified as Forest Edge plantings. This planting zone occurs in areas where the roadway construction

requires that a portion of the existing forest be removed, exposing plant material that was once “inside” the forest or in a field condition sufficiently large to meet reforestation requirements. A new “edge” shall be replanted using shrubs, ornamental trees, evergreen trees, and shade trees. The Design-Builder shall provide this planting at the edges of clearing of existing forest or adjacent to fields for reforestation, as indicated on the Planting Zone Concept Plans. This planting zone shall be designed in accordance with the SHA’s Slope Management Standards in the Integrated Vegetation Management Manual for Maryland Highways and the AASHTO Roadside Design Guide. Plantings are to be provided at the following minimum densities:

- Shade Trees: 61 per acre
- Evergreen Trees: 22 per acre
- Ornamental Trees: 21 per acre
- Shrubs: 43 per acre

A minimum of 3 of overstory tree species (shade trees and evergreen trees) and 3 understory plant species (ornamental trees and shrubs) shall be selected for use. Forest Edge plant selections shall be appropriate for the field environmental conditions of the project corridor. Ornamental tree species shall be multi-stem form unless specified otherwise. This planting zone shall be underplanted with upland meadow seeding. Maintain appropriate sight lines at all times. The approved plant species, minimum acceptable sizes, and maximum spacings are listed as follows:

PLANT MATERIAL: Forest Edge (72,442 SY/15.0 Acres)

<u>Botanical Name (Common Name)</u>	<u>Maximum Spacing</u>	<u>Minimum Size</u>
Shade Tree Species (Overstory)		
Acer rubrum (Red Maple)	35’ OC	2” Cal. B&B
Gleditsia triacanthos var inermis	35’ OC	2” Cal. B&B
Liquidambar styraciflua (Sweetgum)	35’ OC	2” Cal. B&B
Liriodendron tulipifera (Yellow Poplar)	35’ OC	2” Cal. B&B
Nyssa sylvatica (Black Gum)	35’ OC	2.5” Cal. CG
Quercus alba (White Oak)	35’ OC	2” Cal. B&B
Quercus falcata (Southern Red Oak)	35’ OC	2” Cal. B&B
Quercus macrocarpa (Bur Oak)	35’ OC	2” Cal. B&B
Quercus velutina (Black Oak)	35’ OC	2” Cal. B&B
Evergreen Tree Species (Overstory)		
Ilex opaca (American Holly)	15’ OC	5’ Ht. B&B
(Provide 10% male plants of OED approved compatible varieties)		
Juniperus virginiana (Eastern Red Cedar)	10’ OC	5’ Ht. CG
Pinus rigida (Pitch Pine)	15’ OC	5’ Ht. #7 CG

SPECIAL PROVISIONS
SCOPE OF WORK FOR DESIGN BUILD

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Pinus strobus (Eastern White Pine)	15' OC	5' Ht. B&B
Pinus taeda (Loblolly Pine)	15' OC	5' Ht. #7 CG
Pinus virginiana (Virginia Pine)	15' OC	5' Ht. #7 CG

Ornamental Tree Species (Understory)

Amelanchier arborea (Downy Serviceberry)	15' OC	5' Ht. #7 CG
Amelanchier laevis (Allegheny Serviceberry)	15' OC	5' Ht. #7 CG
Amelanchier canadensis (Shadblow Serviceberry)	15' OC	5' Ht. #7 CG
Cercis canadensis (Eastern Redbud)	15' OC	5' Ht. #7 CG
Chionanthus virginicus (White Fringetree)	15' OC	5' Ht. B&B
Hamamelis virginiana (Common Witchhazel)	15' OC	5' Ht. #7 CG
Magnolia virginiana (Sweetbay Magnolia)	15' OC	5' Ht. #7 CG
Ostrya virginiana (Ironwood)	15' OC	5' Ht. #7 CG
(Single Stem, Tree Form)		
Oxydendron arboretum (Sourwood)	15' OC	5' Ht. #7 CG

Shrub Species (Understory)

Callicarpa americana (Beautyberry)	5' OC	3' Ht. #5 CG
Clethra alnifolia (Summersweet)	5' OC	3' Ht. #5 CG
Ilex verticillata 'Winter Gold' (Winterberry)	5' OC	3' Ht. #5 CG
(Provide 10% male plants of OED approved compatible varieties)		
Ilex verticillata 'Winter Red' (Winterberry)	5' OC	3' Ht. #5 CG
(Provide 10% male plants of OED approved compatible varieties)		
Morella pensylvanica (Northern Bayberry)	5' OC	3' Ht. #5 CG
Photinia melonocarpa (Black Chokeberry)	5' OC	3' Ht. #5 CG
Photinia pyrifolia (Red Chokeberry)	5' OC	3' Ht. #5 CG
Rhus aromatica (Fragrant Sumac)	5' OC	3' Ht. #5 CG
Rhus glabra (Smooth Sumac)	5' OC	3' Ht. #5 CG
Viburnum acerifolium (Mapleleaf Viburnum)	5' OC	3' Ht. #5 CG
Viburnum dentatum (Southern Arrowwood)	5' OC	3' Ht. #5 CG
Viburnum prunifolium (Blackhaw Viburnum)	5' OC	3' Ht. #5 CG

Note: B&B indicates Balled and Burlapped. Cal. indicates Caliper inches. OC indicates On-center Spacing. CG indicates Container-grown.

3.13.04.01.03 Median Areas

Primary Aesthetic Intent: The planting category is to be applied to median strips between lanes of travel. Shrubs are to be incorporated to reduce headlight glare, emphasize lane separation, and provide visual interest within the medians. Shrub

plantings are to naturalize and eliminate on-going maintenance practices beyond the establishment period.

Reforestation: This planting zone is not applicable to Reforestation.

The Design-Builder shall prepare Landscape Plans for the median areas along US 113 as shown on the Landscape Concept Plans. Medians shall be planted with turfgrass. Plantings shall be designed to minimize maintenance practices beyond the establishment period. Plant selections shall be appropriate for the field conditions of the planting site.

Shrubs are to be provided at the following minimum densities:

Shrubs: 100 per acre

The approved plant species, minimum acceptable sizes, and maximum spacings are listed as follows:

PLANT MATERIAL: Median Areas (33,872 SY/6.7 Acres)

Botanical Name (Common Name) Maximum Spacing Minimum Size

Shrub Species (Understory)

Alnus serrulata (Smooth Alder)	6' OC	4' Ht. #5CG
Clethra alnifolia (Sweet Pepperbush)	4' OC	3' Ht. #5 CG
Cornus sericea (Redosier Dogwood)	5' OC	3' Ht. #5 CG
Fothergilla gardenii (Dwarf Fothergilla)	3' OC	2' Spr. #5CG
Ilex glabra (Inkberry Holly)	5' OC	3' Ht. #5 CG
Ilex verticillata (Winterberry)	5' OC	3' Ht. #5 CG
(OED approved sp., Provide adequate # of male plants)		
Photinia pyrifolia (Red Chokeberry)	4' OC	3' Ht. #5 CG
Rhus aromatica 'Gro Low' (Fragrant Sumac)	3' OC	2' Spr. #5 CG
Rhus glabra (Smooth Sumac)	6' OC	3' Ht. #5 CG
Spirea x vanhouttei (Vanhoutte Spirea)	5' OC	3' Ht. #5 CG
Viburnum dentatum (Arrowwood Viburnum)	6' OC	3' Ht. #5 CG
Viburnum prunifolium (Blackhaw Viburnum)	6' OC	3' Ht. #5 CG

Note: B&B indicates Balled and Burlapped. Cal. indicates Caliper inches. OC indicates On-center Spacing. CG indicates Container-grown.

3.13.04.01.04 Roadside Buffer

Primary Aesthetic Intent: Roadside Buffer plantings are intended to screen undesirable views; provide privacy to adjacent properties; and to create separation, as desired, between adjacent land uses. This planting zone provides increased quantities of evergreen plantings, relative to other planting zones.

Reforestation: While maximum plant spacings are listed in the following table, spacings can be reduced, where appropriate, to meet reforestation requirements. Refer to Planting Zone Types section for more detailed information on reforestation requirements, and to the Planting Zone Concept Plans for guidance regarding opportunities to implement these more densely planted areas. Areas within this planting zone that do meet the requirements of reforestation are to be indicated on the plans (e.g. outline of area, with callout).

The Design-Builder shall prepare planting plans for the areas identified as Roadside Buffer. The plant category shall be designed as an area between the Right of Way line and the safety/clear zone limits, in accordance with the SHA’s Slope Management Standards in the Integrated Vegetation Management Manual for Maryland Highways and the AASHTO Roadside Design Guide, as indicated on the Planting Zone Concept Plans. The Design-Builder shall design and plant screening areas where the roadway is adjacent to residential or institutional types of land uses to create an attractive landscape screen for the adjacent uses. Plantings are to be provided at the following minimum densities:

- Shade Trees: 39 per acre
- Evergreen Trees: 53 per acre
- Ornamental Trees: 29 per acre
- Shrubs: 28 per acre

A minimum of 3 of overstory tree species (shade trees and evergreen trees) and 3 understory plant species (ornamental trees and shrubs) shall be selected for use. Roadside Buffer plant selections shall be appropriate for the field environmental conditions of the project corridor. Ornamental tree species shall be multi-stem form unless specified otherwise. This planting zone shall be underplanted with upland or lowland meadow seeding, as appropriate to the local conditions. The approved plant species, minimum acceptable sizes, and maximum spacings are listed as follows.

PLANT MATERIAL: Roadside Buffer (23,633 SY/4.9 Acres)

Botanical Name (Common Name)	Maximum Spacing	Minimum Size
Shade Tree Species (Overstory)		
Acer rubrum (Red Maple)	30’ OC	2” Cal. B&B
Betula lenta (Sweet Birch)	30’ OC	2” Cal. B&B
Liquidambar styraciflua (Sweetgum)	30’ OC	2” Cal. B&B
Liriodendron tulipifera (Tulip Poplar)	30’ OC	2” Cal. B&B
Nyssa sylvatica (Black Gum)	30’ OC	2” Cal. B&B
Platanus occidentalis (Sycamore)	35’ OC	2” Cal. B&B
Quercus palustris (Pin Oak)	30’ OC	2” Cal. B&B
Quercus rubra (Northern Red Oak)	35’ OC	2” Cal. B&B
Quercus velutina (Black Oak)	35’ OC	2” Cal. B&B

Tilia americana (American Linden)	35' OC	2" Cal. B&B
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Evergreen Tree Species (Overstory)

Ilex opaca (American Holly)	15' OC	5' Ht. B&B
(Provide 10% male plants of OED approved compatible varieties)		
Juniperus virginiana (Eastern Red Cedar)	10' OC	5' Ht. #7 CG
Picea glauca (White Spruce)	15' OC	5' Ht. B&B
Pinus strobus (Eastern White Pine)	15' OC	5' Ht. B&B
Pinus taeda (Loblolly Pine)	15' OC	5' Ht. #7 CG
Pinus virginiana (Virginia Pine)	15' OC	5' Ht. #7 CG

Ornamental Tree Species (Understory)

Amelanchier arborea (Downy Serviceberry)	20' OC	5' Ht. #7 CG
Amelanchier canadensis (Shadblow Serviceberry)	20' OC	5' Ht. #7 CG
Cercis canadensis (Eastern Redbud)	20' OC	5' Ht. #7 CG
Chionanthus virginicus (White Fringetree)	20' OC	5' Ht. #7 CG
Crataegus viridis (Green Hawthorn)	20' OC	5' Ht. #7 CG
Hamamelis virginiana (Witchhazel)	20' OC	5' Ht. #7 CG
Magnolia virginiana (Sweetbay Magnolia)	20' OC	5' Ht. #7 CG
Prunus angustifolia (Chickasaw Plum)	20' OC	5' Ht. #7 CG
Prunus serotina (Black Cherry)	20' OC	5' Ht. #7 CG

Shrub Species (Understory)

Calicanthus floridus (Eastern Sweetshrub)	4' OC	3' Ht. #5 CG
Clethra alnifolia (Summersweet)	4' OC	3' Ht. #5 CG
Ilex verticillata (Winterberry)	4' OC	3' Ht. #5 CG
Lindera benzoin var benzoin (Spicebush)	4' OC	3' Ht. #5 CG
Morella cerifera (Wax Myrtle)	4' OC	3' Ht. #5 CG
Photinia pyrifolia (Red Chokeberry)	4' OC	3' Ht. #5 CG
Rhus aromatica (Fragrant Sumac)	4' OC	3' Ht. #5 CG
Sambucus canadensis (American Elder)	4' OC	3' Ht. #5 CG
Viburnum lentago (Nannyberry)	4' OC	3' Ht. #5 CG

Note: B&B indicates Balled and Burlapped. Cal. indicates Caliper inches. OC indicates On-center Spacing. CG indicates Container-grown.

3.13.04.01.6 Stormwater Management Plantings

Primary Aesthetic Intent: In addition to following the requisite criteria, SWM plantings shall provide visual enhancement and support the functional requirements of treating or shading water and uptake of pollutants. Plantings should take on a natural appearance. Groups of a single species should be placed in loose drifts interspersed with individual plants of different species to improve visual quality.

Reforestation: This planting zone is not applicable to Reforestation.

The design shall adhere to the planting requirements as outlined in the Maryland State Highway Administration Stormwater Management Site Development Criteria – Section 8.4. Lists of approved species for each SWM facility type and planting zone are provided in the next section.

Table 3 for SWM ponds and wetland hydrologic zones lists the planting zones for these types of SWM facilities. The design shall provide planting according to the zones required by the particular facility being designed. Ponds shall have aquatic benches located within emergent and floating aquatic zones, water depths greater than 4 feet, and storm elevations for up to the 10-year storm. Wetlands shall have micropools or deep pools within submerged aquatic zones, shallow wetland areas, emergent and floating aquatic zones, and water fluctuations up to the 10-year storm. SWM ponds without a 10-year event shall follow Table 3 with the frequently fluctuating zone being defined as dry bottom or permanent pool to the highest storm event up to a 10-year event. Both SWM ponds and wetlands are required to have perimeter shade planting, which covers the emergent zone through the frequently fluctuating zone. Dry SWM infiltration basins and extended detention ponds and bioretention facilities follow the specifications for filtering practices defined in Table 4. Refer to the Maryland Stormwater Design Manual for guidance on Environmental Site Design (ESD), which includes: optimizing conservation of natural features (e.g., drainage patterns, soil, vegetation), minimizing impervious surfaces (e.g., pavement, concrete channels, roofs), slowing down runoff to maintain discharge timing and to increase infiltration and evapotranspiration, using other nonstructural practices or innovative technologies approved by the Maryland Department of the Environment (MDE).

PLANT MATERIAL: Stormwater Management Plantings (16,598 SY/3.4 Acres)

**Table 3
Minimum Planting Requirements at SWM Ponds
and Wetland Hydrologic Zones**

Min. Quantity/ Placement Considerations	Min. Size/Rate	Root Condition
Submerged Aquatic Zone (48 in. or greater depth permanent water)		
1 plant per 9 cu. ft. of water volume for water depths 48 in. or deeper. Min. 2 species with no one species being greater than 60% of the total plants in this zone	8 in. ht./length	Bare root

Table 3 (Continued)
Minimum Planting Requirements at SWM Ponds
and Wetland Hydrologic Zones

<p>Emergent & Floating Aquatic Zone (up to 18 in. depth permanent water) (The area between the submerged aquatic zone and 18" water depth taking into consideration the slope shall be used to determine quantities of plants)</p>		
<p>24 in. centers max. spacing (2.9 plants per 10 sq. ft.) Min. 3 species shall be provided with no one species being greater than 50% of the total plants in this zone Min. 30% of the species shall be broadleaved or floating leaved</p>	<p>24 in. ht.</p>	<p>Container grown</p>
<p>Frequently Fluctuating Zone (permanent water surface to 10 yr. water storm elev.) (The area between the emergent zone and 10 yr storm water elevation taking into consideration the slope shall be used to determine quantities of plants)</p>		
<p>Live Fascines or Wattles 3 species in each fascine bundle Place parallel to contours Min. one layer of fascines at water's edge Do not use when facility is lined</p>	<p>4 in. diameter by 6 ft. length</p>	<p>Bound bundles</p>
<p>Plug Planting Min. 3 species of plugs shall be provided with no one species being greater than 50% of the total plants in this zone Plugs shall be spaced at max. 24 in. centers (2.9 plants per 10 sq. ft.)</p>	<p>2.25" ht</p>	<p>5" Root size</p>

Table 3 (Continued)
Minimum Planting Requirements at SWM Ponds
and Wetland Hydrologic Zones

<p>Seed and Mulch Shall be included to provide permanent stabilization Lowland Meadow Woody Shrub Seed Mix Mulch shall be according to Standard Specification for Construction Materials (SSCM) 2001, Section 705.03.01(f). No straw mulch shall be used at SWM facilities</p>	<p>16 lbs./ac. 10 lbs/ac.</p>	
<p>Perimeter Shade Planting (emergent & floating aquatic zone to 10 yr. water storm elev.)</p>		
<p>Canopy Trees 1 tree if area is $\leq 4,000$ SF (measured at 10 YR water surface contour line) 3 trees if $(4,000 \text{ SF} < \text{area} \leq 8,000 \text{ SF})$ 5 trees if $(8,000 \text{ SF} < \text{area} \leq 12,000 \text{ SF})$ If area $> 12,000$ SF, add 1 additional tree for each additional 4,000 SF If facility is lined, do not plant trees or woody shrubs within the limits of the liner</p>	<p>2 inch cal.</p>	<p>B & B</p>
<p>Understory or Flowering Trees 2 if area is $\leq 4,000$ SF, add 1 additional tree for each additional 1,000 SF Multiple stemmed trees shall have a min. of 3 trunks.</p>	<p>2 in. cal.</p>	<p>B & B</p>
<p>Woody Shrubs 5 for every understory or flowering tree required</p>	<p>24 in. ht. or spread</p>	<p>Container Grown</p>

Table 3 (Continued)
Minimum Planting Requirements at SWM Ponds
and Wetland Hydrologic Zones

<p>Planting Bed Preparation</p> <p>Mulched beds shall not be used at SWM facilities below the 10 YR water surface elevation. Instead, individual plants shall be installed in plant pits that are not mulched.</p> <p>Areas between planting pits shall be stabilized with temporary seed and mulch</p>		
<p>Seed and Mulch</p> <p>See Frequently Fluctuating Zone seed and mulch requirements.</p>		
<p>Minimum planting area is based upon the surface area measurement</p>		
<p> </p>		

Table 4
Minimum Planting Requirements for SWM Filtering Practices
Minimum Planting Requirements for SWM Filtering Practices

Min. Quantity/ Placement Considerations	Min. Size/Rate	Root Condition
<p>Sod</p> <p>Flow shall be diverted from filter practices until 2 in. ht. of permanent turf stabilization has been established.</p> <p>In cases where flow cannot be diverted, sod shall be applied to the filter surface.</p> <p>Sod shall be applied to all grass weirs except emergency spillways (which shall be established in permanent turf).</p>	<p>Section 708 Section 920 (SSCM 2001)</p>	
<p>Seed and Mulch</p> <p>Lowland Meadow and Upland Meadow</p> <p>Woody Shrub Mix</p>	<p>8 lbs / ac. 10 lbs / ac.</p>	

Table 4 (Continued)
Minimum Planting Requirements for SWM Filtering Practices

Min. Quantity/ Placement Considerations	Min. Size/Rate	Root Condition
No straw mulch shall be used at SWM facilities. Mulch shall be according to Section 920.05, SSCM 2001.		
Micro-bioretenion /Bioretention (The filter surface area shall be used for determine quantities of plants)		
Trees min. 0.76 trees per 100 SF (filter surface area measurement) If the facility has underdrains or is lined, large canopy trees shall not be placed directly in the bioretention facility. Instead, they shall be used adjacent to the facility to provide shade to understory plants. In this case, plant large trees 5 feet away from the perimeter of the filter medium/underdrains or liner.	2 inch cal.	B&B
Shrubs Min. 2.8 shrubs per 100 SF (filter surface area measurement)	24 in. ht. or spread	Container Grown
Herbaceous layer 3 perennials or grasses can be substituted for 1 required shrub No more than 50% of plants shall be perennial or grasses	#1 container	Container Grown
Mulch 3 in. depth shredded hardwood mulch, evenly distributed and raked smooth	Section 920 (SSCM 2001)	
Minimum planting area for bioretention is based upon the filter surface area measurement. Minimum planting area for dry swales and sand filters is the bottom of the facility.		

Table 5
Minimum Planting Requirements for SWM Open Channels

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Min. Quantity/ Placement Considerations	Min. Size/Rate	Root Condition
Dry Swale		
Seed and Mulch SWM Seed Mix SHA Special Purpose Mix No straw mulch shall be used at SWM facilities. Mulch shall be according to Section 920.05, SSCM 2001.	8 lbs / ac. 10 lbs / ac.	
Wet Swales		
Emergent Species Grasses, rushes or grass-like species. No broadleaf species. 24 in. centers max. spacing (2.9 plants per 10 sq. ft.)	#SP4	Container Grown
Minimum planting area is based upon permanent water elevation.		

Submerged Aquatic Planting Zone

Botanical Name	Common Name
Elodea Canadensis	Waterweed
Potamogeton pectinatus	Sago Pond Weed
Potamogeton perfoliatus	Redhead Grass
Vallisneria Americana	Wild Celery

Emergent & Floating Aquatic Planting Zone
Emergent Plants

Botanical Name	Common Name
Acorus calamus	Sweet Flag (broadleaf)
Iris versicolor	Blue Flag (broadleaf)
Juncus canadensis	Canada Rush
Juncus effuses	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
Spartina alternifolia	Salt Marsh Cordgrass
Spartina patans	Salt Meadow Hay

Floating Aquatic Plants

Botanical Name	Common Name
Nelumbo lutea	Lotus
Nymphaea odorata	Fragrant Water Lily

**Frequently Fluctuating Zone
Live Fascines**

Botanical Name	Common Name
Salix nigra	Black Willow
Salix sericea	Silky Willow
Cornus amomum	Silky Dogwood
Cephalanthus occidentalis	Buttonbush

Frequently Fluctuating Zone

Plugs (Note: Inclusion on this list does not guarantee availability in plug form)

Botanical Name	Common Name
Chelone glabra	White Turtlehead
Dennstaedtia punctilobula	Hay-Scented Fern
Erythronium americanum	Trout Lily
Eupatorium dubium	Joe-Pye Weed
Eupatorium perfoliatum	Common Boneset
Lilium canadense	Canada Lily
Lilium superbum	Turk's Cap Lily
Lobelia cardinalis	Cardinal Flower
Lobelia siphilitica	Great Blue Lobelia
Oenothera fruticosa	Narrow-leaved Sundrops
Osmunda cinnamomea	Cinnamon Fern
Osmunda regalis	Royal Fern

Frequently Fluctuating Zone

Plugs (Note: Inclusion on this list does not guarantee availability in plug form)

Botanical Name	Common Name
Panicum virgatum	Switchgrass
Sisyrinchium atlanticum	Coastal Blue-eyed Grass
Solidago rugosa	Wrinkle Leaf Goldenrod
Thelypteris palustris	Marsh Fern
Tripsacum dactyloides	Gama Grass
Verbena hastata	Blue Vervain

Perimeter Shade Planting - Emergent Zone
Canopy Trees

Botanical Name	Common Name
Betula nigra	River Birch
Carya cordiformis	Bitternut Hickory
Carya glabra	Pignut Hickory
Liquidambar styraciflua	Sweet Gum
Nyssa sylvatica	Black Gum
Platanus occidentalis	American Sycamore
Populus deltoids	Eastern Cottonwood
Populus heterophylla	Swamp Cottonwood
Quercus bicolor	Swamp White Oak
Quercus michauxii	Swamp Chestnut Oak
Quercus phellos	Willow Oak

Perimeter Shade Planting - Emergent Zone

Understory and Flowering Trees

Botanical Name	Common Name
Alnus serrulata	Smooth Alder
Amelanchier Canadensis	Serviceberry
Magnolia virginiana	Sweetbay Magnolia
Viburnum prunifolium	Blackhaw Viburnum

Perimeter Shade Planting - Emergent Zone

Shrubs

Botanical Name	Common Name
Cephalanthus occidentalis	Buttonbush
Photinia pyrifolia	Red Chokeberry
Rhododendron maximum	Rose Bay Rhododendron
Rhododendron periclymenoides	Pink Azalea
Rhododendron viscosum	Swamp Azalea
Rubus allegheniensis	Allegheny Blackberry
Sambucus canadensis	Common Elderberry
Viburnum prunifolium	Blackhaw Viburnum

Perimeter Shade Planting – Frequently Fluctuating Zone

Canopy Trees

Botanical Name	Common Name
Betula lenta	Sweet or Black Birch
Betula nigra	River Birch
Carya alba (tomentosa)	Mockernut Hickory
Carya ovata	Shagbark Hickory
Diospyrus virginiana	Common Persimmon
Fagus grandifolia	American Beech

Perimeter Shade Planting – Frequently Fluctuating Zone
Canopy Trees

Botanical Name	Common Name
Juniperus virginiana	Eastern Redcedar
Pinus echinata	Shortleaf Pine
Pinus strobus	Eastern White Pine
Pinus virginiana	Virginia Pine
Prunus serotina	Black Cherry
Quercus alba	White Oak
Quercus coccinea	Scarlet Oak
Quercus palustris	Pin Oak
Quercus rubra	Northern Red Oak
Quercus stellata	Post Oak
Quercus velutina	Black Oak
Tilia americana	American Basswood
Ulmus rubra	Slippery Elm
Carpinus caroliniana	American Hornbeam
Corylus americana	American Hazelnut
Cercis canadensis	Eastern Redbud
Chionanthus virginicus	White Fringetree
Cornus florida	Flowering Dogwood
Crataegus crus-galli	Cockspur Hawthorn
Ilex decidua	Possomhaw
Ilex opaca (OED approved species, provide adequate # of male plants)	American Holly
Juniperus virginiana	Eastern Redcedar
Sassafras albidum	Sassafras

Perimeter Shade Planting – Frequently Fluctuating Zone
Shrubs

Botanical Name	Common Name
Comptonia peregrine	Sweet Fern
Cornus amomum	Silky Dogwood
Euonymus americanus	Strawberry Bush
Hamamelis virginiana	Witchhazel
Hydrangea arborescens	Wild Hydrangea
Leucothoe racemosa	Fetterbush
Lyonia ligustrina	Male-berry
Gaylussacia baccata	Black Huckleberry
Rhus glabra	Smooth Sumac
Vaccinium corymbosum	Highbush Blueberry
Vaccinium stamineum	Deerberry
Vaccinium vacillans	Early Lowbush Blueberry
Viburnum acerifolium	Maple-Leaved Viburnum
Viburnum dentatum	Southern Viburnum

Micro-bioretenion or Bioretention Planting
Trees

Botanical Name	Common Name
Acer rubrum	Red Maple
Betula lenta	Sweet Birch
Carya glabra	Pignut Hickory
Cercis canadensis	Eastern Redbud
Chionanthus virginicus	White Fringetree
Cornus florida	Flowering Dogwood
Crataegus crus-galli	Cockspur Hawthorn
Diospyrus virginiana	Common Persimmon

Micro-bioretenention or Bioretention Planting

Trees

Botanical Name	Common Name
Juniperus virginiana	Eastern Redcedar
Nyssa sylvatica	Black Gum
Pinus echinata	Shortleaf Pine
Pinus strobus	Eastern White Pine
Pinus virginiana	Virginia Pine
Quercus rubra	Northern Red Oak
Quercus velutina	Black Oak

Micro-bioretenention or Bioretention Planting

Shrubs

Botanical Name	Common Name
Hamamelis virginiana	Witchhazel
Ilex decidua	Possumhaw
Kalmia latifolia	Mountain Laurel
Lindera benzoin	Spicebush
Rhus glabra	Smooth Sumac
Vaccinium corymbosum	Highbush Blueberry
Viburnum acerifolium	Maple-leaved Viburnum
Viburnum dentatum	Arrowwood Viburnum

Micro-bioretenion or Bioretention Planting
Herbaceous

Botanical Name	Common Name
<i>Aquilegia canadensis</i>	Eastern Columbine
<i>Asclepias incarnata</i>	Swamp Milkweed
<i>Asclepias tuberosa</i>	Butterflyweed
<i>Aster divaricatus</i>	White Wood Aster
<i>Aster ericoides</i>	Heath Aster
<i>Aster novi-belgii</i>	New York Aster
<i>Baptisia australis</i>	Blue False Indigo
<i>Eupatorium fistulosum</i>	Joe-Pye Weed
<i>Eupatorium rugosum</i>	White Snakeroot
<i>Heliopsis helianthoides</i>	Oxeye Sunflower
<i>Hepatica americana</i>	Round-lobed Hepatica
<i>Heuchera americana</i>	Alum Root
<i>Liatris graminifolia</i>	Grass-Leaf Blazingstar
<i>Monarda fistulosa</i>	Wild Bergomot
<i>Penstemon digitalis</i>	Beardtongue
<i>Physostegia virginiana</i>	Obedient plant
<i>Polygonatum biflorum</i>	Solomon's Seal
<i>Rudbeckia fulgida</i>	Early Coneflower
<i>Rudbeckia hirta</i>	Black-eyed Susan
<i>Rudbeckia laciniata</i>	Tall Coneflower
<i>Rudbeckia triloba</i>	Three-lobed Coneflower
<i>Saxifraga virginiana</i>	Early Saxifrage
<i>Silene stellata</i>	Starry Companion
<i>Solidago caesia</i>	Blue-stemmed Goldenrod
<i>Solidago rigida</i>	Rigid Goldenrod
<i>Solidago speciosa</i>	Showy Goldenrod

Code 378 Embankments	
Botanical Name	Common Name
SHA Tufgrass Seeding	
SHA Upland Meadow Seeding	
Andropogon virginicus	Broomsedge
Bouteloua curtipendula	Sideoats Grama
Dichanthelium clandestinum	Deertongue
Elymus canadensis	Canada Wild Rye
Elymus virginicus	Virginia Wildrye
Eragrostis curvula	Weeping Lovegrass
Panicum virgatum	Switchgrass
Schizachyrium scoparium	Little Bluestem
Sorghastrum nutans	Indiangrass
Tripsacum dactyloides	Eastern Gama Grass

3.13.05 Landscape Requirements

3.13.05.01 Preliminary Landscape and Reforestation Plan

The Preliminary Landscape and Reforestation Plan shall include: adjacent natural and manmade features; concept design elements; limits of construction phasing; location and extent of planting zone types; anticipated types of plantings, such as overstory and understory; and clear labels or a legend to identify these elements. The Planting Zone Concept Plans, which are included as additional information on ProjectWise, are indicative in nature, and provided as a guideline; these plans designate planting zones by type, location and square footage. The Preliminary Landscape and Reforestation Plan shall be formatted as a roll plan at a minimum scale of 1" = 100'.

Preliminary Landscape and Reforestation Review Meeting. The Design-Builder shall conduct a review meeting with the LAD and LOD to discuss and review the Preliminary Landscape and Reforestation Plan. This meeting should be scheduled early in the design process to ensure adequate opportunity for coordination and integration with other engineering and design disciplines. The Design-Builder shall prepare meeting minutes and distribute them to attendees for review and comments. After approval by the LAD and the LOD of the Preliminary Landscape and Reforestation Plan, the Design-

Builder may then begin to develop Concept Landscape and Reforestation Plans while continuing close coordination and communication with other engineering and design disciplines.

3.13.05.02 Concept Landscape and Reforestation Plans

The Design-Builder shall prepare a planting plan for the Landscape and Reforestation plantings based on the Preliminary Landscape and Reforestation Plan. The Design-Builder shall be responsible for coordinating the planting plan for the Landscape and Reforestation with all other elements of work to be performed under the Contract including, but not limited to: final grading, storm drain and stormwater management BMP locations and outfalls, cross culvert outfalls, utilities, signage, and lighting. The Design-Builder shall demonstrate that areas were maximized for plantings and that the Design-Builder worked cooperatively toward this goal. Areas used for stormwater management BMPs shall not be used for Landscape and Reforestation plantings. Landscape plantings required as part of the stormwater management plans shall be coordinated with the Landscape and Reforestation planting plans to ensure a unified planting theme is created for the project. Plant locations should conform to the SHA's Integrated Vegetation Management Manual for Maryland Highways.

In the event that conditions change during the design process so as to affect the design integrity of the approved Preliminary Landscape and Reforestation Plan, it is the responsibility of the Design-Builder Landscape Architect to immediately inform the SHA, OED, and LAD of the situation and recommend remedies that may be considered by the SHA and LAD.

The Concept Landscape and Reforestation Plans shall be at a scale appropriate for the project but not 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 the RFP. The preliminary plans shall include, but are not limited to: existing conditions; proposed roadway; tree preservation areas; reforestation areas; plant types, locations and potential species selections; stormwater and ESD plantings; cut and fill lines; limit of disturbance lines; Right of Way lines, and other information deemed necessary for adequately evaluating the proposed planting locations.

3.13.05.03 Pre-final Landscape and Reforestation Plans

The Pre-final Landscape and Reforestation Plans shall serve for use in a multi-disciplinary review to identify and resolve any conflicts. Plans shall be prepared at a scale no smaller than 1" = 50', and shall include, but are not limited to: existing and proposed roadway and site conditions; limits of disturbance, Right of Way lines, existing grades; proposed grades; stormwater management BMP locations; SHA-required setbacks from travel lanes; all existing and proposed utilities and their SHA-required setbacks; all barriers, fences, signage, lighting, and other fixtures that may pose a potential conflict within the project site; location and extent of planting zone types; plant

species and locations; and clear labels and legends to indicate all elements of the drawings. If the Design-Builder determines a conflict from one or more of these elements, the Design-Builder shall be responsible for modifying the concept plans, while still retaining the intent of the design.

Pre-final Landscape and Reforestation Review Meeting. The Design-Builder shall conduct a review meeting with all engineering and design disciplines, the LAD, and LOD to discuss and review the Pre-final Landscape and Reforestation Plans. This meeting should be scheduled well in advance of the submittal of the Final Landscape and Reforestation Plans to ensure adequate opportunity for coordination and all required revisions. The Design-Builder shall prepare meeting minutes, which will include a list of compiled comments to be addressed prior to the submission of Final Landscape and Reforestation Plans, and distribute them to attendees for review and comments.

3.13.05.04 Final Landscape and Reforestation Plans

Final Landscape and Reforestation Plans shall include all plant species, sizes and locations for the project. The plans shall include all proposed wetland and stream restoration plantings and shall be submitted at a scale no smaller than 1" = 50'. The plans shall include the sizes of planting zones in acres, and quantities of plants anticipated, noting any differences in quantities from previous phases in the form of a chart/table. The stormwater plantings shall include the surface area of treatments, in addition to quantities of plantings. Plans shall include signs, roadside barriers and other elements that impact planting areas to demonstrate that the greatest amount of planting area was utilized.

3.13.05.05 Noxious Weed Control Plan

The Design-Builder shall perform the control of noxious weed species within the Right of Way, easements, and limits of disturbance. This shall apply to noxious weeds listed by the Maryland Department of Agriculture (MDA) and in accordance with the MDA requirements. The Design-Builder shall prepare and submit a Noxious Weed Control Plan to the SHA as part of the definitive design submittal for consultation and written comment. If chemicals controls are proposed, they shall be applied by a Maryland-certified Pesticide Applicator, licensed by the MDA.

3.13.05.06 Contour Grading

The Design-Builder shall perform contour grading throughout the limits of the project Right of Way. Contour grading for both cut and fill conditions shall be performed so that the resultant landforms are natural in appearance, blend well with the surrounding landscape and built features, facilitate positive drainage, and minimize opportunities for erosion. Grading shall be performed to maintain desirable existing vegetation and accommodate project landscape plantings. Changes in slopes shall be rounded to appear smooth and natural. Slopes to be routinely mowed shall be no steeper than 4:1.

3.13.05.07 SWM Fence

SWM fencing shall be constructed at SWM facilities accessible by adjacent properties as required by SHA's Storm Water Management Safety Policy. SWM fencing shall be constructed and consist of black vinyl coated chain link fencing. Chain link fencing shall be provided according to the SHA's Pond Fencing Guidelines with a height of 3.5 feet and be placed so as to be visually unobtrusive. Chain link fencing used at stormwater management facilities shall have a top rail run continuously between terminal posts at the top of the chain link. Chain link shall be tied to the top rail at two-foot maximum spacing. The top rails shall conform to the brace rail and brace rail attachment specifications. No brace rail is required when top rails are used. A tension wire shall be run continuously between terminal posts near the bottom of the fabric and be attached to the fabric with hog ring fasteners at eighteen-inch intervals. A twelve-foot wide double gate shall be constructed at each SWM facility requiring fencing.

3.13.05.08 Soil Test Reports

The Design-Builder shall comply with the SHA Environmental Guidelines for Construction Activities.

3.13.05.09 Nutrient Management Plan/Report

The Design-Builder shall comply with the SHA Environmental Guidelines for Construction Activities.

3.13.05.10 Soils

The Design-Builder shall provide a minimum of 2 inches of topsoil and 4 inches of subsoil, in accordance with SHA Standard Specifications for Construction and Materials, Section 701, and SHA Landscaping Manual Estimating Guidelines Section 701, for all areas to be seeded; for areas to receive more extensive mass plantings, the Design-Builder shall provide 2 inches of topsoil and 12 inches of subsoil. The Design-Builder may elect to amend existing subsoil through screening and addition of amendments or may elect to provide imported subsoil in order to meet specifications.

Soil Enhancement Areas. Areas where the existing roadway has been demolished are designated as Soil Enhancement Areas, where the base and sub base are to be excavated and loosened, and any debris is to be removed. These areas are to be delineated on the civil plans, within the appropriate phase of work.

The Design-Builder shall obtain and submit subsoil test results, along with the proposed method to comply with subsoil requirements, to the SHA for consultation and written comments.

3.13.05.11 Final Acceptance

3.13.05.11.01 Landscape Warranties

Installation Phase Acceptance for Trees, Shrubs and Ornamental Grasses/Perennials shall conform to Section 710 of the Standard Specifications. The Design-Builder shall provide a warranty and maintain all landscape plantings for one year after Acceptance for Maintenance of plantings and landscape work. Acceptance for Maintenance for plantings and landscape work shall be implemented after all plant materials in the project have been planted, are true to species and minimum size, and are in a healthy and thriving condition. In addition, each plant pit or bed shall be properly filled, mulched, pruned and staked. During this one-year warranty period, the Design-Builder shall provide all required plant care and maintenance. This work shall include, but is not limited to: watering, weeding, fertilizing, pest control, invasive plant control, mulching, pruning, and replacement of any plant materials that are not in a healthy and thriving condition reflective of the species and in accordance with the SHA's Standard Specifications for Construction and Materials, Sections 705, 708, and 710.

This one-year plant material warranty shall apply to all landscaping, reforestation, wetland, stormwater management and reforestation plantings required in the project.

3.13.05.11.02 Turfgrass Acceptance

Turfgrass Acceptance shall conform to Section 705 of the Standard Specifications. The Design-Builder shall submit a turfgrass establishment certification package that consists of field photographs and completed turfgrass inspection checklists. All turfgrass areas shall be acceptable to the SHA, a uniform dark green color and have achieved the minimum density per Standard Specification 705.03.14.

TC 3.14 GEOTECHNICAL PERFORMANCE SPECIFICATION

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 Auger 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	Manual on 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 the Pavement and Geotechnical Criteria and Data Report.

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
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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.

3.14.03.02.02 Design of Fill Embankments

3.14.03.02.02.01 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.

3.14.03.02.02.02 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.

3.14.03.02.03 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.

3.14.03.02.04 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.

3.14.03.02.05 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 (L_e) 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 (T_a) 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.

3.14.03.02.06 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

3.14.04.02.01 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.

3.14.04.02.02 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.

3.14.04.02.03 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.

3.14.04.03 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.

3.14.04.03.01 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.

3.14.04.03.02 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.

3.14.04.04 Geotechnical Instrumentation

3.14.04.04.01 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.

3.14.04.02 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.

3.14.04.04.03 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.

3.14.05.03 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 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.

Contact Information:

Bruce Poole SHA District Utility Engineer 660 West Road Salisbury, MD 21801 410-677-4082	Mrs. Penny Gamble Verizon 410-768-1357
Mr. Todd Birely Choptank Electric 410-479-0420	Mr. Rodney Bane Delmarva Power 410-860-6292
Steve Crawford Maryland Boardband Cooperative MDBC 443-974-7829	

3.15.01.03 Non-Impacted Utilities

N/A

3.15.01.04 Utility Relocations By Others

Verizon maintains facilities located within the limits of this project that will be relocated by the utility owner concurrent to this project.

Choptank Electric maintains facilities located within the limits of this project that will be relocated by the utility owner concurrent to this project.

Delmarva Power maintains facilities located within the limits of this project that will be relocated by the utility owner concurrent to this project.

Maryland Board Band Cooperative (MDBC) maintains facilities located within the limits of this project that will be relocated by the utility owner concurrent to this project.

If the DBT cannot avoid conflict with these utilities the cost of the redesign and relocation shall be 100% the DBT's responsibility.

3.15.01.05 Utility Relocations by DBT

N/A

3.15.01.06 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 a minimum of ten (10) feet clearance from all existing and proposed utility lines. 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.

3.15.01.07 Permitting

The DBT shall obtain all required utility permits from the Administration and all necessary Governmental Approvals with regard to utility work that it performs including service connections. The Administration 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 the Administration immediately after discovery.

3.15.01.08 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 the Administration.

3.15.01.09 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 unless it has been located and verified by a test hole. The cost for this coordination and time consumption is considered incidental to all work performed.

Utility facilities owned by the Administration are not marked by MISS UTILITY.

Regarding the marking of SHA owned facilities, the DBT shall contact the following (a minimum 72-hour advance notice is required):

SHA owned street lighting: District 1 Maintenance Section 410-677-4000.

3.15.01.10 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.

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.

Table1
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

Table1
Guidelines for Maintenance of Traffic

Priority	Author or Agency	Title
7	SHA	Work Zone on 65/60 MPH Roadways
8	SHA	Work Zone Safety Policy
9	SHA	Office of Traffic and Safety Approved Product List for Temporary Traffic Control Devices and Miscellaneous Items
10	SHA	List of Qualified Removable Preformed Pavement Marking Material for Maintenance of Traffic
11	SHA	Maryland State Highway Standard Sign Book
12	SHA	Book of Standards for Highway and Incidental Structures for items identified as Standard in Appendix B of Part 3-Design Requirements
13	SHA	Standard Specifications for Construction and Materials Section for items identified as Standard in Appendix A of Part 3-Design Requirements
14	SHA	Work Zone Safety and Mobility Policy
15	SHA	Guidance on Maintenance of Traffic Alternatives Analysis
16	SHA	Transportation Management Plan Guidelines
17	SHA	Work Zone Lane Closure Analysis Guidelines
18	AASHTO	A Policy on Geometric Design of Highways and Streets
19	SHA	Maryland Manual on Uniform Traffic Control Devices (MD MUTCD)
20	FHWA	Manual on Uniform Traffic Control Devices (MUTCD)
21	SHA	Roadway Delineation Policy
22	AASHTO	Roadside Design Guide
23	SHA	NCHRP Report 350 Implementation Schedule
24	FHWA	National Cooperative Highway Research Program (NCHRP) Report 553 Crashworthy Work Zone Traffic Control Devices
25	FHWA	National Cooperative Highway Research Program (NCHRP) Report 350 Recommended Procedures for the Safety Performance Evaluation of Highway Features.
26	SHA	Work Zone Safety Tool Box
27	ATSSA	Quality Standards for Work Zone Traffic Control Devices
28	SHA	Accessibility Policy and Guidelines for Pedestrian Facilities Along State Highways
29	ADA	Americans with Disabilities Act Accessibility 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:

- F) Provide for the safe and efficient passage of pedestrians (including those with disabilities), bicycles, and vehicular traffic through and around construction

- zones;
- G) Prohibit use of new permanent pavement construction as haul route(s);
 - H) Minimize negative impacts on residents, commuters, and businesses;
 - I) 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;
 - J) Maintain and provide access at all times to property by owners, customers, visitors, and emergency vehicles;
 - K) Provide a safe travel corridor while minimizing any unnecessary investment in the existing infrastructure that is being replaced;
 - L) 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;
 - M) Coordinate MOT activities and Traffic Control Plans with other construction projects;
 - N) Provide Traffic Control Plans (TCPs) for each major phase of construction (see Section 3.16.06 of this performance specification); and
 - O) Provide for a Public Outreach campaign to be implemented in cooperation with the Administration.
 - P) Develop an incident management plan for accidents occurring within the Project limits, including accident prevention strategies, emergency procedures, reporting requirements, and mitigation strategies.

DESIGN AND CONSTRUCTION CRITERIA

3.16.04.01 Traffic Through Construction Zones

The Design-Builder shall perform the following:

- Q) Implement Traffic Control Plans for all roadways within the Project limits in a manner that safely and efficiently accommodates traffic at all times.
- R) 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.
- S) 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.
- T) 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.
- U) Arrange and host a pre-traffic switch meeting with the Administration and all affected agencies at least two weeks prior to switching traffic.

- V) Identify desired full roadway closures (for any period of time) to the Administration for review and concurrence during the design review process.
- W) Correct all traffic control deficiencies immediately upon notification or observance of the deficiency.
- X) Design all geometric aspects of temporary roadways for the assigned posted speed.
- Y) Design all active roadways to accommodate drainage such that there are no puddles or icing on the traveled roadway or shoulders.
- Z) 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.

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, as defined by the Americans with Disabilities Act (ADA). Whenever an existing pedestrian access route in the public right of way is blocked by a construction, alteration, or maintenance activity, an alternate accessible pedestrian route must be provided.

Recreational trails, including bicycle paths, shall also be maintained and kept in good condition. Access to all recreational facilities shall be provided and coordinated with the appropriate governing agency.

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.

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, bridge girders, 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.

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 exclude weekend and holidays.

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

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 limited to the following:

- 1) Location: Roadway name or State route number;
- 2) Project Number;
- 3) Direction: West/East/North/South;
- 4) Lane Closure Type: 1, 2, 3 or 4;
- 5) Duration: Date and times;
- 6) Limits: Beginning or work zone to end or work zone;
- 7) Nature of work and justification of lane/shoulder closure;
- 8) Number of remaining lanes on roadway;

- 9) Lane(s)/Shoulder(s) to be closed-specifically left, right, middle, left middle, right middle, shoulder, etc.;
- 10) Ramp location to be closed;
- 11) Traffic Control Plan sheet number;
- 12) Appropriate Administration typical application;
- 13) Point of Contact: Field Inspector;
- 14) Contact Information;
- 15) Any detours required;
- 16) Notes: Any other pertinent information that may be needed to facilitate in clarifying closures; and
- 17) State Police request and required number of troopers.

The Design-Builder shall contact and notify the Administration 30 minutes prior to initiating all lane closures and after removing all lane closures.

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.

3.16.05 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 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, 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) For arterial maintenance of traffic operations, the Design-Builder shall QuickZone 2.0, MD QuickZone 2.0, Quewz-98, LCAP, CORSIM or approved equal (as appropriate) to determine the queuing 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. 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 that 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 that requires diversion of traffic. 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 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 changed;
- 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 MD MUTCD signs;
- J) Pavement marker 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;
 - K) Flagging locations; and
 - L) 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
5	MDE	"2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control"

TABLE 1 GUIDELINES FOR DRAINAGE		
Priority	Author or Agency	Title
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	"2000 Maryland Stormwater Design Manual", Volumes I and II. Including updates and Errata.
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"
16	MDE	Environmental Site Design Process & Computations, 2010
17	MDE	Environmental Site Design Redevelopment Examples, 2010
18	MDE	Stormwater Design Guidance – Addressing Quantity Control Requirements, 2012
19	MDE	Stormwater Design Guidance – Submerged Gravel Wetland, 2012
20	UNHSC	Subsurface Gravel Wetland Design Specification, June 2009

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
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"

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

Perform 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.
- F. Construct work so as 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 Structures Performance Specification, Section 3.11, and 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.
- C. Where practicable, use the standard headwalls in the Administration's "Book of Standards for Highways and Incidental Structures" or approved equal(s). Non-standard headwalls shall be designed in accordance with TC 3.11.

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).
- D. No breaks in curb, such as curb cuts, are allowed for drainage purposes.
- 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:
 - Tailwater is less than $\frac{1}{2}$ the culvert height and the culvert outlets onto flat areas with no defined channel.
 - 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:
 - Tailwater is greater than $\frac{1}{2}$ the culvert height.
 - 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, a revised roadway improvement scope is implemented, it is the Design-Build Team's responsibility to provide management acceptable to the SHA and MDE. The SWM concept sets minimum management requirements for the selected sites. The Design-Builder is responsible for obtaining stormwater management final approval for entire project.

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.

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% water quality (Pe=1") credit for on-site (SHA) treatment of untreated impervious with any MDE approved BMP.
- 2. Non-structural BMPs qualify for only Project credit, not bank credit. Excess grass channel credit cannot be applied to the bank.
- 3. 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 or otherwise attached to the Contract Documents. The Design Build Team shall not exceed the net debit or reduce the net credit 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 the above must 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 for further information regarding landscaping design and SWM.
- 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.
- 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 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. Wrapping low flow and dewatering pipes with geotextile (alone) 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 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 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. Design-builder will independently confirm the drainage patterns to each BMP facility. This may include field inspections and the procurement and review of private development drainage and stormwater management as-built plans.

3.17.03.03.04 SWM As-built Certification

Refer to SP 300 - Stormwater Management (SWM) Facility As-Built Certification and elsewhere in TC 3.

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. Projects within the Severn River Watershed require approval from the Anne Arundel Soil Conservation Service.

3.17.03.04.01 Severe Weather Event

Maintain erosion and sediment controls at all times. A severe weather event for erosion and sediment control purposes is defined as at least 3.0 inches of rainfall in a 24 hour period. Maintain, repair, or replace any damaged devices within 48 hours of a severe weather event. A severe weather event shall be determined by rainfall data obtained from the nearest official National Weather Service gauge station to the project.

A lump sum payment of \$49,481.00 will be paid for each severe weather event that occurs between the start of grading operations and removal of all erosion and sediment controls for which the Contractor is eligible. The payment will be full compensation for the maintenance, repair and replacement of any and all erosion and sediment control devices damaged during a severe weather event and for all material, labor, equipment, tools, and incidentals necessary to complete the work. Payment for each severe weather event will only be made if the Project has maintained a minimum Quality Assurance rating of "B" immediately before and within the 48 hours following the severe weather event and has official weather records documenting the occurrence of the severe weather event have been provided to the Administration.

3.17.03.04.02 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.

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.

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 3.18 NOISE ABATEMENT PERFORMANCE SPECIFICATIONS

No Noise Walls are anticipated on this project.

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 3.17.03.09, E&S Specific 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. 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 have existing facilities within the limits of this contract see TC 3.15, location elsewhere within this RFP:

All notifications to the above utility companies and "MISS UTILITY", 1.800.257.7777, shall be given 48 hours (two full working days) in advance of working in the area of the specific affected utility. The notification to "MISS UTILITY" is required whenever any excavating or similar work is to be performed.

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 US 113 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 and avoid and minimize impacts to the natural and forest areas, community, cultural resources (Section 106 Resources), and Parkland (Section 4(f)) 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. The Administration has implemented innovative approaches to reward the Design-Builder for high quality environmental performance, as stated in various sections of this Performance Specification. These innovative approaches include incentives for reductions to forest impacts and incentives for reductions to wetland/waterway impacts.

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

<i>Priority</i>	<i>Author or Agency</i>	<i>Title</i>
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	Nontidal Wetlands and Waterways Permit for Phase 3 and Section 404 Individual Permit for the US 113 Corridor
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

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 will provide an Independent Environmental Monitor (IEM), on behalf of the USACE and MDE, 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. As outlined in the Independent Environmental Monitor Guide Book, the IEM 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 and Section 404 Individual Permit (from MDE and USACE)
- 2) Reforestation Site Review 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) All other approvals, permits and licenses, and pay all charges, fees and taxes, and give notices when necessary or appropriate for the implementation of the Project beyond those obtained by the Administration. These include but are not limited to approvals for on or off-site staging, stockpiling areas, disposal sites and borrow pits
- 4) Notice of Intent (NOI)

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, floodplain, or critical area for the Chesapeake and Atlantic coastal bays compared to those impacts which were authorized by the permits, illustrated in the Concept Plans and defined in the Joint Permit Application impact plates and tables. If the Design-Builder determines that changes to impacts are to be considered through design and/or construction, the Design-Builder shall be responsible for providing 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.

3.20.07 Environmental Summaries (ES)/Reevaluation Process

Modifications and/or design changes proposed by the Design-Builder, which occur inside or outside of the RFP limits of disturbance, such as shifts in alignment, staging areas or alignment shifts, etc., shall be reviewed for impacts by the Design-Builder, including impacts to the natural, social and cultural environments. In addition, the environmental summary/reevaluation process is triggered by the following activities:

- A. Change in scope or design;
- B. Change in the limits of disturbance
- C. Change in surrounding environment;
- D. New information becomes available;
- E. Change that occurs outside of the planning area evaluated in the FONSI and the approved re-evaluation (6/15/14), such as staging areas and alignment shifts;
- F. Final Design review, and
- G. Changes in applicable laws and regulations.

The Design-Builder shall provide all the information needed such as narratives and figures to 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. Delays due to environmental summary/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 Environmental Summary Reevaluation for design changes is described below.

If the Design Builder proposes a design change that is outside of the LOD the following is the step by step process to obtain approval:

1. Design-Builder determines a design change is warranted
2. Design-Builder environmental staff conducts a quick review to determine if any environmental, social or cultural impacts will occur due to the change

3. Design-Builder presents information to the SHA Project Engineer and SHA Environmental Manager including narrative and figures
4. SHA Project Engineer conditionally approves the change
5. SHA Environmental Manager determines specific agency involvement
6. SHA Environmental Manager prepares Environmental Summary (ES) and sends documentation letters required to regulatory agencies (such as MHT letter, permit modification, etc.)
 - a. Permit modification (signed and mailed within 1 week of Design-Builder submission) (approval obtained within 2 weeks)
 - b. MHT concurrence (signed and mailed within 2-4 weeks of Design-Builder submission depending on the extent of the resource) (concurrence obtained within 30days in accordance with signed MOA)
 - c. Rare Threatened or Endangered (RTE) responses (typically takes 30 days to receive responses for DNR and FWS)
7. Obtain all agency approvals, (1 -2 months depending on the complexity of the change)
8. SHA submits the ES to FHWA for formal approval (4 weeks)

Notes:

1. FHWA could request more information before they will approve an ES.

3.20.08 Natural Resources

3.20.08.01 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, 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 have lost their hydrology. If it is determined that remnant wetlands are no longer functioning as a jurisdictional wetland, the Design-Builder shall be responsible for costs associated with the additional mitigation required. Mitigation ratios for the lost wetlands shall be in accordance with COMAR.

3.20.08.02 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.

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 wetlands or waters of the US. 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 downloads at any time to verify compliance.

3.20.08.03 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 COMAR for the protection of aquatic biota.
- C. Conduct all in-stream work in compliance with Maryland mandated stream closure periods for Use I (March 1 through June 15, inclusive of any year) and Use II (detailed in Nontidal Wetlands and Waterways Permit) streams. 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.

3.20.08.04 Wetlands and Waters of the US

Direct impacts to wetlands and waterways are anticipated to occur under the Project. The impact plates and table in the Joint Permit Application present the total impacts permitted

for the US 113 Phase 3 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 buffer as identified in the Nontidal Wetlands and Waterways and Section 404 Individual Permits, and 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 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.

3.20.08.04.01 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.

3.20.08.04.02 Avoidance and Minimization

The Administration proposed avoidance and minimization techniques during the planning and preliminary engineering phase which consisted of alignment shifts where practicable, avoiding skewed stream crossings and reductions in overall roadway widths at stream crossings where safety considerations allow, and relocation of stormwater management facilities.

The Design-Builder shall focus its efforts to continue to minimize impacts to wetlands, waterways, floodplains, in all areas of the Project, especially sensitive areas. 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.

3.20.08.04.03 Wetland and/or Waterway Impact Reduction Incentive

The Design-Build Team is advised upon final acceptance of the constructed project, completion of as-built plans and approval of permit modification by USACE/MDE, the contractor will be reimbursed for any permanent wetland or waterway impact reduction in increments of 0.10 acre. The reimbursement only pertains to reduced permanent impacts within the Limit of Disturbance. This determination will be made by comparing the permanent impacts determined in the as-built plans against the

permanent impacts permitted by MDE and USACE in the Nontidal Wetlands and Waterways and Section 404 Individual Permits. This incentive will be paid at \$8000.00 per 0.10 acre saved.

3.20.08.05 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.

3.20.08.05.01 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" diameter at breast height measured 4.5' above the ground) were identified, evaluated and are depicted on the Landscape Plates. The Design-Builder shall avoid as many specimen trees as possible without affecting resources with equal or greater regulatory protection. As the design advances, it may be found that specimen trees are located near the outer edge of the required LOD/ROW or just outside the LOD/ROW. If this condition exists, the Design-Builder shall coordinate with the Administration to mark and provide a buffer for any such tree to avoid its removal during clearing and grubbing activities. An adequate buffer is defined as the critical root zone (drip line).

Before reforestation is approved by the DNR, every reasonable effort shall be made by the Design-Builder to minimize the cutting or clearing of trees. Only the minimum number of trees may be cut, and sound design practices shall be utilized.

The Department of Natural Resources has analyzed the area adjacent to the project site. The analysis of the information provided suggests that the forested area on or adjacent to the project site contains Forest Interior Dwelling Bird habitat. Populations of many Forest Interior Dwelling Bird Species (FIDS) are declining in Maryland and throughout the eastern United States. The conservation of FIDS habitat is strongly encouraged by the Department of Natural Resources. The DBT shall adhere to the following guidelines to minimize the project's impacts on FIDS and other native forest plants and wildlife:

1. Avoid placement of new roads or related construction in the forest interior. If forest loss or disturbance is absolutely unavoidable, restrict development to the perimeter of the forest (i.e., within 300 feet of the existing forest edge), and

- avoid road placement in areas of high quality FIDS habitat (e.g., old-growth forest). Maximize the amount of remaining contiguous forested habitat.
2. Do not remove or disturb forest habitat during May-August, the breeding season for most FIDS.
 3. Maintain forest habitat as close as possible to the road, and maintain canopy closure where possible.

The SHA has coordinated with the DNR and the DBT is allowed to remove or disturb forest habitat in the area from the northern project limit to south of the Maryland and Delaware railroad crossing (Sta1509+00) during the restricted period of May-August. All other removal or disturbance to forest habitat shall not take place during May-August.

3.20.08.05.02 Forest Impact Reduction Incentive

N/A

3.20.08.05.03 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 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.

The Administration will pay an incentive bonus of \$2,500 per 0.50 acre for additional on-site upland reforestation, which meets SHA requirements as outlined in SHA's Landscape Design Guide, that is accomplished beyond the approximately 5.64 acres of on-site reforestation specified.

3.20.08.06 Terrestrial Wildlife (TW)

3.20.08.06.01 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.

3.20.08.07 Cultural Resources

Except where otherwise noted below, the Administration will be responsible for conducting all cultural resources activities. These activities will include all historic and archaeological testing and data recovery, coordination with the Administration staff and

consultation with all federal, state and local historic preservation agencies and public parties, including affected landowners. The project is governed by a Memorandum of Agreement (MOA) between the Administration, the Federal Highway Administration (FHWA), and the Maryland State Historic Preservation Officer (MD SHPO).

- 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.

3.20.08.07.01 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 the negative results of prior studies; however, should such resources be encountered during Design-Build activities, the following procedures will be followed:

3.20.08.07.02 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 the MD SHPO of the discovery.

The Administration and the 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 the MD SHPO.

Within no more than three working days of the original notification of discovery, the Administration, in conjunction with the 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 the 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.

3.20.08.08 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.

3.20.08.08.01 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.

3.20.09 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 the revised impact tables that were included in the Joint State/Federal Nontidal Wetlands and Waterways Permit application.
- B. Forest Impact Plans.

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, emergency response organizations 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. This effort shall include activities such as, but not limited to, the Design-Builder supporting the Administration in meetings with individual land owners, local officials, and community groups and public meetings to keep the public involved in design and construction activities.

Public Outreach is intended to keep the public informed of major activities and decisions through design and construction. This element will involve the preparation and distribution of Project information to the assigned Administration representative for further dissemination to the public and media.

The Design-Builder shall make a good faith effort to address any concerns the public may have, and take under consideration any suggestions or wishes they express if those suggestions are reasonable in regard to cost, time, and construction effort. Documentation shall be in the form of meeting minutes and correspondence, including e-mails. The Design-builder shall direct

requests it receives to the Administration and shall assist in preparing responses. All design or construction modifications are subject to written acceptance by the Administration.

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, with active support provided by the Design-Builder, to include project research, adequate support staff, graphic design, materials, and printing .

The Design-Builder shall have primary responsibility for performing the activities specified in this Public Outreach Specification as was well as in the Contract Documents.

The Administration's responsibilities include the following activities:

- A. Maintain Questions & Answers/Frequently Asked Questions of any approved communication efforts by the Design-Builder; and
- B. Liaising with and monitoring the Design-Builder's performance for compliance with the Contract's public outreach requirements.

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 member of the public shall be referred to the Administration within 4 hours. The Design-Builder shall take necessary steps to facilitate such contact.
- B. If Design-Builder receives a complaint regarding its conduct of work on the Project, the Design-Builder shall notify Administration within 4 hours. The Design-Builder shall provide necessary information, staff support, and representation to assist in resolving the issue.
- C. 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 is 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 \$ 1,000.00 per day, whichever is more for each day or portion thereof that the deficiencies exist, and will continue until the deficiencies and proper assumption of the required maintenance provisions are satisfactorily corrected and accepted by the Engineer. The amount of monies deducted will be a permanent deduction and are not recoverable. Upon satisfactory correction of the deficiencies, payment of the Maintenance of Traffic lump sum item will resume.

TERMS AND CONDITIONS

TC SECTION 5
LEGAL RELATIONS AND PROGRESS 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.

08-15-2008

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. All required records shall be retained for three years after grantees or subgrantees make final payments and all other pending matters are closed.



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. WO6365170

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.

11-04-10

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-705,e.)
Design Engineering
As-Built Drawings
Engineer's Office
Maintenance of Traffic
Construction Stakeout
Earthwork - Excavation & Embankment

Drainage
Erosion & Sediment Control
Structures (if applicable)
Paving Items – hot mix asphalt, concrete pavement, and graded aggregate base
Concrete
Fencing
Seed & Mulch
Landscaping
Lighting & Electrical
Pavement Markings
Permanent Signing
W-beam and concrete barrier



The Design-Build Team shall also submit to the Administration a Cost Breakdown of the Design Engineering item. This cost breakdown shall include the name and fee for each consultant and subconsultant firm that is included in this item.

The Administration may require additional items to be identified and included prior to approval

Note that to enable the Administration to make effective progress payments, the successful Design-Build Team will be required to submit for approval the more detailed Progress Payment Breakdown described in TC-7.11. All progress payments will be based on an approved Progress Payment Breakdown. The Progress Payment Breakdown may be submitted in place of the Cost Breakdown described above.

All costs associated with the preparation, submission, or revision of any Cost Breakdown will not be considered as an item for payment, but shall be included in the Design-Build Team's Lump Sum price.

The successful Design-Build Team will be required to submit an Initial Critical Path Method Project Schedule Design-Build Activities Chart within 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, the approved Cost Breakdown.

.04 Justification of Cost Breakdown or Projected Schedule of Payments

The Administration may require the Design-Build Team to provide explanations and supporting documentation if the Cost Breakdown or Projected Schedule of Payments indicate unbalancing or do not reasonably reflect the actual cost of performing the work or the value of work received by the Administration.

TC-7.11 CONSTRUCTION PROGRESS PAYMENT BREAKDOWN

.01 Submittal of Progress Payment Breakdown

The successful Design-Build Team shall submit to the Administration an itemized Progress Payment Breakdown and supporting documentation to be used as a basis for payment. This breakdown shall be a realistic and documentable presentation of the costs for the major elements that comprise the Contract Lump Sum price for the work. The breakdown shall be sent to the District Engineer. No progress payment will be made until such time that this breakdown has been accepted by the Administration. The Design-Build Team shall submit additional updates to the Payment Breakdown as the design and construction progresses and as directed by the Administration. The Administration reserves the right to request additional detail from the Design-Build Team in order to process progress payments. The breakdown shall be in MS Excel format and include at a minimum, the following items.

Section 1000

- LS for Design Costs
- LS for Mobilization (refer to TC-7.05, e.)
- LS for As-Builts
- LS for Clearing & Grubbing
- LS for Engineer's Office
- LS for Maintenance of Traffic
- LF of Temporary Barrier
- LF of Temporary Striping
- SF of Temporary Signs
- EA of Drums
- EA of Arrow Panels
- EA of VMS

Section 2000

CY of Excavation

Section 3000

LF of RCCP
LF of CMP
LF of HDPE Pipe
EA of Drainage Structures
LF of Underdrain Pipe
LS for Erosion & Sediment Control
LS for Stormwater Management

Section 4000 (if applicable)

CY of Structure Excavation
LF of Piling
LF of Caissons
CY of Substructure Concrete
CY of Superstructure Concrete
LS for Reinforcing Steel
LS for Fabricated Structural Steel
LS for Cleaning & Painting New Structural Steel
LS for Pre-stressed Concrete Beams & Panels
LS for Retaining Walls
LS for Retaining Walls

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
LF of Wire, Conduit for Lighting and Signals

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 ACD 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 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)
<p><u>Divided-Uncontrolled Highway</u></p> <p>From Oct. 1 – April 30</p> <p>From May 1 – September 30</p> <p><u>Two Lane – Two Way</u></p> <p>Prior to the commencement of any work, please contact the District 1 Traffic Office to obtain a Lane Closure Permit at 410-677-4040</p>	1/1 (with permit)	M-F	9:00 am to 3:00 pm
	0/1 (with permit)	M-F	Sunrise to Sunset
	1/1 (with permit)	T – Thur, Monday Friday	9:00 am – 3:00 pm 12:00 pm – 3:00 pm 9:00 am – 12:00 pm
	0/1 (with permit)	M-F	Sunrise to Sunset
	1/1 (with permit)	M-F	9:00 am to 3:00 pm
	0/1 (with permit)	M-F	Sunrise to Sunset

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).

SPECIAL PROVISIONS

104.01 — TRAFFIC CONTROL PLAN

CONTRACT NO: WO6365170.

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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 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.

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 or 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 from the Office of Planning and Preliminary Engineering.

The lane closure penalties for freeways are categorized by the District in which they are located.

For Districts 1, 2 and 6, the following fee structure will be followed:

ASSESSED DEDUCTIONS FOR FREEWAYS	
ELAPSED TIME, (MINUTES)	DEDUCTION
<i>For 1 Lane Closures</i>	
1 – 10	\$ 100.00
Over 10	\$50.00 per minute (In addition to the original 10 minute deduction)
<i>For 2 or more Lane Closures</i>	
1 – 10	\$ 200.00
Over 10	\$100.00 per minute (In addition to the original 10 minute deduction)

For Districts 3, 4, 5 and 7, the following fee structure will be followed:

ASSESSED DEDUCTIONS FOR FREEWAYS	
ELAPSED TIME, (MINUTES)	DEDUCTION
<i>For 1 Lane Closures</i>	
1 – 10	\$ 1,000.00
Over 10	\$500.00 per minute (In addition to the original 10 minute deduction)
<i>For 2 or more Lane Closures</i>	
1 – 10	\$ 2,000.00
Over 10	\$1,000.00 per minute (In addition to the original 10 minute deduction)

The lane closure penalties for other roads are categorized by intersection Level of Service. The penalty for other roads with Level of Service D, E or F is greater than that for Level of Service A, B or C.

For Level of Service A, B or C, the following fee structure will be followed:

ASSESSED DEDUCTIONS FOR OTHER ROADS	
ELAPSED TIME, (MINUTES)	DEDUCTION
<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

CONTRACT NO. WO6365170

104.11 — TEMPORARY PAVEMENT MARKINGS

1 of 2

**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. WO6365170

104.11 — TEMPORARY PAVEMENT MARKINGS

2 of 2

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. WO6365170

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 4. 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

104.28 SPEED DISPLAY TRAILER (SDT).

104.28.02 MATERIALS.

185 **DELETE**: Second paragraph on this page “All materials for the SDT...approach roadway at all times”.

INSERT: The following.

All materials for the SDT shall be like new, corrosion resistant, and unaffected by water spray, salt, oil, gasoline, and all other contaminants in the quantities normally found along the edge of the traveled roadway. Construction, materials, and operation shall be in accordance with NFPA, ULI, and NEC. Sign messages shall be visible for a distance of 0.5 mile and legible for a distance of 900 ft from any point along the traveled approach roadway at all times.

104.28.02.01 Equipment.

186 **DELETE**: LED Illumination in its entirety.

INSERT: The following.

LED Illumination. LED illumination for each matrix element shall have the following characteristics:

- (a) LED shall conform to the ITE specification for amber color for warning applications.
- (b) Each LED shall produce at least 1 candela output on center at operating drive current.
- (c) LED shall provide full illumination within at least a 24 degree cone perpendicular to the sign face.
- (d) Operating temperature range of the LED shall be -30 to 125°F.



Sign Controller.

- 187 **DELETE:** (e) Be contained in a sheet metal, weatherproof cabinet located on the controller housing, and insulated to protect against excessive vibration and temperature.

The cabinet shall have a lockable door latch and interior cabinet dome light.

INSERT: The following.

- (e) Be contained in a sheet metal or high density polyethylene (HDPE), weatherproof cabinet located on the controller housing, and insulated to protect against excessive vibration and temperature.

The cabinet shall have a lockable door latch and interior cabinet dome light.

104.28.03. CONSTRUCTION.

- 188 **DELETE:** The second paragraph on this page “Aim the STD at approaching...either sunlight or vehicle headlights”.

INSERT: The following.

Aim the SDT at approaching traffic that is atleast 900 ft in advance of the SDT and in accordance with the 0.5 mile minimum visibility and 900 ft minimum legibility requirement. Ensure that the SDT is level and that the sign face is not obscured by highway alignment or glare from either sunlight or vehicle headlights.

**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**

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 1 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/antispyware 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



**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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111 — SAMPLING DEVICES, TESTING AND SAFETY EQUIPMENT

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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.



SPECIAL PROVISIONS INSERT

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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 Worcester 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.

SPECIAL PROVISIONS
203 — BORROW EXCAVATION

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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 300
DRAINAGE

STORMWATER MANAGEMENT (SWM) FACILITY
AS-BUILT (AB) CERTIFICATION

DESCRIPTION. Inspect stormwater management facilities during specified stages of construction, and furnish a completed (SWM) Facility AB Certification Package to the Administration certifying that the SWM facilities have been constructed as specified in the Contract Documents.

As-Built (AB) Inspector. Furnish an approved AB Inspector to complete the AB 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. 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 SWM Facility AB Certification Package certifies that the SWM Facilities have been constructed as specified. Include with the submitted package, photographs with written descriptions of specified stages of construction, completed tabulations and checklists, completed certification forms, material testing reports, turf/vegetation establishment report, and green-line revision plans for each facility.

MATERIALS. Not applicable.

CONSTRUCTION. Inspect and complete the appropriate MDE Tabulations and Construction Checklist for each facility to ensure that facility features are constructed as designed.

Stages of Construction for AB Inspections by the AB Inspector. Perform minimum inspections for the following SWM Facilities as applicable:

(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 establishment of permanent stabilization.
- (a) **Surveys, Computations, and Green-Line Revision Requirements.** Upon completion of each SWM facility, survey and provide green-line revisions. Adhere to CAD Standards established by the Administration. MicroStation CAD files will be provided for use as references to the green-line revisions. Include the following items in the survey and green-line revisions: Core trench location, dimensions, material and compaction.
- (b) **Contours.** Indicate 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. An approved SWM Report including design computations will be provided to facilitate the requirements of the AB Inspector.

SPECIAL PROVISIONS
300 — STORMWATER MANAGEMENT (SWM) FACILITY
AS-BUILT CERTIFICATION

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When SWM facilities do not meet the designed parameters, reconstruct, re-inspect, resurvey and resubmit the SWM Facility AB Certification Package.

Submission Requirements. Furnish two hard-copies and one digital copy in PDF format of the SWM Facility AB Certification Package. Incomplete SWM Facility ABCertification Packages will not be accepted. Upon acceptance of the SWM AB Certification Package as complete, one copy will be submitted to Maryland Department of the Environment (MDE) for review and approval.

MEASUREMENT AND PAYMENT. Stormwater Management (SWM) Facility AB 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 therein. Modifications to unacceptable SWM Facility AB 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:

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	Upon submission
Receive approval from the Maryland Department of the Environment (MDE)	50	At project close-out



CATEGORY 300
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.



CATEGORY 300
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.

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 \$220,000.00. The rating quarter incentive payment for this contract is \$10,000.00. A final incentive payment for this contract is \$110,000.00 less the total quarterly incentives paid during a contract extension.

For each day that the project has a 'D' rating, liquidated damages will be imposed in the amount of \$5,966.00 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 \$6,978.00 per day.



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.



CATEGORY 300
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



SPECIAL PROVISIONS INSERT
316 — STORMWATER MANAGEMENT (SWM)
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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316.03.09 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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316 – STORMWATER MANAGEMENT (SWM)
FILTRATION FACILITIES

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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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FILTRATION FACILITIES

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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 405 — REMOVAL OF EXISTING
STRUCTURE

284 **DELETE:** 405.01 DESCRIPTION in its entirety.

INSERT: The following.

405.01 DESCRIPTION. Remove and dispose of or recycle, reclaim, reuse, wholly or in part, designated structures.

The Contractor is advised that prints of plans of the existing pertinent structure(s) may be included in the Contract Documents. No responsibility for their accuracy or completeness is assumed by the Administration. Dimensions, details, etc. as shown thereon may not be as built.

405.03 CONSTRUCTION.

DELETE: The first paragraph, “Before removal operations...method for approval.” in its entirety.

INSERT: The following.

Protect from any damage all portions of the existing structure scheduled to remain in the rehabilitated structure, and the remaining portions of the existing structure used to maintain traffic, and are scheduled to be removed at a later stage, including bridge deck, the beams, abutments, piers, or any other structure members.

Prior to the start of removal operations, submit a list of the proposed equipment and removal methods for approval. Approval does not relieve the Contractor of responsibility for preserving those portions of the structure designated to remain and be incorporated into the rehabilitated structure, or used to maintain traffic.

Immediately halt removal operations if any of these existing elements that are to remain permanently or temporarily are damaged by the Contractor’s operation. Submit the material and work methods proposed to be used to repair or replace the damaged elements to the Office of Structures for approval. Perform the approved method of repair or replacement of the damaged elements to the full satisfaction of the Engineer and the Office of Structures at no additional cost to the Administration. Any delays due to the required repair or replacement shall not be a cause for any claim.



During construction only approved equipment and material (for maximum weight, size, and location) required for a particular operation will be allowed on the existing or newly constructed portion of new bridge. Refer to TC-6.14 and 420.03.15 for additional requirements.

When a structure contains existing protective shields (sheeting or planking) that have been previously placed to contain debris from a deteriorating deck, the Contractor shall remove and dispose of the debris and shields at no additional cost to the Administration.

286 **ADD:** The following after 405.03.03.

405.03.04 Reporting Requirements. Recycle, reuse, reclaim as much of the removed structure material (structural steel, rebar, concrete, asphalt, bearings, fencing, etc.) as practical. Report the disposition of all removed structure components to the Project Engineer. Indicate the item description, amount (by weight, linear feet, cubic yard, or each), disposition (recycled, reused, reclaimed, disposed of, stockpiled for future recycling or use), place where material was taken (company name, phone number and address), and date. Report all like items using the same unit of measurement.

405.04 MEASUREMENT AND PAYMENT.

DELETE: the first paragraph, “The removal of.....data for review.” in its entirety.

INSERT: The following.

The removal of existing bridges and structures or portions thereof will be measured and paid for as specified. The payment will be full compensation for all excavation, backfill, saw cuts, professional engineer services, removal of existing shields and debris, temporary protective shields, temporary sheeting and shoring, hauling, recycling, reuse, reclamation, storage or disposal, reporting and for all material, labor, equipment, tools, and incidentals necessary to complete the work. On deck replacement projects, payment also includes outlining the locations of the flange and floor beams, obtaining all deck elevations specified to determine rebound, computations necessary to place the new deck at the required elevation, and submitting all data for review.

**CATEGORY 400
STRUCTURES**

SECTION 410 — PILING

410.01 DESCRIPTION.

287 **ADD:** The following after the first paragraph.

When required, Dynamic Pile Monitoring will be performed as specified elsewhere in the Contract Documents.

410.03 CONSTRUCTION.

289 **DELETE:** 410.03.05 Test Piling in its entirety.

INSERT: The following.

410.03.05 Test Piling. Furnish for each test pile, a Wave Equation Analysis Program (WEAP) of pile driveability, sealed and signed by a professional engineer, registered in the State of Maryland, experienced in such work. The analysis shall demonstrate that the pile hammer proposed by the Contractor has sufficient power to drive the piles to the Driving Load and Estimated Minimum Penetration shown on the plans without overstressing or damaging the piles. The analysis shall, at a minimum, include the following:

(a) Analysis methodology.

- (1) The ultimate soil resistance used in the analysis shall be not less than 225 percent of the required minimum driving load. For a structure where at least 2 percent of the piles will be dynamically monitored, an ultimate soil resistance not less than 155 percent of the required minimum driving load may be used. The proportioning of the tip resistance and the distribution of the side resistance shall be based on the soil boring data using either static analysis or other strength correlations.
- (2) For hammers with an adjustable energy range, analysis shall demonstrate that minimum energy used within the range can mobilize the ultimate soil resistance, and that the maximum energy used within the range will not overstress the pile during driving operations based on allowable stresses in the AASHTO LRFD Bridge Design Specifications (current edition and all interims).
- (3) The analysis shall demonstrate that with the hammer used, the required ultimate soil resistance shall be attained using hammer blows in the range of 2 to 10 blows per in.

- (b) Interpretation of Soil Boring Data necessary to determine the resistance the pile will develop during driving to the estimated pile tip elevation.
- (c) Computer input and output sheets and graphs showing soil resistance versus blow counts, and maximum tensile and compressive stresses in the pile versus blow counts.
- (d) Provide for each hammer, at each test pile, charts of LRFD Driving Load (Pu) versus Energy (blow/minute) and Pile Set (blow/in.) using the formula shown on the plans for the End of Driving (EOD) condition.
- (e) Test pile driving operations shall not commence until approval for the WEAP has been received.
- (f) Drive test piles to determine the depth of penetration and the length of piling for structures.

Acceptance of the pile hammer and driving equipment will not relieve the Contractor's responsibility for properly driving piles, in satisfactory condition, to the driving resistance and tip elevations indicated or directed.

Drive test piles in permanent vertical position. Test piles found to be satisfactory shall be utilized as permanent piles.

410.03.06 Pile Driving.

DELETE: The first paragraph, "Submit a plan...driving any piling."

INSERT: The following.

At least one month prior to the start of pile driving operations submit to the Director, Office of Structures, hammer name, model, and manufacturer's data for each pile hammer proposed to be used for pile driving, including Manufacturer's Catalog Information and a completed Pile and Driving Equipment Data Form provided elsewhere in this Invitation for Bids.

290 **DELETE:** The fourth, fifth and sixth paragraph "Hammer energy, for...of the hammer."

INSERT: The following.

Use pile-driving equipment of an acceptable type, mass (weight), and capacity. Use air compressors of sufficient capacity to provide 25 percent more air than shown in the manufacturer's specifications for air-driven hammers. Do not use capblocks or cushions containing asbestos.

Use either drop-steam, air, diesel, or hydraulic actuated pile-driving hammers. Hammers shall be capable of developing at least the energy shown on the plans.

Equip hammers with a suitable drive head that accurately and securely holds the top of the pile in correct position, with reference to the hammer, and that distributes the blows from the ram over the entire top area of the pile or mandrel.

Within reasonable limits, use the optimum type and size of hammer for the indicated pile and subsurface conditions at the structure site. Use a hammer of a type and size that enables piles to be driven to any driving resistance without pile damage due to driving stresses, as indicated by the Wave Equation Analysis. Acceptance of a hammer relative to driving stress damage will not relieve the Contractor's responsibility for piles damaged because of misalignment of the leads, failure of capblock or cushion material, failure of splices, malfunctioning of the hammer, or other improper construction methods.

Construct pile driver leads to allow free movement of the hammer. Hold the leads in true vertical or inclined positions, as required, by guys or stiff braces to ensure support of the pile during driving. Provide leads of sufficient length so a follower will not be necessary under normal conditions.

291 **DELETE:** 410.03.09 in its entirety.

INSERT: The following.

410.03.09 Unanticipated Driving Conditions. Should unanticipated driving conditions occur such as when resistance on the pile results in hammer blows per inch in excess of 20 with the hammer operated at its maximum fuel or energy setting, or at a reduced fuel or energy setting recommended by the Engineer based on pile installation stress control then the Contractor may elect to stop driving and contact the Office of Structures for further guidance.

410.04 MEASUREMENT AND PAYMENT.

295 **ADD:** The following after 410.04.06.

410.04.07 WEAP analysis will not be measured, but the cost will be incidental to the Contract unit price for the pertinent Pile item.



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420 – PORTLAND CEMENT CONCRETE STRUCTURES

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**CATEGORY 400
STRUCTURES**

**SECTION 420 – PORTLAND CEMENT
CONCRETE STRUCTURES**

420.04 MEASUREMENT AND PAYMENT.

334 **DELETE:** 420.04.06 in its entirety.

INSERT: The following.

420.04.06 Floodlighting for placement of concrete (including superstructure concrete and concrete overlays) will not be measured but the cost will be incidental to the pertinent Concrete item. The payment will also be full compensation for fuel, backup generator, setup, relocation, and removal.



CATEGORY 400
STRUCTURES

SECTION 430 — METAL STRUCTURES

430.03 CONSTRUCTION.

363 **DELETE:** 430.03.19 Welding in its entirety.

INSERT: The following.

430.03.19 Welding. Welding of structures and welding qualifications shall meet the Contract Documents and AASHTO/AWS Bridge Welding Code D1.5 unless otherwise specified. The provisions contained herein apply to both shop and field welding.

Ensure that all welders, welding machine operators, and tackers employed to work on steel structures on Administration projects are qualified as follows:

- (a) **American Welding Society (AWS) Qualifications.** Welders shall take tests approved by the Structure Committee for Economic Fabrication (SCEF) in accordance with AASHTO/AWS Bridge Welding Code D1.5; as administered by an AWS Accredited Test Facility (ATF).
- (b) **Fabricator Qualifications.** Fabricators approved in accordance with 430.03.20 may issue in-house welder qualifications for shop and field welding.
- (c) **Steel Stud Shear Developer Qualifications.** Steel Stud Shear Developer welders will be inspected and approved in accordance with AASHTO/AWS Bridge Welding Code D1.5 at the time of installation.

All field welders shall possess a current AWS welder's qualification card or a fabrication facility qualification card approved by the Office of Materials Technology. This card shall be available for inspection at all times.

Unless otherwise specified, welding members carrying primary stress shall be by the submerged arc process (SAW). For material thickness 2 in. and greater, the narrow gap electro slag welding process (ESW) may be substituted. Members carrying primary stress are specified in 909.01.

After fabrication, no welding will be permitted on tension flanges except for steel stud shear developers, as specified.

Welding transversely across tension flanges of beams or girders will be cause for rejection, unless otherwise specified.

CATEGORY 400
STRUCTURES

SECTION 498 — DYNAMIC PILE MONITORING - STEEL PILES

DESCRIPTION. Secure and provide the services of an independent dynamic testing consultant to furnish and operate all equipment necessary to perform dynamic pile driving analyzer tests. These tests shall be performed on all piles indicated in the plans as a test pile or on production piles designated by the Engineer. The independent testing firm shall be experienced in the use of the test equipment described herein and shall be subject to approval by the Engineer. All incidental labor and material necessary to make the work area accessible and to operate the equipment shall be supplied by the Contractor.

The independent testing firm shall direct the progress of the testing work and shall obtain and record the test data, perform monitoring of the stresses in the test piles during restrike and evaluate the driven pile capacity. The independent testing firm shall be responsible for conducting the actual tests of the test piles.

All tested piles shall be driven to the minimum pile tip elevation. The piles shall remain untouched for 72 hours at which time the piles shall be restruck.

Dynamic testing shall only be required on test piles during restrike.

All test and production piles shall be driven by impact hammers. Vibratory hammers are prohibited. The locations of the test piles are shown on the Plans.

Dynamic testing involves attaching two strain transducers and two accelerometers to the pile approximately two to three pile diameters below the pile head. The dynamically tested piles shall be of sufficient length so that gauges are not driven below the water surface, pile template, or into the ground. Cables connecting the gauges near the pile head with the pile driving analyzer located at the ground or water level shall be of sufficient length to reach 50 to 100 ft from the pile.

MATERIALS. The dynamic monitoring shall be performed using a GC, GCPC, or PAK Model Pile Driving Analyzer. All equipment necessary for the dynamic monitoring such as gauges, cables, etc., shall be furnished by the dynamic testing consultant. The equipment shall conform to the requirements of D 4945.

The Contractor shall provide the power supply to the test pile locations for the dynamic testing duration. The power supply shall consist of a regular power source providing 110 volt AC power with a frequency of 60 Hz. Direct current welders or nonconstant power sources are unacceptable.

The Contractor shall maintain a stock of at least four working accelerometers and strain transducers at the job site whenever dynamic testing is being performed.

All repair or replacement costs shall be performed at no additional cost to the Administration.

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CONSTRUCTION. The Contractor shall submit the Pile and Driving Equipment Data and a WEAP analysis for the test piles at least one month prior to pile driving as specified elsewhere in the Contract Documents.

The wave equation analysis shall be used to assess the ability of the proposed driving system to install the pile to the required capacity and desired penetration depth within the allowable driving stresses.

Test Enclosure. The Contractor shall construct a test enclosure to protect the test equipment, the test equipment operator, and inspection personnel from wind, sun, precipitation, and cold. Heat shall be provided, if necessary, so that a minimum temperature of 50 F is maintained within the enclosure. The test enclosure shall be sufficiently near the pile butt (when the pile is in the driving leads) to be reached by 210 ft of signal cable.

Driving and Testing Procedures. Pile restrike testing shall be conducted no sooner than 72 hours after the pile, or any pile within a 25 ft radius, has been driven. Restrike testing shall include dynamic testing of the pile when it is redriven. The pile shall be redriven with the same pile hammer used for initial driving for at least 50 blows or at least 6 in. of penetration, whichever occurs first. The pile hammer must be warm before testing of the test pile can begin.

The Contractor shall arrange for the dynamic testing consultant and Office of Structures personnel to be on hand at the time of restrike.

Prior to lifting the pile to be dynamically tested, the Contractor shall provide a 3 ft minimum clear envelope around the pile so the dynamic testing consultant can access and prepare the pile for testing. Holes shall then be drilled and prepared for gauge attachment.

A new pile driving system, modifications to the existing system, or new pile installation procedures shall be proposed by the Contractor if the pile installation stresses predicted by the wave equation analysis or calculated by the pile driving analyzer exceed the following maximum values:

Compression Stresses	0.9 Fy
Tension Stresses	0.9 Fy

where Fy = steel yield strength in ksi.

Dynamic testing shall be conducted only during restrike. Piles shall be driven to achieve an ultimate soil resistance not less than 155% of the minimum driving load as shown on the plans. If a test pile fails to achieve the required capacity on restrike an additional test pile shall be driven. This additional test pile shall be one of the proposed production piles located within a 10 ft radius of the failed test pile as directed by the Engineer. The Engineer may make adjustments to the preliminary driving criteria based upon the dynamic testing information. Once it has been determined that the design capacity has been achieved on the additional test pile, the failed test pile shall be driven to

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the same tip elevation as the additional test pile. Driving criteria for the remaining test pile and production piles will be determined by the Office of Structures and will be based on the dynamic testing results of the test piles.

The dynamic testing consultant shall direct the progress of the testing work and shall obtain and record the test data. The dynamic testing consultant shall prepare a hand written daily field report summarizing the dynamic testing results. As a minimum, the daily reports shall include the calculated driving stresses, transferred energy, and estimated pile capacity at the time of testing. Variations from previous trends in the dynamic test data shall also be noted. Daily field reports shall be faxed to the Engineer.

Impact Driving Method. This dynamic load testing procedure consisting of the following steps shall be used:

- (a) Prior to being restruck with the pile-driving hammer, each pile to be tested shall be instrumented with force and acceleration transducers by the independent testing firm with the aid of the Contractor's personnel.
- (b) Dynamic measurements resulting from the pile hammer blows shall be automatically recorded electronically. The independent testing firm shall operate all the equipment that analyzes the data from the sensors installed on the piles to capture pile stresses, pile-soil support capacity, and the hammer efficiency.

The results of the dynamic testing shall be printed by the pile driving analyzer and shall include, for each blow count selected by the Engineer, a combination of the following quantities:

- (1) Bearing capacity for the Case Goble method.
- (2) Input and reflected values of force and velocity.
- (3) Maximum transferred energy.
- (4) Maximum compression force.
- (5) Velocity and displacement.
- (6) Blows per minute.
- (7) Value of upward and downward traveling force wave.
- (8) Ram stroke and corresponding blow sequence.

All of the above information shall be supplied to the Engineer within 24 hours of the testing. All recorded signals from the pile sensors captured electronically shall be stored and shall be

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DYNAMIC PILE MONITORING

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made available upon request by the Engineer at a later date for additional analysis. Within three days of completion of testing, the Contractor shall furnish the Engineer with a written report summarizing the generated data and computed bearing capacities. A copy of the written report shall be furnished to the Office of Structures and shall be approved in writing prior to driving the remaining test pile and production piles at other locations within the project site.

- (c) Upon determination by the independent testing firm that valid data have been secured, the independent testing firm with the assistance of the Contractor's crew shall remove the instrumentation for the piles.

Pile Analyses. All dynamically tested piles shall receive a CAPWAP-C analyses. Each CAPWAP-C analysis shall include the following information:

- (a) Graph showing the bearing capacity versus blow count and pile stress versus blow count.
- (b) Simulated static load test curves for the tip and the top of the pile.
- (c) Evaluation of the soil parameters based on the matching of the measured and computed values of forces, velocities and displacements.
- (d) Static resistance distribution along the length of the pile.

Within three days of completion of CAPWAP-C analysis, the Contractor shall furnish the Engineer with a written report containing all computer print-outs and graphs from the CAPWAP-C analysis. A copy of the written report shall be furnished to the Office of Structures and shall be approved in writing prior to driving the remaining test pile and production piles at other locations within the project site.

MEASUREMENT AND PAYMENT. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Dynamic Pile Monitoring will be measured and paid for at the Contract unit price per each. The price and payment thereof shall constitute full compensation for preparing the preconstruction wave equation analysis and will also be full compensation for the preparation of reports.

CAPWAP-C analysis will be measured and paid for at the Contract unit price per each. The payment will also be full compensation for performing the analysis and preparation of reports.

09-23-13

CATEGORY 400
STRUCTURES

SECTION 499 — WORKING DRAWINGS

499.03 CONSTRUCTION.

454 **DELETE:** 499.03.02 Consultant Engineering Firm in its entirety.

INSERT: The following.

499.03.02 Consultant Engineering Firm. There is no consultant engineering firm to review working drawings on this project.

11-03-08

**CATEGORY 500
PAVING**

466 **DELETE:** SECTION 504 — HOT MIX ASPHALT PAVEMENT in its entirety.

INSERT: The following

SECTION 504 — ASPHALT PAVEMENT

504.01 DESCRIPTION. Construct Asphalt Pavement.

504.02 MATERIALS.

Performance Graded Asphalt Binders	904.02
Tack Coat	904.03
Asphalt Paving Mixes	904.04
Crack Filler	911.01
Production Plants	915

504.03 CONSTRUCTION.

Quality Control Plan. Submit a Plant Quality Control Plan and a Field Quality Control Plan (QCP) at least 30 days prior to placement of any asphalt pavement. Submit the Plant QCP to the Office of Materials Technology (OMT) for approval. Submit the Field QCP to the District Engineer for approval. The Plans shall contain a statistically based procedure of random sampling and show methods proposed to control the equipment, materials, production, and paving operations. Discuss the QCP requirements in the pre-construction, pre-pave and progress meetings.

The Plant and Field QCP shall contain:

- (a) Name and location of asphalt production plants,
- (b) Laboratory and field personnel qualifications,
- (c) Inspection and record keeping methods, and
- (d) Minimum frequencies of sampling and testing.

Use the Quality Control Plant Template (www.roads.maryland.gov) to address all requirements necessary for plant quality control and plant approval.

Corrective actions will be taken for unsatisfactory construction practices and deviations from the Contract Documents.

Plan Administrator and Certified Technicians. The QCPs shall designate a Plan Administrator who shall have full authority to institute any action necessary for the successful implementation of the Plan. The Plan Administrator may supervise the QCP on more than one project if that person can contact the job site within one hour after being notified.

The QCP shall also designate a Certified Asphalt Plant Technician – Level 2, a Certified Asphalt Field Technician, a Certified Inertial Profiler Operator, a Certified Asphalt Plant Technician – Level 1, or Trainee Technicians per the Mid-Atlantic Region Technician Certification Program (MARTCP) and the Maryland Technician Certification Program,

A Certified Plant Technician shall be present at the plant during asphalt production and shipment unless otherwise approved in the Plant QCP. The technician shall perform the quality control sampling, testing and documentation as specified.

A Certified Field Technician shall be present at the job site unless otherwise approved in the Field QCP. The technician shall be responsible for the required field quality control sampling and testing. Deviations from the QCP shall be cause for immediate suspension of production and paving operations.

The certified technicians shall perform sampling for quality control, quality assurance, acceptance, split sampling, and verification. Submit quality control test results to the Engineer.

MARTCP-certified technicians found deficient in their duties will have their certification(s) rescinded, as determined. Replace the deficient technician with a certified technician before resuming production and paving operations.

Records. Maintain complete records of sampling, testing, corrective actions and quality control inspection results. Provide copies of the reports upon request.

Maintain linear control charts or use other types of control charts (such as standard deviation or range), as approved. Control charts may be maintained by production, by mix, or by mix per project. Maintain the control charts in the quality control laboratory per the QCP. The control charts shall identify the mix design number, each test result, and the upper and lower limits specified for each test. Retain all original Quality Control worksheets for five years.

Quality Assurance (QA). The Administration will perform independent QA sampling, testing and inspections. QA consists of the following:

- (a) Periodically observe the performance of Quality Control (QC) or QA testing,
- (b) Monitoring control charts,
- (c) Directing the sampling of mixes behind the paver prior to compaction,
- (d) Directing the sampling of mixes at the plant site,
- (e) Directing the sampling of cores taken from the compacted pavement,
- (f) Monitoring conformance with the approved QCP(s), and;
- (g) Quality control sampling and testing procedures and quality control sampling and testing equipment will be evaluated per the Independent Assurance (IA) program.

504.03.01 Equipment. All production and paving equipment will subject to approval. Ensure the plant is ready for inspection per 915.01.02.

Hauling Units. Refer to 915.02(f).

Pavers. Pavers shall be equipped with a means of preventing the segregation of the coarse aggregate particles when moving the mix to the paver augers. The means and methods used may consist of chain curtains, deflector plates, or other such devices, or any combination of these per the manufacturer's recommendations. Demonstrate that modifications to the paving equipment have been implemented on all pavers prior to use on the project.

Use a self-contained, self-propelled unit for mainline paving. Inspection and approval will be based upon the manufacturer's recommendations. The paver shall:

- (a) Produce a finished surface of the required smoothness and texture without tearing, shoving, or gouging the mix.
- (b) Be operated in a manner which delivers a homogeneous mix the full width of the pavement.
- (c) Have automatic controls capable of maintaining the grade and transverse slope within the required tolerances set forth in the contract documents.
- (d) Use auger extensions to maintain a distance no greater than 18 in. from the end of the auger to the end gate when screed extensions are used.

Provide reference lines or other approved markings to control the horizontal alignment.

Manual operation will be permitted to make grade changes for constructing irregularly shaped and minor areas.

The equipment may be operated manually for the remainder of the workday if a malfunction of any automatic control occurs, as directed.

Rollers. Rollers shall be self-propelled, reversible, and steel wheeled or pneumatic tired. Inspect all rollers and present them for approval before use. Rollers shall be operated:

- (a) In conformance with the manufacturer's recommendations.
- (b) In a manner that does not damage the pavement.
- (c) In a manner that delivers the optimal combination of density and ride requirements.
- (d) In a manner that protects bridge decks. Do not use rollers in vibratory mode when paving bridge decks.

504.03.02 Weather Restrictions. Place mixes used as the final surface when the ambient air and surface temperatures are at least 40 F. Ensure that surfaces to be paved are clean and dry before paving, as approved.

- (a) Place mixes used as intermediate and base layers when the ambient air and surface temperatures are at least 32 F.
- (b) Place polymer-modified surface mixes when the ambient air and surface temperatures are at least 50 F.
- (c) When it begins raining while the work is underway, material en route from the plant may be used at risk.
- (d) The Administration reserves the right to perform any testing necessary to ensure the quality of the pavement.
- (e) All additional testing and associated costs, including maintenance of traffic, will be at no cost.

If material placement is halted due to weather conditions, waste all material en route at no additional cost.

Do not place asphalt on a frozen graded aggregate base.

504.03.03 Foundation Preparation. Construct the foundation as specified prior to paving. Remove all excess crack filler and patch material before paving over existing pavement. All spalls and potholes shall be cleaned, tack coated, filled with asphalt, and tamped before paving. Adjust to grade manholes, valve boxes, inlets, and other construction appurtenances within the area to be paved as directed.

504.03.04 Tack Coat. Ensure the surface is dry and clear of all loose and foreign materials prior to application. Apply the tack coat uniformly across the surface using an application rate of 0.01 to 0.05 gal/yd² as directed.

504.03.05 Non-Tracking Tack Coat (NTTC). The Manufacturer shall supply a QCP for the NTTC detailing the handling and application procedures per PP71-11, and test results from an independent, accredited laboratory for shear and tensile strength.

- (a) Sample the NTTC as directed and submit to OMT's Asphalt Technology Division. All samples will be tested against the manufacturer's specifications. Material out of compliance will not be accepted for use.
- (b) Use equipment to heat and apply the NTTC at an application temperature range that conforms to the manufacturer's recommendations. Apply the NTTC in accordance with 504.03.02 and as directed.
- (c) Apply the NTTC uniformly with a pressure distributor. Use hand spraying equipment only in areas inaccessible to the pressure distributor. Apply the NTTC using an application rate of 0.05 to 0.10 gals/sq.yd and do not dilute with water. The quantity, rate of application, temperature, and areas to be tacked shall be approved prior to application.

- (d) Do not clean or discharge the tack coat distributor into ditches, onto shoulders or along the right of way. Park the distributor so the spray bar will not drip NTTC onto the surface of the traveled pavement.
- (e) Exclude all traffic from sections treated with NTTC until the tack has cured and will no longer track onto adjacent non-treated areas. Adjacent pavement surfaces shall show minimal visible evidence and pavement markings shall show no visible evidence of tracking.

504.03.06 Asphalt Placement. Delivery and placement of the asphalt should be continuous. Place the asphalt while the temperature is at least 225 F, or as specified in the Field QCP. Place the asphalt with a paver used that conforms to 504.03.01. Do not broadcast loose mix over the new surface.

504.03.07 Compaction. Roll the asphalt immediately after placement and compact to the proper in-place density and ride smoothness. Incentive or disincentive price adjustment for density will be as specified in 504.04.02. Use steel wheel rollers for the first rolling of all joints and edges, the initial breakdown rolling, and the finish rolling. Use a power driven trench roller when base widening is too narrow to permit the use of conventional rollers.

Construct an earth berm or shoulder against the loose asphalt as soon as it is placed. The trench must be excavated wider than the proposed width. Roll and compact the two materials simultaneously.

No traffic is permitted on the pavement after rolling until it has cooled to less than 140 F. Roller marks shall not be visible after rolling operations.

504.03.08 Joints. Construct joints as directed and as follows:

- (a) Stagger longitudinal and transverse joints in successive courses so that one is not directly above the other.
- (b) Stagger transverse joints by the length of the paver.
- (c) Stagger longitudinal joints at least 6 in. and arrange so that the longitudinal joint in the top course is within 6 in. of the line dividing the traffic lanes.
- (d) Construct joints in a manner that provides a continuous bond between the old and new surfaces.
- (e) Overlap the existing pavement 1 to 1.5 in. when constructing longitudinal joints adjacent to existing asphalt pavements.
- (f) The initial longitudinal roller pass shall be on the uncompacted hot mat and 6 inches to 1-foot from the joint. The successive roller pass shall compact the overlapped material and the 6 in. to 1 ft. material simultaneously.

- (g) Apply tack coat to joints as directed. Cut back the edge of the existing pavement for its full depth at transverse joints when placing a surface course, and apply tack coat material as directed.
- (h) Apply tack coat to all contact surfaces before placing the mix against curbs, gutters, headers, manholes, etc.

504.03.09 Edge Drop-off. When paving highways carrying traffic:

- (a) Match all compacted pavement courses exceeding 2-1/2 in. in depth with the abutting lane or shoulder on the same working day.
- (b) For compacted pavement courses of 2-1/2 in. or less are placed, use the option of paving the abutting lane or shoulder on alternate days.
- (c) Pave all abutting lanes or shoulders prior to weekends and temporary shutdowns.
- (d) Place advance warning traffic control devices per Section 104 where uneven pavement joints

504.03.10 Tie-In. When paving highways carrying traffic:

- (a) Construct a temporary tie-in at least 4 ft in length for each 1 in. of pavement depth when the posted speed \leq 40 mph.
- (b) Construct a temporary tie-in at least 10 ft in length for each 1 in. of pavement depth when the posted speed $>$ 40 mph
- (c) Construct temporary tie-ins before traffic is allowed to cross the transverse joint.
- (d) Construct temporary tie-ins 10ft or greater using a paver meeting 504.03.01.
- (e) Remove a transverse portion of the existing pavement at the final tie-in point to maintain the design thickness of the final surface course.
- (f) Construct the final tie-in to a length equal to the posted speed per 1 in. depth of the design thickness of the final course, with a length of at least 25 ft per 1 in. depth and a maximum length of 50 ft per 1 in. depth.

504.03.11 Mix Sampling & Testing. Mix sampling and testing for Quality Control (QC) is the responsibility of the Producer or Contractor. Identify the QC sampling locations in the Field QC Plan (plant or project site). Perform Quality Assurance (QA) sampling as directed and witnessed by the Administration. Obtain QA samples from behind the paver prior to compaction. The Administration will perform all QA testing.

- (a) **QC Sampling at the Plant Site** Refer to MSMT 457. The Engineer will retain all random sampling documentation. The producer shall sample the mix at the plant. The sample shall be obtained or witnessed by the Certified technician. QC plant mix sample

results shall not be used in the pay factor calculation. Submit the results to the Administration and identify as Plant samples.

(b) QC Sampling at the Project Site. Refer to MSMT 457. QC and QA samples shall not be split samples. The certified technician shall sample the mix at the project site. Sampling will be witnessed by the Administration.

- (1) A mix lot constitutes all sublots of a mix created during the production of required tonnage for a lot.
- (2) A mix subplot size should not exceed 1,000 tons.
- (3) A subplot size up to 200 tons can be combined with the previous 1,000 ton subplot placed on the same day.
- (4) A new lot number for a mix will be given when there is a change in the approved job mix formula.
- (5) QC project site mix sample results may be used in the pay factor calculation.

(c) QA Sampling at the Project Site. Refer to MSMT 457. Sample mixes at the project site as specified.

- (1) Obtain the samples from behind the paver prior to compaction. Documentation of random sampling shall be retained by the Engineer.
- (2) The Contractor's Certified Technician shall sample the mix at the project site as witnessed by the Administration.
- (3) The Administration will take possession of the QA samples and deliver to the Laboratory for testing.
- (4) A mix subplot size should not exceed 1,000 tons. A subplot size up to 200 tons can be combined with the previous 1,000 ton subplot placed on the same day. A mix lot constitutes all sublots of a mix created during the production of required tonnage for a lot. A new lot number for a mix will be given when there is a change in the approved job mix formula.

(d) Mix Acceptance Determination. Obtain at least three behind the paver mix samples per acceptance lot for mix acceptance determination. An acceptance lot size is approximately equal to 6,000 tons of mix per project. A mix acceptance lot ends on the day when 6,000 tons is reached.

- (1). QC and QA results from behind the paver will be compared based on the F test and t test methods per MSMT 733 for each pay factor property.
- (2). When F test and t test method results indicate a QC and QA pay factor property is not from different populations, QC and QA results will be combined to calculate the mix pay factor property per MSMT 735 and 504.04.02.
- (3). When F test and t test method indicate a QC and QA pay factor property is from different populations, the pay factor property will be determined using QA results only.
- (4). The Administration will determine the acceptance evaluation procedure when less than three QA samples are obtained for an acceptance lot. The results will be made available within five working days.

504.03.12 Sampling & Testing for Density Determination. Refer to MSMT 457. Random core sampling locations will be selected for each subplot as specified. Sample the QC and QA cores in the presence of the Engineer. Cut four or six inch cores for mixes smaller than 25 mm and 6 inch cores for mixes 25 mm and larger.

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. The Engineer shall witness the random location coring. At the end of the day's paving, the Engineer will designate one randomly selected core subplot set for QC and one for QA. The Engineer will note specific reasons for any density waivers and submit the proper forms to the Administration.

- (a) **Quality Control for Density.** The density of the core samples will be expressed as a percentage of the maximum specific gravity of the mixture for each lot's placement. The maximum specific gravity will be determined in accordance with T 209 and the core's percent density will be expressed to the nearest 0.1%.

If more than one mix sample is obtained per day's placement, an average of all maximum specific gravity tests for the day will be used for the determination of percent density of each core sample. The QC Laboratory will make results of individual days paving available to the Engineer and the Contractor no later than the next working day. Retain core samples until notified of the results of the F& t test.

- (b) **Quality Assurance for Density.** The Engineer will take possession of the core samples and deliver the cores to the Administration's Laboratory for testing. The density of the core samples will be expressed as a percentage of the maximum specific gravity of the mixture for each lot's placement. The maximum specific gravity will be determined in accordance with T 209 and the core's percent density will be expressed to the nearest 0.1 percent.

If more than one mix sample is obtained per day's placement, an average of all maximum specific gravity tests for the day will be used for the determination of percent density of each core sample. The Laboratory will make results of individual days paving available to the Engineer and the asphalt Producer within five working days.

- (c) **Acceptance.** Each asphalt density lot will be evaluated for compliance using the Engineer's quality assurance test data and the Contractor's QC data. The QC and QA core specific gravity data will be analyzed in conformance with MSMT 733 (F test and t test method).

- (1). If test results are determined to be from the same population, QC and QA subplot results will be averaged to calculate the density pay factor in accordance with 504.04.02.
- (2). If results are determined not to be from the same population, the pay factor will be calculated using QA subplot results only. The average QC maximum specific gravity test results and the average project site behind the paver QA maximum specific gravity test results shall be compared.
- (3). If QC results and QA results compare within 0.026, the average of the combined QC and QA results shall be used to calculate each core density. If they do not compare within 0.026, QA maximum specific gravity results shall be used to determine each core density.

- (4). Pay reduction or incentive for the pavement compaction lot will be calculated in conformance with 504.04.02. Statistical outliers will be determined per MSMT 734.
- (5). An asphalt density lot size shall equal one paving day's production per mix. A lot shall be divided into a minimum of five equal sublots. A subplot shall not be greater than 500 tons. When a paving day's production per mix is greater than 2,500 tons, then each subplot size shall be 500 tons or fraction thereof.

Acceptance on projects requiring less than 500 tons of asphalt or when asphalt is used in non-traffic areas or on bridge decks will be determined with a thin layer density gauge used per the manufacturer's recommendations.

504.03.13 Thin Lifts and Wedge/Level Courses. If an asphalt course is determined 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.

- (a) Use a thin-lift nuclear or non-nuclear asphalt density gauge in accordance with the manufacturer's recommendations to take readings from the control strip in five 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.
- (b) 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 QC/QA cores will be saved by the contractor and made available to the Administration for retesting ten days past after the paving date or as directed.
- (c) 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.
- (d) Take a minimum of ten 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.
- (e) 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.
- (f) Take 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 1,000 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, construct a new control strip and recalibrate the density gauge.

- (g) Wedge/Level courses placed at variable thicknesses and any area greater than $\frac{3}{4}$ " shall be tested and accepted in accordance with this Thin Lift specification. Incentives are not applicable for Thin Lift or Wedge/Level courses.

504.03.14 Control Strip. When mixes are not determined to be Thin Lifts per in 504.03.12, use the option of constructing a control strip for guidance in determining roller patterns. Construct the control strip on the first workday in which asphalt is placed between 400 and 500 ft in length. Remove any control strip, if necessary and as determined at no additional cost.

The construction a control strip may be required at any time during placement of asphalt based on the evaluation of compaction results, as determined.

504.03.15 Pavement Surface Checks. Ensure an approved 10 ft straightedge is available at all times. The surface of each pavement course shall be true to the established line and grade after final compaction of each course. The surface shall also be sufficiently smooth so that the surface does not deviate more than $\frac{1}{8}$ in when the straightedge is placed parallel to the center line,. The transverse slope of the finished surface of each course shall not deviate more than $\frac{3}{16}$ in when the straightedge is placed perpendicular to the center line.

Check transverse joints using the straightedge immediately after the initial rolling. When the surface of each course varies more than $\frac{1}{8}$ in. from true, make immediate corrections so the finished joint surface is within tolerance.

Areas that are tested and reported in accordance with the Pavement Surface Profile Specification are not applicable to 504.03.14.

504.03.16 Curbs, Gutters, Etc. Where permanent curbs, gutters, edges, and other supports are planned, they shall be constructed and backfilled prior to placing the asphalt.

504.03.17 Shoulders. Shoulders abutting the asphalt surface course of any two-lane pavement that is being used by traffic shall be completed as soon as possible after completion of the surface course on that lane. Construct shoulders as specified.

504.03.18 Pavement Profile. Refer to 535

504.04 MEASUREMENT AND PAYMENT. Asphalt pavement will be measured and paid for at the Contract unit price per ton. The payment will be full compensation for furnishing, hauling, placing all materials including anti-stripping additive, tack coat, control strip, pot hole and spall repairs, setting of lines and grades where specified, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Temporary Tie-Ins. Placement and removal of the temporary tie-in where asphalt is being applied to the traveled way carrying traffic will not be measured but the cost will be incidental to the pertinent asphalt item.

Removal of the existing pavement or structure for the final tie-in will be measured and paid for at the Contract unit price for the pertinent items used. The asphalt for the final tie-in will be measured and paid for at the Contract unit price for the pertinent Asphalt item.

Adjustments. Adjustment of existing visible manholes, valve boxes, inlets, or other structures will not be measured but the cost will be incidental to the asphalt item. Adjustment of existing manholes, valve boxes, inlets, or other structures that are encountered below the existing grade will be considered for payment in conformance with GP-4.07.

Removal of Existing Raised/Recessed Pavement Markers. Removal of existing raised/recessed pavement markers will not be measured but the cost will be incidental to the asphalt item. Removal of existing raised/recessed pavement markers that are encountered below the existing pavement will be considered for payment in conformance with GP-4.07.

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 (PG64S-22) at time of bid opening. Cost differentials between PG 64-22 (PG64S-22) and a binder specified shall be included in the price bid per ton for 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 asphalt placed for the current month
- P_p = Index price for PG 64-22(PG64S-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 (PG64S-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.

504.04.02 Payment Adjustments for Pavement Density and 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 Asphalt. Incentive payments will be made using the Contract items for Pavement Density and 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 Asphalt Mixes – Percent of Maximum Density		
<i>Lot Average % Minimum</i>	<i>No Individual Sublot Below %*</i>	<i>Pay Factor (DF)</i>
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: Lots with test data above 97.0 may be rejected. Lots that are accepted 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 sublot densities are above 97.0, the pay factor = 95%

(c) When 4 or more subplot densities are above 97.5, the pay factor = 75%

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.

Lots in conformance will be accepted per 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 using the quality level analysis.

Payment adjustments will be computed as follows:

$$\begin{aligned} \text{Density Lot Payment Adjustment} &= (DF - 1) \times (AP) \times (TL) \\ \text{Mix Design Lot Payment Adjustment} &= (MF - 1) \times (AP) \times (TL) \end{aligned}$$

Where:

- MF = Mixture pay factor $[0.55 + (0.5 \times \text{CMPWSL})]$
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.

- (a) A lot containing material with a pay factor of less than 1.000 may be accepted at the reduced pay factor if the pay factor is at least 0.800 and there are no isolated defects.
- (b) A 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.
- (c) A 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.
- (d) Lots with less than five Quality Control or Quality Assurance samples per in-place density lot will not be evaluated for incentive payment.
- (e) 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.

504.04.04 Dispute Resolution. Refer to 915.02.01(e)

**CATEGORY 500
PAVING**

483 **DELETE**: SECTION 505— HOT MIX ASPHALT PATCHES in its entirety.

INSERT: The following

SECTION 505—ASPHALT PATCHES

505.01 DESCRIPTION. Repair rigid, flexible, or composite pavements by removing part or all of the section of the existing pavement and replace with asphalt paving material. The locations and extent of the repairs will be as specified or as directed.

Partial Depth Patching (PDP). PDP consists of removing areas of unsound pavement up to a 50 percent of the pavement thickness and replacing with an asphalt paving mix. The pavement thickness is defined as the thickness of all bound materials in the pavement structure including asphalt paving mix, portland cement concrete (PCC), and any other asphalt or cement modified material.

Full Depth Patching (FDP). FDP consists removing the full thickness of the pavement sections to the top of the aggregate base and replacing with an asphalt paving mix. Perform FDP whenever more than 50 percent of the pavement thickness requires repair.

505.02 MATERIALS.

Graded Aggregate Base	901.01
Aggregates for HMA	901.01
Aggregates for Superpave Mixes	901.01 and MP2
Performance Graded Asphalt Binders and Asphalt Mixes	904
Crack Filler	911.01
Production Plants	915
Cold Patch Material	924

505.03 CONSTRUCTION. Keep disturbance of the base material to a minimum. The faces of the remaining pavement shall be square and vertical without ragged edges. Do not use equipment that could damage the existing pavement.

505.03.01 Weather Restrictions. Refer to 504.03.02

505.03.02 Existing Pavement. Complete all repairs on the same day in which excavation is completed. Do not leave open excavated areas at the end of the workday.

505.03.03 Removal of Pavement for PDP. Remove existing pavement by milling, grinding, or saw cutting to the specified depth. Maintain square vertical faces after removal.

- (a) If concrete is encountered during removal, limit the depth of the patch to the top elevation of the PCC.
- (b) For PDP of composite pavements, protect the PCC from damage during removal of the HMA.
- (c) IF the material at the bottom of the PDP is determined to be unsuitable, remove the unsuitable material until sound material is encountered.
- (d) IF PCC present in a composite pavement is determined to be unsuitable, follow the removal and replacement procedures for a FDP.
- (e) Before placing the patch, remove all loose and foreign materials then treat all spalled cracks and joints by tack coating, filling and tamping with asphalt.

505.03.04 Removal of Pavement for FDP. Make a perpendicular saw cut full depth around the perimeter and remove the existing pavement to the top of the aggregate base. Refer to the applicable portions of 522.03.03 for the concrete portion of a composite pavement. Maintain square vertical faces after saw cutting.

505.03.05 Base and Subgrade Preparation. The Engineer will evaluate the aggregate base of the FDP area to determine if it is suitable.

- (a) If the aggregate base is determined to be unstable, compact it as specified in 501.03.10.
- (b) If no aggregate base is present, construct the subgrade foundation per Section 208 or as directed.
- (c) Removal of Unsuitable Material:
 - (1) If the aggregate base or subgrade material is unsuitable, remove and dispose of the unsuitable material.
 - (2) Replace the unsuitable material with graded aggregate base conforming to Section 501.
 - (3) Compact the replacement material in layers no greater than 4 in. depth.
 - (4) Protect the aggregate base or subgrade after placement.
 - (5) Remove and replace any aggregate base or subgrade damaged due to lack of protection at no additional cost.

505.03.06 Subgrade Drains. Refer to Section 306. The construction of subgrade drains may be required in areas of wet underlying subgrade or in areas where future drainage problems may be a concern, as determined.

505.03.07 Emergency Filler. Have sufficient approved cold patch material readily available to fill the void of the repair area. Place and compact the material as directed. Completely remove the material at the beginning of the next workday.

505.03.08 Steel Plates. Ensure an ample supply of 12 x 14 ft by 1 in. thick steel plates to cover the emergency filler is available on site.

505.03.09 Patch Construction. Refer to 504. Furnish equipment and perform placement, compaction, and quality control procedures as specified. Manual placement of the asphalt patches is permissible, as directed. .

505.03.10 Patch Placement. Thoroughly clean and tack the exposed vertical surface of adjacent pavement prior to placing the asphalt patch per 504.03.04. Spread the asphalt 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:

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

505.03.11 Mix Sampling Requirements. One random sample per mix will be required daily for projects using more than 200 tons. Quantities of 200 tons or less of asphalt may not require daily field sampling; however, one random sample per mix for every 1000 tons of asphalt or one sample per mix will be required for every five days of patching, whichever yields the greater frequency. Random mix samples for patching will only be required for patches placed with a paver and will not be required for patches less than 1000 sq. ft.

505.03.12 Testing and Acceptance. Acceptance of Base and/or Surface of each patch will be determined by using an asphalt density gauge with test data witnessed by the Engineer. Calibrate the density gauge to the mix in order to obtain acceptable readings.

505.03.13 Density Determination Requirements. On the first day of patching, the Engineer will select three test locations and witness the testing. Sample the cores and label with the date sampled. Test the cores then retain in the QC Laboratory until OMT verifies the results. .Submit the completed core sheets to OMT.

- (a) The average pcf of the three cores and the average pcf of the three corresponding gauge readings shall be within 3.0 lb/ft³ of each other, recalibrated the density gauge according to the manufacturer's recommendation. .When the difference between the

gauge readings and the core tests are greater than 3.0 lb/ft³, verify the gauge's accuracy by reading three new random locations.

- (b) Report density gauge test data as a percentage of the maximum specific gravity determined for each day's production. An in-place density of 92.0 to 97.0 percent is required for each patch. Compliance will be determined for each patch separately by averaging all density tests performed within each specific patch. Submit compaction sheets to OMT daily for all production.

505.04 MEASUREMENT AND PAYMENT. Refer to 504.03.10 and MSMT 735. Payment will be full compensation for saw cutting, milling, grinding, removal, disposal, trimming of the existing pavement, subgrade preparation, placing all materials including tack coat, steel plates, emergency filler, and for all material, labor, equipment, tools, and incidentals necessary to complete the work. After removal, steel plates and emergency filler will remain the property of the Contractor.

505.04.01 Partial Depth Patching and Full Depth Patching will be measured and paid for at the Contract unit price per square yard or per ton as specified. The payment will be full compensation for furnishing, hauling, placing all material, additional removal of pavement above the aggregate base, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

505.04.02 Removal of Unsuitable Material will be measured and paid for at the Contract unit price per cubic yard. The payment will also include excavation and disposal of unsuitable material, backfilling with aggregate, and compaction.

505.04.03 Price Adjustment for Asphalt Binder. Refer to 504.04.01. An adjustment will be made to the final Contract unit price for asphalt mixture if the price of asphalt binder fluctuates significantly from the prevailing price on the date of placement. This includes asphalt patching material converted to tons.

505.04.04 Price Adjustment for Asphalt Mix. Payment reduction or incentive will be made using the Contract items for Asphalt Mixture. Revisions to the established item amounts will not be allowed



**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.



SPECIAL PROVISIONS INSERT
520 — PLAIN AND REINFORCED PORTLAND CEMENT
CONCRETE PAVEMENTS

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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. Measure the roughness of the final surface of Hot Mix Asphalt (HMA) or Portland Cement Concrete (PCC) pavements using an International Roughness Index (IRI) Inertial Profiler to collect Quality Control (QC) data. The IRI Inertial Profiler shall conform to E 950 and MSMT 563. The Administration will use an IRI Inertial Profiler to perform all Quality Assurance (QA) testing and acceptance. Measure all final roadway surfaces unless otherwise indicated.

535.01.01 Existing Conditions. Following are the IRI values for this project:

IRI INDICATOR	REPORTED VALUES FOR BOTH WHEEL PATHS (in./mile)	REPORTED STATEWIDE RURAL OTHER PRINCIPAL ARTERIAL VALUES (2013) (in./mile)
Average	84	107
Maximum	211	637
Minimum	38	27
Standard Deviation	30	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 the most recent pavement longitudinal profile data available, measured in the outside travel lane.

NOTE 3: The average, maximum, minimum, and standard deviation IRI values are based on intervals of 1/10 of a mile in length.

A definition of ride quality based on IRI (as defined by The Federal Highway Administration) is given below:

IRI RANGE (in./mile)	RIDE QUALITY
< 60	Very Good
≥ 60 to < 95	Good

≥ 95 to ≤ 170	Fair
>170 to ≤ 220	Mediocre
> 220 to ≤ 640	Poor

535.02 MATERIALS. Not applicable.

535.03 CONSTRUCTION.

535.03.01 Equipment Standardization Testing. MSMT 563. Perform standardization testing on Administration specified sites at regular intervals. Additional testing may be required for a device that may be out of conformance between regular standardization tests. Send a copy of the completed standardization test results to the Administration’s Office of Materials Technology (OMT). QC test data obtained with a profiler that has not completed standardization testing will not be accepted.

535.03.02 Quality Control Testing for Pavement Profile. E 950 and MSMT 563. Measure the pavement profiles in the direction of travel in both wheel paths simultaneously and parallel to the right edge of the lane. Document a regular schedule of pavement profiling in the HMA Field Quality Control Plan (504.03) or the PCC Proposed Paving Plan (520.03). Notify the Engineer prior to performing any QC measurements. Submit the results to the Engineer per the approved QC plan within 72 hours of completion of the paving operations.

Data Submittal. Submit all data to the Engineer and OMT (in electronic format) via one of the following:

- (a) **E-mail:** ridespec@sha.state.md.us
- (b) **Delivered:** Office of Materials Technology
 7450 Traffic Drive
 Hanover, MD 21076
 Attention: Paving Quality Assurance Team Leader

Profile measurements and data submission that has not been completed for all sections on the project as specified will not be eligible for incentive payment per 535.04.03(a). QC data is required for materials clearance.

- (a) Measure and report the QC IRI in sections equal to 25 ft in length and one lane in width. Sections measured that are shorter than 25 ft due to exempt areas or the project end are required to be reported but not used in the pay calculation.
- (b) Measure a full 25 ft section after each exempt area.
- (c) Perform three measurement runs per MSMT 563. The coefficient of variation of the overall average IRIs shall be less than or equal to 4 percent for three runs.
- (d) When the first three runs do not meet the above criteria, perform additional runs until three measured runs meet the criteria. Submit the acceptable three runs to the

Administration. Only the median run (based on average IRI) will be considered for the QC IRI data, and will be used to compute any pay adjustments.

(a) Areas Not Profiled. The following pavement areas are exempt from profiling and reporting for pay adjustment:

- (1) Shoulder areas.
- (2) Parking areas of ride sharing facilities or park and ride lots.
- (3) Pavements of ramps, side street tie-ins, acceleration lanes, or deceleration lanes less than 1,000 ft in length.
- (4) Bridge decks, railroad crossings, stop signs and pavement within 50 ft thereof.
- (5) Pavement within 50 ft of transverse joints that separate it from existing pavement. This does not apply when a transverse joint is paved on both sides as part of one contract.
- (6) Pavements on projects with less than 1,000 center lane feet, after elimination of areas not to be profiled under items 1 through 5.
- (7) Ramps greater than 1,000 centerline feet with radius less than 2,000 feet.

Perform Pavement Surface Checks on areas listed above per 504.03.14.

(b) Defects. 535.04. When any section IRI is greater than or equal to IRI_e per the table, take one of the following corrective actions as directed and at no additional cost:

- (1) Remove and replace the pavement that is greater than or equal to IRI_e , or
- (2) Grind the section to bring the section IRI into conformance, or
- (3) Accept the Defect Cost per 535.04 for any defective section where corrective action is not performed.

Perform the above corrective actions to each defective section as determined. Approval to waive (1) or (2) does not constitute a waiver of (3) unless explicitly stated.

- (1) Re-profile all affected pavement sections after any corrective work, including any additional transverse paving joints created, to determine if the sections are within specification.
- (2) The re-profiled data shall include the section prior to the corrected sections and the four sections after the corrected sections.
- (3) The re-profiled data shall be used for final pay calculations; however, the minimum IRI value for any corrected section shall be limited to IRI_c .

Defects Not Due to Workmanship. When it is determined that a defect is not the result of substandard workmanship, a written justification for removing the defect from final pay calculations will be provided to OMT’s Asphalt Technology Division. The Engineer will discuss this matter with OMT’s Asphalt Technology Division before making the final pay adjustment determination.

535.03.03 Paving Quality Assurance Testing for Pavement Profile (IRI). The Administration may measure sections of the pavement to verify the QC data. The QC data will be used for any pay adjustments on the project if the QA measurements have not been performed within 14 calendar days from the date that the completed QC data was submitted. Perform QA testing per 535.03. The initial QA test will consist of one run on all 25 ft sections. The initial QA run and the median QC run will be compared to determine QC data acceptance. The average IRI, the number of defects, and the number of tested sections will be compared as follows:

STATISTIC	UNIT	QC DATA TOLERANCE WITH RESPECT TO QA DATA
Average IRI	in./mile	± (2 % + 2)
Number of Defects	Sections	± (10 % + 2)
Number of Tested Sections	Sections	± (1 % + 1)

The QC data will be used for all pay adjustments when it falls within the above tolerances.

- (a) Perform a minimum of two additional QA runs when the QC data does not agree with the initial QA data and a cause cannot be determined.
- (b) The initial and two additional QA runs will then be evaluated to determine if the coefficient of variation of the overall average IRIs is less than or equal to 4 percent for the three runs.
- (c) When the three QA runs do not meet the above criteria, additional runs will be performed until three measured QA runs meet the criteria.
- (d) The median run (based on average IRI) of the three QA runs will then be re-compared with the QC data in conformance with the above tolerances.

Corrective Actions. If the QC and QA data are still not within the tolerances described above for Average IRI or Number of Defects, both profilers shall be retested on a standardization test site per MSMT 563 to determine their conformance and recalibrated or repaired as necessary.

- (a) If the QC profiler is not brought into compliance within three paving days, cease paving operation or use another standardized profiler to collect QC data.
- (b) Once the QC profiler is brought into compliance, previously tested sections may be retested for comparison with the QA data or the QA data can be accepted as the basis for any pay adjustment on all sections.
- (c) If the QA profiler is out of compliance, then the QC data for all sections tested will be accepted.
- (d) If both profilers are found to be in noncompliance, they shall be repaired or recalibrated as necessary and all QC and QA testing since the previous comparison repeated.

When the QC and QA data for Number of Tested Sections are not within tolerance, the respective Distance Measuring Instruments (DMIs) shall be recalibrated and additional QC testing performed until the QC data meets the tolerance criteria.

535.04 MEASUREMENT AND PAYMENT. Pavement surface profile testing costs will be incidental to the HMA surface material or PCC material as specified. Payment will be full compensation for all set up, technicians, traffic control, any type of corrective work to bring the pavement into conformance, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

The Administration will perform the pay adjustment calculations for the Overall IRI per 535.04.01 and for Defect Cost per 535.04.02 and then will calculate the Total Pay Adjustment per 535.04.03.

535.04.01 Overall IRI. The overall average IRI for the project (IRI_{AVG}) will be calculated as the average IRI value of all tested 25 ft sections on the project. The pay adjustment for Overall IRI will then be calculated based on the factors below.

Incentive. $PF = P_{max}$, when IRI_{AVG} is less than or equal to IRI_a
 $PF = P_{max} \times (IRI_b - IRI_{AVG}) / (IRI_b - IRI_a)$, when IRI_{AVG} is greater than IRI_a
and less than IRI_b

INCENTIVE = $PF \times NS \times (25/5280 \text{ lane miles per section})$
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 Defect Cost. The IRI for each individual section will be used to calculate any cost to be applied for defects on the project. This pay adjustment applies only to the pavement within the tested sections. The pay adjustment for defects will be calculated based on the factors shown below.

DEFECT COST = Sum of the defect costs ($P_{defect,i}$) for all defect sections

Where:

	DESCRIPTION	VALUE	UNITS
P _{max}	Maximum Incentive for Overall IRI	\$6,150	Dollars per lane-mile
P _{min}	Maximum Disincentive for Overall IRI	\$6,150	Dollars per lane-mile
P _{defect,i}	Defect Cost for a given 25' section	*	Dollars per section
PF	Pay Factor for Overall IRI	*	Dollars per lane-mile
INCENTIVE	Incentive for Overall IRI	*	Dollars
DISINCENTIVE	Disincentive for Overall IRI	*	Dollars
DEFECT COST	Sum of the defect costs (P _{defect,i}) for all defect sections	*	Dollars
IRI _a	IRI for Maximum Incentive	45	Inches per mile
IRI _b	Minimum IRI for Full Pay	53	Inches per mile
IRI _c	Maximum IRI for Full Pay	71	Inches per mile
IRI _d	IRI for Maximum Disincentive	79	Inches per mile
IRI _e	IRI threshold for Defects	180	Inches per mile
IRI _{AVG}	Overall average IRI for the project	*	Inches per mile
IRI _{defect}	IRI for a given 25' defect section	*	Inches per mile
NS	Number of tested 25 foot Sections	*	Sections

* Value to be determined on the project.

The defect cost (P_{defect,i}) for each defect section will be computed using the following formula:

$$P_{\text{defect, i}} = 100 + \left(\frac{190 * (IRI_{\text{defect}} - IRI_e)}{(600 - IRI_e)} \right)$$

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 will be paid under the item Pavement Surface Profile Pay Adjustment. This item amount has been established by the Administration and shall not be revised. TPA resulting in decreased payment will be deducted from monies owed. The TPA shall be subject to conditions (a) and (b) below.

$$\text{Total Pay Adjustment} = \text{INCENTIVE} - \text{DISINCENTIVE} - \text{DEFECT COST}$$

- (a) Regardless of the measured profile of any test section, incentive payment will not be permitted for the project when the Contractor's QC data was not submitted on time in conformance with 535.03.02.

$$\text{Total Pay Adjustment} = 0 - \text{DISINCENTIVE} - \text{DEFECT COST}$$

- (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
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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.

Prefomed 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

Prefomed Thermoplastic Pavement Marking lines will be measured and paid for at the Contract unit price per linear foot for the color and width specified.

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

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.

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.

559.03.04 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.

- (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.

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.



**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

NUTRIENT MANAGEMENT PLAN

DESCRIPTION. Apply fertilizer and soil amendments at the rates of the Nutrient Management Plan (NMP) when performing the specified operations.

MATERIALS.

Limestone	920.02.01
Sulfur	920.02.02
Gypsum	920.02.04
Compost	920.02.05
Fertilizer	920.03.01

CONSTRUCTION. Refer to Sections 704 thru 716.

(a) General.

(1) Applicability. This NMP is for the Salvaged Topsoil stockpiled on site. If another topsoil source will be used, submit an updated source of supply and request the Office of Materials Technology to sample and test the soil per MSMT 356 so the Landscape Operations Division can develop an updated NMP.

(2) Watershed. 02130203 - Upper Pocomoke River; 02130105 - Newport Bay

(3) Soil Test Results.

SHA Soil Test No.	WO6365170	July 30, 2013
Texture	Silt Loam	Meets Specifications
Organic Material	4.4%	Meets Specifications
pH	6.1	Meets Specifications - Requires Amendment
Soluble Salts	124	Meets Specifications

(4) Location Map.



(b) Application Rates. Apply fertilizer and soil amendments for the specified operations as listed below.

TURFGRASS ESTABLISHMENT & TURFGRASS SOD ESTABLISHMENT		
MATERIAL	LB PER ACRE	LB PER SY
20-16-12 (83% UF with MAP & SOP)	200	0.04
38-0-0 (UF)	0	0.00
0-0-50 (SOP)	0	0.00
Dolomitic Limestone	1150	0.24
Sulfur	0	0
Compost	0.0 yd ³ per 24 yd ³ of soil	
Gypsum	0	0.00
Refertilization (when included)		
20-16-12 (83% UF with MAP & SOP)	200	0.04

(c) Expiration. This NMP expires July 29, 2016. If fertilizer will be applied after that date, request the Office of Materials Technology to sample and test the soil per MSMT 356 so the Landscape Operations Division can develop an updated NMP.

MEASUREMENT AND PAYMENT. Nutrient Management Plan will not be measured and the payment is incidental to the specified operations of Sections 704 thru 716.

**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.
- (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 48 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 2.0 in. from the soil surface when spreading is completed. In all other areas, remove debris with a length or width greater than 4.0 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, 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 in. 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 per square yard.

CATEGORY 700
LANDSCAPING
BIORETENTION SOIL MIX

DESCRIPTION. Install (BSM) within specified areas of stormwater filtration facilities.

When installation of BSM is completed, immediately install permanent vegetation establishment in conformance with Section 705, 706, 707, 708, 710, or as specified. Install soil stabilization matting (SSM) in conjunction with Section 709 as specified.

When it is not possible to perform Turfgrass Establishment or other permanent vegetation establishment, refer to Section 704 and install temporary matting mulch.

Performance of Bioretention Soil Mix as specified herein complies with requirements of the Maryland Department of the Environment for installation of filtration soils in preparation for permanent seeding or other permanent vegetation stabilization.

MATERIALS.

Bioretention Soil Mix	920.01.05
Fertilizer	920.03.01
Straw Mulch	920.04.01
Shredded Hardwood Bark (SHB) Mulch	920.04.03
Water	920.09.01

CONSTRUCTION.

General.

(a) Schedule. Install BSM when soil moisture and weather conditions are suitable for construction and prompt vegetation installation. Cease operations when soil is frozen, or when conditions are otherwise not suitable.

(b) Nutrient Management Plan (NMP). The specifications of this section shall replace any pertinent fertilizer and soil amendment specifications of Section 705, 706, 707, 708, 710, or as specified. The following will be the NMP for fertilizer applied to plant materials installed in BSM.

Non-Vegetated BSM. Do not apply compost, other soil amendments, or fertilizer to non-vegetated BSM.

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.

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

- (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.
- (d) **Temporary Matting Mulch.** Install temporary matting mulch per Section 704 when it is necessary to temporarily stabilize BSM areas, including BSM areas under construction, the surface of BSM, and adjacent sideslopes.
- (e) **Contamination Removal.** Keep BSM stockpiles separate from other landscape materials. Ensure that topsoil or other soil materials are not able to move into areas designated for BSM during construction. Do not allow soil or other contaminants to flow, blow, or erode onto the finished surface of BSM. Remove contaminated BSM as needed or as directed, and dispose of the contaminated materials.
- (f) **Debris Removal.** Remove grass, weeds, brush, and other objectionable debris material from the surface of BSM stockpiles before transporting soil, or when such debris is encountered during construction of stormwater filtration facilities. Remove debris as needed or as directed, and dispose of the contaminated materials.
- (g) **Site Preparation.** Ensure the site is uniformly graded true to line and cross section in preparation for placing BSM. Complete construction of sideslopes at the same time that BSM is installed to ensure that all parts of the facility are stabilized together.
- (h) **Placing, Spreading, and Firming BSM.** Place, spread, and firm BSM in layers up to 1 ft thickness to provide a firm and uniform soil profile, and to ensure placement of the specified depth.

- (i) Plant Material Installation.** Perform seeding, sodding and installation of trees, shrubs, perennials, and other plant materials with the least impact to BSM, and without the use of machinery. Planting beds shall not be prepared per 710.03.05. The surface of BSM shall be uniformly restored each day after planting operations are completed.
- (j) 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 are installed.
- (k) Shredded Hardwood Bark Mulch (SHB).** When SHB Mulch will be applied over the surface of non-vegetated BSM, or over the entire surface of BSM that will be installed with vegetation per Section 710, place SHB Mulch as specified in Section 710.03.13 to a uniform depth of 3 in., unless specified otherwise.
- (l) Stone Mulch or Other Mulch.** Place stone mulch or other specified materials used as mulch per the plans or contract documents.
- (m) Clean-up.** Ensure that grades are repaired, that soil stabilization matting and other landscape materials are secure, and that debris is removed from the BSM areas and sideslopes at the end of each working day.
- (n) Watering.** Apply water as specified in 705, 706, 707, 708, 709, 710 or as necessary to ensure that the entire surface of BSM and soil of sideslopes are wet to a depth of 2 in.

Gently apply water with a sprinkler, water-breaker nozzle, or other approved methods. Do not allow water to cause erosion or to displace the matting, seed, or sod.

Water seeding, sod, or other plant materials during the establishment phase per the pertinent specifications to ensure the survival of the vegetation.
- (o) Damage Repair.** Promptly repair damage to BSM as needed or as directed. Repair seeding, sod, soil stabilization matting, or other vegetation establishment per the pertinent specifications.
- (p) 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.

MEASUREMENT AND PAYMENT. Bioretention Soil Mix 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, and incidentals necessary to complete the work.

SPECIAL PROVISIONS
BIORETENTION SOIL MIX

CONTRACT NO. **WO6365170**

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Bioretention Soil Mix, including nutrient management reporting, contamination removal, debris removal, site preparation, placing, spreading, and firming BSM, fertilizer, clean-up, watering, and damage repair will be measured and paid for at the Contract unit price per cubic yard.

Temporary Mulch applied as temporary matting mulch will be measured and paid for at the pertinent Contract unit price.

Hardwood Bark Mulch 3 in. Depth will be measured and paid for at the Contract unit price per square yard.

Vegetation Establishment installed in conformance with Section 705, 706, 707, 708, 710, or as otherwise specified, will be measured and paid for at the pertinent Contract unit price.

Soil Stabilization Matting installed in conformance with Section 709 in conjunction with permanent vegetation establishment will be measured and paid for at the pertinent Contract unit price.

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

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.

SPECIAL PROVISIONS

CONTRACT NO. WO6365170

704 – TEMPORARY MULCH AND TEMPORARY SEED

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(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.

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.

SPECIAL PROVISIONS

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704 – TEMPORARY MULCH AND TEMPORARY SEED

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(b) Replace Temporary Seed with approved materials when it has degraded, or when more than 6 months have elapsed since Acceptance.

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, 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 that will be redisturbed 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 as follows:

TURFGRASS ESTABLISHMENT	
TABLE 2 - APPLICATION RATES	

SPECIAL PROVISIONS
705 – TURFGRASS ESTABLISHMENT

CONTRACT NO. WO6365170
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MATERIAL	LB PER SY	LB PER ACRE
SOIL AMENDMENTS per Nutrient Management Plan for topsoil or other specified soil substrate. ^{a, b}		
Limestone	0 to 0.930	0 to 4,500
Sulfur	0 to 0.052	0 to 250
Gypsum	0 to 0.455	0 to 2,200
Compost	0 to 1.033	0 to 5,000
MATERIAL	LB PER SY	LB PER ACRE
FERTILIZER AT SEEDING ^{c, d}		
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		
SHA Turfgrass Seed Mix, applied to roadsides, facilities, and other designated areas.	4.591	200
SHA Special Purpose Seed Mix, applied to slopes 4:1 and steeper within four miles of a State airport, and other designated areas.	4.591	200
ADDITIVE SEED		
SHA Temporary Seed Mix	0.574	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 fertilizer, gypsum, compost, and either limestone or sulfur 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.		

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 3.0 in. from the soil surface. Apply soil amendments to tracked soil.

705.03.06 Initial Fertilizer and Seeding. Apply fertilizer and seed 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 Installation 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

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705 – TURFGRASS ESTABLISHMENT

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full compensation for all material, labor, equipment, tools, 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 per square yard.

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	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				

- (b) **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.

- (c) **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.

- (d) **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.

- (e) **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.

- (f) **Nutrient Management Plan (NMP).** Soil testing will be performed and a NMP will be developed by the Administration. Replace application rates of 706.03.08 as required by the NMP. When a NMP has not been developed, apply 500 lb. per acre of 20-16-12 (83% UF with MAP & SOP) fertilizer as the NMP rate for Meadow Establishment.

- (g) **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.

(h) 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.

(i) 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.

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. Seed shall be delivered unmixed. 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(d) and include seed additives as specified. Apply materials according to Table 2, Table 3 and Table 4:

SHRUB SEEDING ESTABLISHMENT		
TABLE 2 - APPLICATION RATES		
MATERIAL	LB PER SY	LB PER ACRE
SOIL AMENDMENTS per Nutrient Management Plan for topsoil or other specified soil substrate ^{a, b}		
Limestone	0 to 0.930	0 to 4,500
Sulfur	0 to 0.052	0 to 250
Gypsum	0 to 0.455	0 to 2,200
Compost	0 to 1.033	0 to 5,000
FERTILIZER ^{c, d}		
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

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SHRUB SEEDING ESTABLISHMENT		
TABLE 2 - APPLICATION RATES		
MATERIAL	LB PER SY	LB PER ACRE
11-52-0 (MAP)	0 to 0.036	0 to 175
0-0-50 (SOP)	0 to 0.041	0 to 200
SEED MIXES		
SHA Lowland Shrub Seed	Refer to Table 3 - Application Rates	
SHA Upland Shrub Seed	Refer to Table 4 - Application Rates	
ADDITIVE SEED		
A = Tall Fescue	0.010	50
B = Common Oat	0.010	50
STRAW MULCH		
	0.413	2000
WOOD CELLULOSE FIBER to secure straw mulch		
	0.103	500
Notes:		
^a Apply fertilizer, gypsum, compost, and either limestone or sulfur 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.		

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					

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
Select all marked 'x'					
Kentucky Bluegrass	1.876	20.0	x	x	x
Deertongue, 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
Blackeyed Susan, 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	
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'					
Hard Fescue	2.814	30.0	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
Blackeyed Susan, PLS ¹	0.047	0.5	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					

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
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 3.0 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 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, 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	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

SPECIAL PROVISIONS
707 – MEADOW ESTABLISHMENT

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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		
MATERIAL	LB PER SY	LB PER ACRE
SOIL AMENDMENTS per Nutrient Management Plan for topsoil or other specified soil substrate ^{a, b}		
Limestone	0 to 0.930	0 to 4,500
Sulfur	0 to 0.052	0 to 250
Gypsum	0 to 0.455	0 to 2,200
Compost	0 to 1.033	0 to 5,000
FERTILIZER ^{c, d}	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		
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	GRAM PER SY	LB PER ACRE
A = Garden Cosmos	0.028	0.3
B = Plains Coreopsis	0.028	0.3
C = Tall Fescue, Perennial Ryegrass	4.690	50
D = Corn Poppy	0.028	0.3
E = Common Oat	4.690	50

MEADOW ESTABLISHMENT		
TABLE 2 - APPLICATION RATES		
MATERIAL	LB PER SY	LB PER ACRE
STRAW MULCH	0.413	2000
WOOD CELLULOSE FIBER to secure straw mulch	0.103	500
Notes:		
^a Apply fertilizer, gypsum, compost, and either limestone or sulfur 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	Longhair Sedge	0.056	0.6
King of the Meadow	0.038	0.4	Rattlesnake Mannagrass	0.094	1.0
New York Aster	0.038	0.4	Shallow Sedge	0.056	0.6
New York Ironweed	0.038	0.4	Woolgrass	0.056	0.6
Seedbox	0.038	0.4	Rough Bluegrass	1.876	20.0
Swamp milkweed	0.019	0.2			
Swamp Sunflower	0.56	0.6	Note:		
Swamp Verbena	0.131	1.4	* 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.		
Trumpetweed or Spotted Trumpetweed	0.038	0.4			

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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	Indiangrass	0.188	2.0
Lanceleaf Tickseed	0.141	1.5	Switchgrass	0.094	1.0
Maximilian Sunflower	0.047	0.5	Hard Fescue	1.876	20.0
New England Aster	0.019	0.2	Kentucky Bluegrass	1.876	20.0
New York Ironweed	0.019	0.2			
Showy Tickseed	0.019	0.2	<p>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.</p>		
Stiff Goldenrod	0.028	0.3			
Swamp Verbena	0.066	0.7			
Trumpetweed or Spotted Trumpetweed	0.019	0.2			

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	Little Bluestem	0.188	2.0
Gray Goldenrod	0.038	0.4	Purpletop	0.094	1.0
Lanceleaf Tickseed	0.263	2.8	Hard Fescue	1.876	20.0
Maryland Senna	0.056	0.6			
Partridge Pea	0.225	2.4	<p>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.</p>		
Smooth Blue Aster	0.038	0.4			
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.

707.03.06 Seed Delivery, Weighing, and Mixing. 706.03.04

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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, 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 7 - 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.

SPECIAL PROVISIONS
707 – MEADOW ESTABLISHMENT

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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 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		
MATERIAL	LB PER SY	LB PER ACRE
SOIL AMENDMENTS per Nutrient Management Plan for topsoil or other specified soil substrate ^{a, b}		
Limestone	0 to 0.930	0 to 4,500
Sulfur	0 to 0.052	0 to 250
Gypsum	0 to 0.455	0 to 2,200
Compost	0 to 1.033	0 to 5,000
FERTILIZER AT INSTALLATION ^{c, d}		
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:		
^a Apply fertilizer, gypsum, compost, and either limestone or sulfur as 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.		

708.03.05 Initial Fertilizer. Use spreaders, drills, or other approved machinery. Apply 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 inches when directed. Use approved machinery to cut to a height of 3 to 5 inches.

(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, 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

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708 – TURFGRASS SOD ESTABLISHMENT

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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.

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.

(d) 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.

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, 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. 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.

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709 — SOIL STABILIZATION MATTING

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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.

710.02 MATERIALS.

Furnished Subsoil	920.01.04
Limestone	920.02.01
Sulfur	920.02.02
Compost	920.02.05
Fertilizer	920.03.01
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.

- (c) **Pesticide Application.** Apply pesticides in conformance with the Maryland Pesticide Applicator’s Law and the manufacturer’s label 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).** 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 48 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 (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.

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(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 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 (EPT), 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

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.
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 foot clearance for pedestrians.

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 synthetic fabric, plastic, and metal containers before installing plants.

Remove twine and natural burlap 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.

(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.

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(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.

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

TREE, SHRUB, AND PERENNIAL				
TABLE 5 - STAKING AND GUYING				
TREE TYPE	CALIPER In.	HEIGHT Ft	SUPPORT	
			No. of Stakes	Length, ft
				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.

(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.

(a) **Follow-Up Watering.** Monitor and apply water during the Installation Phase to supply plant needs.

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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.

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.

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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

TREE, SHRUB, AND PERENNIAL		
TABLE 7 - REQUIREMENTS FOR INSTALLATION PHASE ACCEPTANCE		
Item	Requirement	Section
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 and successfully transplanted.	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.
- (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 pounds of 20-20-20 water soluble fertilizer in 1,000 gallons of 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.

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For planting beds, apply 0.21 gallons 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)
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)

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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, 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.

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.

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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 711 — ANNUAL AND BULB
INSTALLATION AND ESTABLISHMENT**

603 **DELETE:** Section 711 — Annual and Bulb Installation
and Establishment in its entirety

INSERT: The following.

**SECTION 711 — ANNUAL AND BULB
INSTALLATION AND ESTABLISHMENT**

711.01 DESCRIPTION. Install and establish annuals and bulbs in topsoil. When it is not possible to perform this work, refer to Section 704 and perform Temporary Mulch, or as directed.

711.02 MATERIALS.

Limestone	920.02.01
Sulfur	920.02.02
Compost	920.02.05
Fertilizer	920.03.01
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

711.03 CONSTRUCTION.

711.03.01 General.

(a) **Regional Areas.** Refer to 705.03.01(a).

(b) **Planting Seasons.** Perform operations when soil moisture and weather conditions are suitable. Cease operations when conditions are unsuitable. Install plants according to Table 1.

<p>ANNUAL AND BULB TABLE 1 - PLANTING SEASONS</p>
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SEASON	PLANTS	INSTALLATION DATE		
		Region 1	Region 2	Region 3
Spring	Container Grown Summer Annuals	5/20 – 6/20	5/10 – 6/10	5/01 – 6/01
Fall	Container Grown Winter Annuals	9/01 – 10/20	9/10 – 10/31	9/20 – 11/10
	Spring Flowering Bulbs	9/01 – 11/30	9/10 – 12/31	9/20 – 12/31

(c) Modification Request. 710.03.01(b).

(d) Pesticide Application. 701.03.01(b).

(e) Pesticide Application Reporting. 701.03.01(c).

(f) Nutrient Management Plan (NMP). 710.03.01(e).

(g) Nutrient Management Reporting. 710.03.01(f).

(h) Plant Storage and Handling. 920.07.05.

711.03.02 Submittals and Inspection. Submit the following items as indicated:

(a) Breakdown List of Contract Prices. Refer to 710.03.02(a).

(b) Installation Phase Schedule. Refer to 710.03.02(b) and submit the Schedule with dates for completing 711.03.02 thru .12.

(c) Plant Material Inspection and Approval. The Inspection will be conducted by the Landscape Operations Division as specified in 920.07.01.

(d) Establishment Phase Schedule & IPM Program. Refer to 710.03.02(d) and submit the Schedule with dates for completing 711.03.17.

711.03.03 Utilities Marking, Layout, and Inspection. Refer to 710.03.03.

711.03.04 Preparing Planting Beds and Planting Areas.

(a) Planting Beds. Refer to 710.03.05 for preparing beds and planting holes for container grown annuals and bulbs. Dig holes for bulbs to the depth and width recommended for the species or variety by the grower.

(b) Planting Areas for Naturalized Daffodils. Dig planting holes to 3.0 diameter and to a 5 in. depth. Mix 0.20 oz of 14-14-14 fertilizer into the backfill soil of each bulb, or as specified in the NMP. Firmly cover each bulb with backfill soil to the level of the surrounding grade. Omit 711.05.05 thru .10 when installing naturalized daffodils.

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711.03.05 Soil Berming. Refer to 710.03.10.

711.03.06 Edging. Refer to 710.03.11.

711.03.07 Mulching. Refer to 710.03.13.

711.03.08 Plant Acclimation. Refer to 710.03.06.

711.03.09 Plant Care. Refer to 710.03.07.

711.03.10 Installing. Handle annuals and bulbs with care to avoid damage or bruising. Refer to 710.03.09 and the following:

(a) **Foliage Removal.** Remove dead foliage of annuals and other unwanted vegetation from the previous season without damaging or disturbing perennials or other desirable vegetation.

(b) **Mulch.** Remove and conserve SHB mulch at sites where annuals or bulbs will be installed before digging the planting hole. Replace mulch to a depth of 2 in. over bulbs and around the stems of annuals.

711.03.11 Watering After Installation.

(a) **Application Equipment.** Refer to 710.03.14(a).

(b) **Follow-Up Watering.** Refer to 710.03.14(d).

711.03.12 Cleanup. Refer to 710.03.15.

711.03.13 Unacceptable Plants and Replacement Plants. Refer to 710.03.18, 920.07 and replace unacceptable plants as specified in Section 711 for the remainder of the growing season until Final Acceptance.

711.03.14 Installation Phase Inspection. Refer to 710.03.19.

711.03.15 Installation Phase Punch List. Refer to 710.03.20.

711.03.16 Installation Phase Acceptance. Refer to 710.03.21 and provide the Establishment Phase Schedule as specified in 711.03.02(e).

Installation Phase Acceptance will be granted when the Punch List and all Installation Phase requirements are completed according to Table 2.

ANNUAL AND BULB

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TABLE 2 - REQUIREMENTS FOR INSTALLATION PHASE ACCEPTANCE		
Item	Requirement	Section
a	Submittals are accepted and Inspections are completed.	710.03.01(b), 711.03.02, 920.07
b	Dead foliage in existing beds is removed.	711.03.10(a)
c	Fertilizer and compost is applied, as required.	711.03.04
d	Planting pits and planting beds are bermed and edged.	710.03.10 and 710.03.11
e	SHB mulch is uniformly spread to the specified depth.	710.03.13 and 711.03.10(c)
f	Plants receive initial watering and follow up watering.	711.03.04 and 711.03.11
g	Damaging pests are controlled.	711.03.02(c)
h	Cleanup is completed, plant tags and ribbons are removed.	710.03.15
i	Washouts in and around planting beds are repaired.	710.03.13
j	Unacceptable plants are replaced as needed or required.	710.03.18
k	Damage repairs and Installation Phase Punch List is completed.	710.03.20
l	Pesticide Application and Nutrient Management Reporting Forms are completed.	710.03.01(d) and (f)
m	Plants are properly installed and successfully transplanted.	711.03.01 thru .13
n	Establishment Phase Schedule & IPM Program is accepted.	710.03.02(e) and 711.03.16

711.03.17 Establishment Phase. The Establishment Phase for annuals and bulbs planted in beds begins upon Installation Phase Acceptance. Maintain all plants except naturalized daffodils as specified in 711.03.01 thru 0.16 and as follows:

- (a) **Period of Maintenance.** Plants shall be maintained for one Planting Season, until Final Acceptance.
- (b) **Plant Watering.** Refer to 710.03.22(b).
- (c) **Pest Management.** Refer to 710.03.22(c).
- (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 at the request of the Engineer.
- (e) **End-of-Season Foliage Removal.** Remove the foliage of annuals that have declined in late summer or fall, as directed by the Engineer. Remove the foliage and flower stems of bulbs planted in beds after they have declined at the end of their growing season in June.
- (f) **Refertilizing.** 710.03.22(f).
- (g) **Partial Establishment Phase Inspection.** The Project Engineer will inspect plant establishment 2 to 4 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.

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711.03.18 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 3 are satisfactorily completed. The Inspection Report will be included in the Punch List requirements for the project. Complete the Punch List requirements as directed.

ANNUAL AND BULB		
TABLE 3 - REQUIREMENTS FOR ESTABLISHMENT PHASE AND FINAL ACCEPTANCE		
Item	Requirement	Section
1	Washouts in and around planting beds are repaired.	710.03.13
2	Plants are watered as needed and refertilized when directed.	710.03.22(b) and (f)
3	Damaging pests are controlled.	710.03.22(c)
4	Planting beds are weed free.	710.03.22(c)
5	Pesticide Reporting and Nutrient Management Reporting Forms are completed.	710.03.01(d) and (f)
6	Unacceptable plants are replaced as requested.	711.03.17(d)
7	End-of-season foliage removal is completed.	711.03.17(e)
8	Damage repairs and Establishment Punch List are completed.	711.03.17(f)

711.04 MEASUREMENT AND PAYMENT. Annual and Bulb Installation and Establishment 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, and incidentals necessary to complete the work.

711.04.01 Annual and Bulb Installation and Establishment. Annual and Bulb Installation and Establishment shall include the cost of plants, layout, marking, pruning, planting pit excavation, fertilizer, compost, backfilling, berming, edging, watering, pest management, plant maintenance, refertilizing, and all operations related to the Installation and Establishment Phases of each plant, until Final Acceptance.

Annual and Bulb Installation and Establishment will be paid according to Table 4 based upon the approved Breakdown List of Contract Prices. Refer to 711.03.02(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 4 when construction requirements are met.

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TABLE 4 - PAYMENT SCHEDULE					
INSTALLATION AND ESTABLISHMENT PHASE COMPLETION		PERCENT OF TOTAL CONTRACT PRICE			PAYMENT FOR COMPLETED WORK
		Annuals in Beds	Bulbs in Beds	Naturalized Bulbs	
711.03.0 thru .16	Installation Phase	70	70	100	At Installation Phase Acceptance
711.03.17(a) thru (d)	Establishment Phase In-Season Maintenance	15	15	–	At Partial Establishment Phase Acceptance
711.03.17(e) thru (g)	End-of-Season Maintenance, Removal & Replacement, and Final Acceptance	15	15	–	At Final Acceptance
Total Payment		100	100	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.

711.04.02 Constructing Planting Beds. Refer to 710.04.02.

711.04.03 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 operations within a Tree Preservation area per Section 120 when specified, but do not perform 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 selectively pruned or the dimensions or goals to be achieved by pruning. Meet ANSI A300 standards for Tree Care Operations. Tree branch pruning shall conform to one or more of the following Operations, as specified:

(a) **Cleaning.** To remove dead, diseased, and broken branches.

(b) **Thinning.** To reduce the density of live branches.

(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. Promptly disperse or remove and dispose of wood debris and other waste materials as directed. Restore ruts and damaged turfgrass areas by seeding as specified in Section 705 before beginning any new 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.

SPECIAL PROVISIONS
712 — TREE BRANCH PRUNING

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The payment will be full compensation for all labor, material, equipment, tools, 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 713 — BRUSH REMOVAL**

612 **DELETE**: Section 713 — Brush Removal, in its entirety

INSERT: The following.

SECTION 713 — BRUSH REMOVAL

713.01 DESCRIPTION. Remove brush as indicated in the SP 700 Tree Preservation Program, or in the plans. Perform operations within a Tree Preservation area per Section 120 when specified, but do not perform operations within areas of Clearing and Grubbing. When areas of bare soil are caused by Brush Removal operations, perform Temporary Mulch in conformance with Section 704 to provide temporary soil stabilization, or perform Turfgrass Establishment in conformance with Section 705, or perform other stabilization as directed.

713.02 MATERIALS.

Herbicide	920.09.03(a)
Water	920.09.01
Marking Dye	920.09.04

713.03 CONSTRUCTION.

713.03.01 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) **Pesticide Application.** 701.03.01(b).
- (e) **Pesticide Application Reporting.** 701.03.01(c).

713.03.02 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.

713.03.03 Meetings. Meet with the Engineer, the LTE, and the Landscape Operations Division to review areas and Operations before beginning Operations.

713.03.04 Marking. Mark areas where brush is to be removed. Identify trees and shrubs to be preserved and protected. Ensure that marking and identification is completed and approved before beginning Operations.

713.03.05 Equipment. Equipment and tools shall conform to accepted arboricultural practices.

713.03.06 Notice. Notify the Engineer at least 10 days before beginning Operations.

713.03.07 Operations. Brush removal shall involve cutting, herbicide treatment, and debris removal of areas of living or dead vegetation. Do not injure vegetation identified for preservation. One or more of the following Operations will be specified:

(a) **Operation 1 - Brush Removal.** Cut vegetation to a height of no more than 1 in. above the soil surface. Remove wood debris.

(b) **Operation 2 - Brush Removal with Stump Treatment.** Cut vegetation as in Operation 1. Immediately treat the cambium layer and exposed bark of live stumps with an approved herbicide solution and marking dye. Remove wood debris.

713.03.08 Wood Chipping. Dispose of wood in conformance with the pertinent Operation, or chip wood and disperse chips to a depth of 1 in. as directed.

713.03.09 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 ruts and damaged turfgrass areas by seeding as specified in Section 705 before beginning any new landscape operations.

713.03.10 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.

713.03.11 Damage Compensation. Monetary compensation for damages or loss of trees will be calculated and assessed in conformance with the Guide for Plant Appraisal of the Council of Tree & Landscape Appraisers.

713.04 MEASUREMENT AND PAYMENT. Brush Removal will be measured and paid for at the Contract unit price per square yard, as specified. The payment will be full compensation for all labor, material, equipment, tools, and incidentals necessary to complete the work.

713.04.01 Payment for Temporary Mulch, Turfgrass Establishment, or other vegetation establishment within areas of Brush Removal will be measured and paid for at the pertinent Contract Unit price.

CATEGORY 700
LANDSCAPING
SECTION 714 — TREE FELLING AND STUMP REMOVAL

614 **DELETE**: Section 714 — Tree Felling, in its entirety

INSERT: The following.

714.01 DESCRIPTION. Fell trees and remove stumps as indicated in the SP 700 Tree Preservation Program, or in the plans. Perform operations within a Tree Preservation area per Section 120 when specified, but do not perform operations within areas of Clearing and Grubbing.

714.02 MATERIALS.

Furnished Topsoil	920.01.02
Herbicide	920.09.03(a)
Water	920.09.01
Marking Dye	920.09.04

714.03 CONSTRUCTION.

714.03.01 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) **Pesticide Application.** Refer to 701.03.01(b).
- (e) **Pesticide Application Reporting.** Refer to 701.03.01(c).

714.03.02 Breakdown List of Contract Prices. Refer to 714.04 and develop a Breakdown List of Contract Prices for each tree or stump in the Contract. Include costs for felling, removing stumps, and completing all required operations per tree or stump.

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.

714.03.03 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.

714.03.04 Meetings. Meet with the Engineer, the LTE, and the LOD to review areas, Operations, and the Breakdown List of Contract Prices before beginning Operations.

714.03.05 Utilities and Tree Marking. 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) **Tree Marking.** Mark trees to be felled. Obtain approval before beginning Operations.

714.03.06 Equipment. Equipment and tools shall conform to accepted arboricultural practices.

714.03.07 Notice. Notify the Engineer at least 10 days before beginning Operations.

714.03.08 Operations. Tree felling and stump removal involves cutting, herbicide treatment, stump removal, stump grinding, debris removal, and restoration of turfgrass in conformance with the pertinent Operation. When trees cannot be felled as a unit without danger to traffic or injury to other plants or property, remove the top sections until the tree can be safely felled. One or more of the following Operations will be specified:

(a) **Operation 1 - Felling and Stump Removal.** Perform Operation 1 in turfgrass areas, or as specified. Fell trees and remove the stumps or grind them to a depth at least 8 in. below the soil surface. Remove wood debris and stump grindings. Within 24 hours after removal or grinding, backfill the stump holes with topsoil to the surrounding soil level. Perform Turfgrass Sod Establishment in conformance with Section 708, or perform Turfgrass Establishment in conformance with Section 705 when directed.

(b) **Operation 2 - Felling and Stump Treatment.** Perform Operation 2 for Tree of Heaven and other species that sprout from stumps, as directed. Fell trees and remove wood debris. Cut stumps to a height of no more than 4 in. above the soil surface. Treat with herbicide as specified in 713.03.07(b).

(c) **Operation 3 - Felling and Removal.** Perform Operation 3 in non-turfgrass areas. Fell trees and remove wood debris. Cut stumps to a height of no more than 4 in. above the soil surface.

(d) **Operation 4 - Felling and Delimiting.** Perform Operation 4 in naturalized areas that will not be maintained. Fell trees and cut stumps to a height of no more than 12 in. above the soil surface. Branches of felled trees that extend higher than 3 ft above the soil surface shall be

cut or delimbed to a height of no more than 3 ft above the soil surface. Do not remove wood debris.

(e) Operation 5 - Stump Removal. Perform Operation 5 to remove stumps of trees in turfgrass areas that were not removed per Operation 1. Remove existing stumps or grind them to a depth at least 8 in. below the soil surface. Remove wood debris and stump grindings. Within 24 hours after removal or grinding, backfill the stump holes with topsoil to the surrounding soil level. Perform Turfgrass Sod Establishment in conformance with Section 708, or perform Turfgrass Establishment in conformance with Section 705 when directed.

714.03.09 Wood Chipping. Dispose of wood in conformance with the pertinent Operation, or chip wood and disperse chips to a depth of 1 in. as directed.

714.03.10 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 ruts and damaged turfgrass areas by seeding as specified in Section 705 before beginning any new landscape operations.

714.03.11 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.

714.03.12 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.

714.04 MEASUREMENT AND PAYMENT. Tree Felling and Stump Removal 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, and incidentals necessary to complete the work. Topsoil and materials required to perform Turfgrass Sod Establishment and Turfgrass Establishment shall be incidental to the Contract price for Tree Felling and Stump Removal.

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
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 operations 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 ruts and damaged turfgrass areas by seeding as specified in Section 705 in areas where root pruning has been completed, before beginning any new 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, 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.

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 pounds of 20-20-20 water soluble fertilizer in 1,000 gallons of water, and inject fertilizer solution at the rate of 1,000 gallons of solution per acre or 0.21 gallons of solution per SY, or at the application rate specified in the TPP. 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 as specified.

(b) **Operation 2 - Drill Fertilizing.** Apply 200 pounds per acre of 20-16-12 (83% UF with MAP & SOP) , or at the application rate specified in the TPP. Place fertilizer into 1 to 3 in. diameter drilled holes, at points 2 to 3 ft apart, to a depth of 8 to 10 in., or as specified.

(c) **Operation 3 - Broadcast Fertilizing.** Apply 200 pounds per acre of 20-16-12 (83% UF with MAP & SOP) fertilizer, or at the application rate specified in the TPP using approved fertilizer spreader machinery. Uniformly apply the fertilizer over the soil surface under the dripline of the tree, or as specified.

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 as specified in Section 705 before beginning any new 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.

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

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716 – TREE FERTILIZING

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compensation for all labor, fertilizer, water, material, equipment, tools, 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**

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.



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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 813 — SIGNS

813.02 MATERIALS.

640 **ADD:** The following.

Furnish and install 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. Supply VID stickers with all non-Administration supplied signs.

813.03 CONSTRUCTION.

ADD: The following after the third paragraph.

Use the following minimum thickness for fabricated sheet aluminum signs.

Longest Dimension of Sheet Sign in.	Minimum Thickness in.
≤ 12	0.040
12+ to 24	0.063
24+ to 36	0.080
36+ to 48	0.100
> 48	0.125

Install sheeting in accordance with manufacturer's recommendations. Repair/replace defects in workmanship per manufacturer's recommendation.

813.04 MEASUREMENT AND PAYMENT.

641 **ADD:** The following after 813.04.03.

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 the signs.



**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

655 **DELETE:** 901.01 - Tables 901 A, 901 B, 901 C, and 901 D in their entirety.

INSERT: The following.

SPECIAL PROVISIONS INSERT

901 — AGGREGATES

CONTRACT NO. WO6365170

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**TABLE 901 A
AGGREGATE GRADING REQUIREMENTS
TEST METHOD T 27**

MATERIAL	SIEVE SIZE															
	2-1/2" 63 mm	2" 50 mm	1-1/2" 37.5 mm	1" 25 mm	3/4" 19 mm	1/2" 12.5 mm	3/8" 9.5 mm	No. 4 4.75 mm	No. 8 2.36 mm	No. 10 2.0 mm	No. 16 1.18 mm	No. 30 600 µm	No. 40 425 µm	No. 50 300 µm	No. 100 150 µm	No. 200 75 µm
CRUSHER RUN AGGREGATE CR-6 (f)(g)	—	100	90-100	—	60-90	—	—	30-60	—	—	—	—	—	—	—	0-15
BANK RUN GRAVEL — SUBBASE	100	—	—	90-100	—	60-100	—	—	—	35-90	—	—	20-55	—	—	5-25
GRADED AGGREGATE — BASE DESIGN RANGE (a)	—	100	95-100	—	70-92	—	50-70	35-55	—	—	—	12-25	—	—	—	0-8
TOLERANCE (b)	—	-2	±5	—	±8	—	±8	±8	—	—	—	±5	—	—	—	±3(c)
BANK RUN GRAVEL — BASE	100	—	—	85-100	—	60-100	—	—	—	35-75	—	—	20-50	—	—	3-20
COARSE AGGREGATE UNDERDRAIN - PORTLAND CEMENT CONCRETE	—	—	100	95-100	—	25-60	—	0-10	0-5	—	—	—	—	—	—	—
7	—	—	—	100	90-100	—	20-55	0-10	0-5	—	—	—	—	—	—	—
FINE AGGREGATE — PORTLAND CEMENT CONCRETE, UNDERDRAIN, and PNEUMATIC MORTAR (d)	—	—	—	—	100	90-100	40-70	0-15	0-5	—	—	—	—	—	—	—
COARSE AGGREGATE — LIGHTWEIGHT PORTLAND CEMENT CONCRETE	—	—	—	100	90-100	—	100	95-100	—	—	45-85	—	—	5-30	0-10	—
FINE AGGREGATE — LIGHTWEIGHT PORTLAND CEMENT CONCRETE (d)	—	—	—	—	—	—	—	0-15	—	—	—	—	—	—	—	—
FINE AGGREGATE/SAND MORTAR and EPOXIES (d)	—	—	—	—	—	—	100	85-100	—	—	40-80	—	—	10-35	5-25	—
MINERAL FILLER	—	—	—	—	—	—	—	100	95-100	—	—	100	—	95-100	0-25	0-10
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	70-100



Maryland Department of Transportation
State Highway Administration

SPECIAL PROVISIONS INSERT

901 — AGGREGATES

- (a) To establish target values for design.
- (b) Production tolerance.
- (c) ± 2 for field grading (omitting T 11).
- (d) Fine aggregate includes natural or manufactured sand.
- (e) Crushed glass shall not contain more than one percent contaminants by weight.
- (f) Not to be used in the structural part of any Administration project.
- (g) Recycled asphalt pavement may be used as a component not to exceed 15 percent and is not subject to aggregate physical property requirements in TABLE 901 B.
- (h) Recycled concrete is prohibited in drainage applications.

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TABLE 901 B

AGGREGATE PHYSICAL PROPERTY REQUIREMENTS

MATERIAL	TEST METHOD				
	S P E C I F I C A T I O N	T 90	T 11	T 96	T 104
		PI	MATERIAL FINER THAN No. 200 SIEVE	LOS ANGELES ABRASION	SODIUM SULFATE SOUNDNESS
	max	% max	% max	% max	
CRUSHER RUN AGGREGATE CR-6	D 1241(a)	6	—	50	—
BANK RUN GRAVEL — SUBBASE	D 1241	6	—	50	—
GRADED AGGREGATE — BASE	D 1241	6	—	50	—
BANK RUN GRAVEL — BASE	D 1241	6	—	50	—
COARSE AGGREGATE — PCC (b)	M 80 CLASS A	—	1.0(c)	50	12
FINE AGGREGATE — PCC (b)(d)	M 6 CLASS B	—	4.0(e)	—	10
COARSE AGGREGATE — LIGHTWEIGHT PCC	M 195	—	—	—	—
FINE AGGREGATE — LIGHTWEIGHT PCC (f)	M 195	—	—	—	—
FINE AGGREGATE/SAND MORTAR and EPOXIES	M 45	—	—	—	10
MINERAL FILLER (g)	M 17	4	—	—	—
GLASS CULLET (h)	M 318	—	—	—	—

- (a) Other approved inert materials of similar characteristics may be used provided they meet these provisions. For crushed reclaimed concrete, the soundness loss shall not exceed 18 percent after magnesium sulfate testing as specified in T 104.
- (b) Test coarse and fine aggregate for PCC for alkali silica reactivity (ASR) per MSMT 212.
- (c) 1.5 if material passing No. 200 sieve is dust of fracture, free of clay or shale.
- (d) In areas exposed to traffic, manufactured sand shall have a minimum ultimate Dynamic Friction Value (DFV) of 45, based on the parent rock.
- (e) 5.0 for concrete not subject to surface abrasion.
- (f) Fine aggregate meeting M 6 may be used if the lightweight concrete does not exceed the maximum unit weight specified in the Contract Documents.
- (g) Fly ash shall not exceed 12 percent loss on ignition.
- (h) For use as a granular road base material. Not intended for use in locations where surfacing will not be placed over the base.

SPECIAL PROVISIONS INSERT

901 — AGGREGATES

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TABLE 901 C
ASPHALT MIXES
AGGREGATE GRADING REQUIREMENTS, % PASSING FOR MIX DESIGN
TEST METHOD T 27

MATERIAL	SIEVE SIZE										
	3/4in. 19.0 mm	1/2in. 12.5 mm	3/8in. 9.5 mm	No. 4 4.75 mm	No. 8 2.36 mm	No. 16 1.18 mm	No. 30 600 µm	No. 50 300 µm	No. 100 150 µm	No. 200 75 µm	
GAP GRADED STONE MATRIX ASPHALT MIX - 9.5mm	100	100	75-90	30-50	20-30	—	—	—	—	8-13	
GAP GRADED STONE MATRIX ASPHALT MIX - 12.5mm	100	90-99	70-85	28-40	18-30	—	—	—	—	8-11	
GAP GRADED STONE MATRIX ASPHALT MIX - 19.0mm	100	82-88	60 max	22-30	14-20	—	—	—	—	9-11	
OPEN GRADED FRICTION COURSE — 9.5mm (a)	—	100	85-100	20-40	5-10	—	—	—	—	2-4	
OPEN GRADED FRICTION COURSE — 12.5 mm (a)	100	85-100	55-75	15-25	5-10	—	—	—	—	2-4	
OPEN GRADED FRICTION COURSE — 12.5mm (b)	100	80-100	35-60	10-25	5-10	—	—	—	—	1-4	
SLURRY SEAL (SS) AND MICRO -SURFACING (MS)	—	—	100	90-100	65-90	45-70	30-50	18-30	10-21	5-15	
	—	—	100	70-95	45-70	28-50	19-34	12-25	7-18	5-15	
CHIP SEAL SURFACE TREATMENT	100	90-100	40-70	0-15	0-5	—	—	—	—	—	
	—	100	85-100	10-30	0-10	0-5	—	—	—	—	

(a) Less than Design Level 4 (ESAL)

(b) Porous European Mix (PEM) – Design Level 4 (ESAL)



SPECIAL PROVISIONS INSERT

901 — AGGREGATES

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TABLE 901 D

AGGREGATE PHYSICAL PROPERTY REQUIREMENTS FOR ASPHALT MIXES

MATERIAL	SPECIFICATION	TEST METHOD					
		T 11	T 96	T 104	D 4791	MSMT 216	T 279
		MATERIAL FINER THAN No. 200 SIEVE % max	LOS ANGELES ABRASION (LA) % max	SODIUM SULFATE SOUNDNESS % max	FLAT and ELONGATED (a) (h)	DFV (c)	BPN (c)
4.75mm, 9.5mm, 12.5mm, and 19.0mm	M323	—	45	12	10	min	—
4.75mm, 9.5mm, 12.5mm, and 19.0mm - HDFV	M323	—	45	12	10	45 (e)	—
25.0mm and 37.5mm	M323	—	45	12	10	—	—
GAP GRADED STONE MATRIX ASPHALT — 9.5mm, 12.5mm, and 19.0mm	M323	—	30	12	20/5 (g)(i)	45 (e)	—
OPEN GRADED FRICTION COURSE 9.5 mm, 12.5 mm, 12.5 mm PEM (j)	MSMT 409	0.5	30	12	20/5 (g)(i)	45 (e)	—
SLURRY SEAL (SS) and MICRO-SURFACING (MS)	—	—	—	12	—	25 (f)	16
CHIP SEAL SURFACE TREATMENT	M 80, CLASS A	1.0 (d)	45	—	—	—	—

(a) Dimensional ratio of calipers shall be 5:1.
 (b) Dynamic Friction Value (DFV) shall be 30.0 when any aggregate being blended has a DFV less than 25.0. DFV shall be 25.0 or greater when the aggregate from each source has a DFV of 25.0 or greater. Determine proportions of blended aggregate under MSMT 416. Not applicable for Gap Graded Stone Matrix surface mixes or any other surface mix requiring high polish aggregate.
 (c) DFV and British Pendulum Number (BPN) determined on parent rock. Reclaimed asphalt pavement (RAP) shall have a DFV of 30.0.
 (d) 1.0 for samples taken at the point of production. Samples taken at any point after shipment shall have no more than 1.5 percent finer than 0.075 mm sieve.
 (e) DFV shall be 50 when any aggregate being blended has a DFV less than 45. DFV shall be 45 when the aggregate from each source has a DFV of 45 or greater. Carbonate rock shall have a minimum of 25 percent insoluble residue retained on the 0.075 mm sieve
 (f) No blending allowed.
 (g) Dimensional ratio of calipers shall be 3:1/5:1.
 (h) Testing for flat and elongated particles shall be conducted on the blend.
 (i) Test conducted on particles retained on the 4.75 mm sieve.
 (j) Porous European Mix



**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.



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.



SPECIAL PROVISIONS INSERT
902-PORTLAND CEMENT CONCRETE

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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.



SPECIAL PROVISIONS INSERT
902-PORTLAND CEMENT CONCRETE

CONTRACT NO. WO6365170
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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

683 **DELETE**: SECTION 904— PERFORMANCE GRADED ASPHALT BINDERS AND
HOT MIX ASPHALT

INSERT: The following.

SECTION 904 – PERFORMANCE GRADED
ASPHALT BINDERS AND ASPHALT MIXES

904.01 CERTIFICATION. The manufacturer and hauler shall furnish certifications as
specified in TC-1.03 and the following:

The manufacturer shall certify:

- (a) Date and time of loading.
- (b) Tank or blending system.
- (c) Identification of hauling unit.
- (d) Binder grade, temperature, and quantity of materials.
- (e) Complete certified analysis.
- (f) Lot number, if applicable.

The hauler shall certify:

- (a) Identification of hauling unit.
- (b) Binder grade and source of last delivery.
- (c) The date of the last delivery using this hauling tank and volume of material remaining in
the tank at the time of current loading.

904.02 PERFORMANCE GRADED ASPHALT BINDERS. M332 Table 1, for mixes
containing all virgin materials, recycled asphalt pavement materials, or roofing shingles from
manufacturing waste. The Office of Materials Technology's (OMT) Asphalt Technology
Division (ATD) will approve all PG binders. Submit certification from an approved supplier per
M332 showing the final product meets specifications.

Chemical or organic additive suppliers shall supply the dosage rate and provide certification of
the resultant PG binder.

The PG binder for asphalt mixes shall be achieved by the use of Neat Asphalt with elastomer
polymer modifications when needed. Modifications to PG binder shall be as approved.

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904 — PERFORMANCE GRADED ASPHALT BINDERS
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902.02.01 Warm Mix Asphalt (WMA) PG Binders. Include the PG binder performance grade test data over the range of WMA additive percentages proposed for WMA use. An AASHTO accredited laboratory shall be employed to perform all required WMA binder laboratory testing

904.03 EMULSIFIED ASPHALTS. M140 or M208, and M316 with the following exceptions:

- (a) Cement mixing tests are waived.
- (b) Maximum of 3.0 percent by volume of oil distillate.
- (c) The sieve test requirement for field samples shall be a maximum of 0.4 percent.

904.04 ASPHALT MIXES. 915. Asphalt mixes shall be produced as specified.

904.04.01 Aggregates. M323 and 901. Test the aggregate retained on the 4.75 mm sieve for flat and elongated particles per D4791. Recycled asphalt pavement used in an asphalt mix shall be considered an aggregate source per 900.03.

904.04.02 Mix Design. Develop asphalt mix designs in conformance with R35, M323 and MSMT 416, except replace “Table 6, Superpave HMA Design Requirements” in M323 with the following:

DESIGN LEVEL	20-Year Design Traffic, ESALs	N_{design}
1	<300,000	50
2	300,00 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 for the Equivalent Single Axle Loading (ESAL) range specified.

Asphalt mixes designed with Reclaimed Asphalt Pavement (RAP) and/or Reclaimed Asphalt Shingles (RAS) shall also conform to MSMT 412.

904.04.03 Mix Design Approval. Submit data from the laboratory study to OMT for tentative approval at least 30 days prior to paving operations. Submit mix designs in an approved format. Include the following:

- (a) Mix designation.

- (b) Source, percentage, and grade of performance graded asphalt binder.
- (c) Source, gradation, and proportion of each component aggregate.
- (d) Target aggregate gradation.
- (e) Plant where the asphalt mix will be produced.
- (f) Plant target mixing temperature based on viscosity of 0.22 Pa·s.
- (g) Ratio of dust to binder material on effective asphalt.
- (h) Maximum specific gravity at the target binder content.
- (i) Mix design grading plotted on 0.45 power gradation chart.
- (j) Tensile strength ratio and worksheets.
- (k) The bulk specific gravity and gyratory weight at N_{design} gyrations.
- (l) The air void content (percent V_a) at N Design gyrations.
- (m) The voids in the mineral aggregate (percent VMA) and the voids filled with asphalt (percent VFA) at N Design gyrations (T 312).
- (n) All consensus and source properties.
 - (1) Coarse aggregate angularity.
 - (2) Flat and elongated.
 - (3) Sand equivalent.
 - (4) Uncompacted void content of fine aggregate.
 - (5) Bulk and apparent specific gravity of coarse and fine aggregate.
 - (6) Absorption of coarse and fine aggregate.

Include the quantity of job mix formula aggregate and appropriate amount of required PG binder for ignition oven calibration with each mix design submitted for approval.

When previous construction or performance experience has shown the proposed mix design to be unsatisfactory, OMT may require submission of a more suitable design.

- (a) When a change to the source of aggregate used in the mix is proposed, submit a revised mix design as specified.
- (b) Notify OMT two working days in advance if a change in the PG binder source becomes necessary.
- (c) Conduct a stripping test per MSMT 410 and submit an initial PG binder sample for testing and approval. OMT may require an anti-stripping additive test per D4867 before approval.

904.04.04 WMA Mix Design Approval. 904.04.03 and the following:

- (a) Warm Mix technology and/or additive information.
- (b) WMA manufacturer's established target rate for water and additives and the acceptable variation for production.
- (c) Producer's compaction temperature of gyratory specimens.
- (d) The producer shall follow the manufacturer's recommendation for incorporating additives and WMA technologies into the mix per the manufacturer's recommendations.

When a foaming, chemical or organic additive is used, submit the appropriate job mix formula (JMF) per R35 for approval.

- (a) All WMA technology methods shall require a mix design/field placement demonstration on a non-Administration project once the JMF is approved, and before verification or as approved. Notify OMT two working days prior to shipment.
- (b) A technical representative from the product supplier must be present during the initial shipment and placement of the WMA when a chemical or organic additive is used.
- (c) If all specification requirements are met, this is a one-time demonstration per product, per plant, or with a combination of products.
- (d) The demonstration may be waived if the asphalt producer has successfully placed WMA on other projects with the same aggregates and can provide testing data and contact information.

904.04.04. Verification of Mix Design. Conduct a verification of the mix at the beginning of production in each plant after receiving tentative approval for the design,

- (a) Notify the Engineer and OMT at least two working days in advance of the scheduled verification. Verification shall be performed by certified personnel per 504.03.
- (b) Prepare the verification samples per R35. All verification samples will be split with the OMT laboratory.
- (c) Compare and evaluate the verification test results per MSMT 735.

904.04.05 Verification Evaluation. MSMT 735

- (a) Initial verification consists of four split samples tested as specified. Begin random sampling with the first day's production, with at least one split sample witnessed by an OMT representative.
- (b) If the first day of production is less than 2000 tons, verification testing may be spread over no more than five (5) working days with production of 200 tons or more. Complete verification testing no later than the fifth working day with production in excess of 200 tons or on the day when production has reached 2000 tons, whichever occurs first.
- (c) Production may proceed without any changes when the Contractor's and Administration's test results conform to a Percent Within Specification Limit (PWSL) of at least 85. If the mixes submitted have identical aggregate combinations and differing asphalt contents associated with changes in ESAL loads, verification may be limited to volumetric analysis, as determined.
- (d) If all test results do not conform to the parameters with a PWSL of at least 85, then an adjustment to the asphalt content or gradation may be made to bring the mix design requirements within acceptable levels. Permissible adjustment limitations between the approved Mix Design and Adjusted Mix Design are as follows:

TEST PROPERTY	PERMISSIBLE ADJUSTMENT % (*)
Larger than 1/2 in. (12.5 mm) sieve	± 5
1/2 in. (12.5 mm) thru No. 4 (4.75 mm) sieves	± 4
No. 8 (2.36 mm) thru No. 100 (1.50 μm) sieves	± 3
No. 200 (75 μm) sieve	± 1.0
Binder Content	± 0.20

*The permissible adjustment for all mixes shall be within control points

- (e) Perform a second verification to ensure that the modified mix conforms to all design requirements when an adjustment outside the permissible adjustment percentage is

made to the mix design. Conform to the time and tonnage limitations as specified. Production may proceed when the adjusted mix is within control points and meets the PWSL. Suspend mix production and submit a new mix design for approval if the mix does not meet specifications. Design the new mix as specified.

- (f) Suspend mix production if subsequent designs submitted due to nonconformance do not meet specifications during the initial verification until corrective action is taken, as approved.

If an adjustment to a verified mix is necessary due to aggregate changes, the mix design must meet all specification requirements before a new mix design number is issued. Verification will be based on the last 4 QA and QC production samples.

904.04.06. Thin Lifts. 504.03.12. Lift thicknesses shall be designated as thin lifts when the lift thickness specified does not meet 3-times nominal maximum aggregate size for fine graded mix designs or 4-times nominal maximum aggregate size for coarse graded mix designs.

Determine fine and coarse graded thin lift mix designs per M 323 and in accordance with the table below.

Thin Lift Mix Design Identification Table

Mix Designation	Gradation Classification	
	Control Sieve Mix Design Target (%Passing)	
	Fine Graded	Coarse Graded
4.75mm	A thin lift is a specified pavement thickness < 1 inch.	A thin lift is a specified pavement thickness < 1 inch.
9.5mm	When the 2.36mm (#8) is ≥ 47%, a thin lift is a specified pavement thickness < 1 1/8 inches	When the 2.36mm (#8) is < 47%, a thin lift is a specified pavement thickness < 1 1/2 inches
12.5mm	When the 2.36mm (#8) is ≥ 39%, a thin lift is a specified pavement thickness < 1 1/2 inches	When the 2.36mm (#8) is < 39%, a thin lift is a specified pavement thickness < 2 inches
19.0mm	When the 4.75mm (#4) is ≥ 47%, a thin lift is a specified pavement thickness < 2 1/4 inches	When the 4.75mm (#4) is < 47%, a thin lift is a specified pavement thickness < 3 inches
25.0mm	When the 4.75mm (#4) ≥ 40%, a thin lift is a specified pavement thickness < 3 inches	When the 4.75mm (#4) < 40%, a thin lift is a specified pavement thickness < 4 inches
37.5mm	When the 9.50mm (3/8) ≥ 47%, a thin lift is a specified pavement thickness < 4 1/2 inches	When the 9.50mm (3/8) < 47%, a thin lift is a specified pavement thickness < 6 inches

904.04.07 Anti-stripping Additives. D 4867. Asphalt mixes shall have a Tensile Strength Ratio (TSR) of at least 0.85.

- (a) The freeze-thaw conditioning cycle is required. OMT testing of TSR's will be performed randomly.
- (b) Asphalt mixes not meeting the minimum TSR require the use of an approved anti-stripping additive.
- (c) The producer shall determine the exact quantity of anti-stripping additive required per D 4867 based on a minimum TSR of 0.85.
- (d) The dosage rate when a heat stable anti-stripping additive is used shall be at least 0.20 percent of the total weight of asphalt. The additive shall be introduced by the PG binder supplier or at the plant by line blending, metering, or otherwise measuring to ensure accurate proportioning and thorough mixing.
- (e) Hydrated lime (when used) shall conform to C 1097. Add hydrated lime in slurry form at the rate of 1.0 to 1.5 percent by weight of total aggregate. The lime slurry shall be sprayed uniformly on the aggregate on the feed belt prior to entry into the asphalt plant dryer.
- (f) Plant control and acceptance of the mix will be based on MSMT 410 per its stripping potential.

904.04.08 Plant Control. The following tolerances shall apply:

TABLE 904 A – DENSE-GRADED MIX TOLERANCES

PHYSICAL PROPERTIES	PLANT	PROJECT SITE
	Site or Hauling Unit Samples	Behind the Paver Samples
Passing No. 4 (4.75 mm) sieve and larger, %	± 7	± 7
Passing No. 8 (2.36 mm) thru No. 100 (150 µm) sieve, %	± 4	± 5
Passing No. 200 (75 µm) sieve, %	± 2	± 2
Asphalt content, %	± 0.4	± 0.5
Ratio of dust to binder material	0.6 to 1.6 (a)	0.6 to 1.6 (a)
Mix temperature leaving plant vs. mix design temperature, F	± 25	NA
Deviation of maximum specific gravity per lot versus design maximum specific gravity	± 0.030	± 0.040
Voids, total mix, (VTM), %	4.0 ± 1.2	4.0 ± 1.2
Voids, total mix, 4.75 mm mix (VTM), %	3 ± 2	3 ± 2
Voids in mineral aggregate, (VMA), %	± 1.2 from design target	± 1.2 from design target

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Voids filled asphalt (VFA), %	Within spec	Within spec
Bulk specific gravity, Gmb, %	± 0.022	± 0.022

(a) Not applicable to 4.75 mm.

904.04.09 PWSL computations. 504.04.02 Perform PWSL computations for maximum specific gravity, voids in the total mix, voids in the mineral aggregate, and voids filled with asphalt. Use the moving average of the last three consecutive test values for each parameter.

- (a) If the PWSL for the three test values falls below 85, take corrective action to bring the PWSL to at least 85.
- (b) If the PWSL drops below 68, production shall be suspended until corrective action is taken as approved.



**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 ENCASMENT. 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.



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

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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 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	MSMT	Particle	% Passing by Weight

COMPOSITION - EXISTING TOPSOIL & SALVAGED TOPSOIL					
TEST PROPERTY	TEST¹ METHOD	TEST VALUE AND AMENDMENT			
Analysis	356	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
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.			

COMPOSITION - FURNISHED TOPSOIL		
TEST PROPERTY	TEST¹ METHOD	TEST VALUE AND AMENDMENT
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

COMPOSITION - SALVAGED SUBSOIL					
TEST PROPERTY	TEST¹ METHOD	TEST VALUE AND AMENDMENT			
		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. MSMT 356. Sand shall be washed silica sand that conforms to ASTM C-33 or ASTM M-6 with less than 1% 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 1,400 pounds per cubic yard 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 Seeding
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.

SPECIAL FERTILIZER ANALYSIS AND COMPOSITION	
FERTILIZER ^a	USE
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.

Soil stabilization matting products shall be listed in the current AASHTO National Transportation Product Evaluation Program (NTPEP) Report for Erosion Control Products.

Criteria of each matting type shall be obtained by large scale test results of a Geosynthetic Institute Accredited laboratory, or other approved laboratory, as described below.

- (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.

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	<input type="checkbox"/>	No more than 2.0 x 1.0 in.
Thread	<input type="checkbox"/>	Degradable
Stitching and Spacing	<input type="checkbox"/>	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.

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	<input type="checkbox"/>	No more than 1.0 x 0.75 in.
Thread	<input type="checkbox"/>	Nondegradable, UV stabilized, synthetic
Stitching and Spacing	<input type="checkbox"/>	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	<input type="checkbox"/>	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.

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 as specified in Section 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	<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.

WEEDS PROHIBITED IN MEADOW & WILDFLOWER SEED	
COMMON NAME	SCIENTIFIC NAME
Canarygrass = Reed Canarygrass and related spp.	<i>Phalaris L.</i>
Common Wormwood = Mugwort	<i>Artemisia vulgaris L. var. vulgaris</i>
Dogbane and related spp.	<i>Apocynum L.</i>
Eastern Poison Ivy	<i>Toxicodendron radicans (L.) Kuntze</i>
Fig Buttercup = Lesser Celandine	<i>Ranunculus ficaria L. var. bulbifera</i> Marsden-Jones
Garlic Mustard	<i>Alliaria petiolata (M. Bieb.) Cavara and Grande</i>
Giant Hogweed	<i>Heracleum mantegazzianum</i> Sommier and Levier
Japanese Honeysuckle, Tatarian Honeysuckle, related spp.	<i>Lonicera L.</i>
Japanese Knotweed	<i>Polygonum cuspidatum</i> Siebold and Zucc.
Lesser Knapweed = Spotted Knapweed	<i>Centaurea nigra L.</i>
Multiflora Rose	<i>Rosa multiflora</i> Thunb.
Nepalese Browntop = Japanese Stiltgrass	<i>Microstegium vimineum (Trin.) A. Camus</i>
Poison Hemlock	<i>Conium maculatum L.</i>
Purple Loosestrife and related spp.	<i>Lythrum L.</i>
Silvergrass and related spp.	<i>Miscanthus Andersson</i>
Thistle and related spp.	<i>Cirsium Mill., Onopordum L.</i>

(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 (Thunb.) Siebold</i>
Common Buckthorn	<i>Rhamnus cathartica L.</i>
Japanese Barberry	<i>Berberis thunbergii DC.</i>
Oriental Bittersweet	<i>Celastrus orbiculatus</i> Thunb.
Oleaster; Russian Olive, Autumn Olive, and related spp.	<i>Elaeagnus L.</i>
Privet, and related species	<i>Ligustrum L.</i>
Tree of Heaven	<i>Ailanthus altissima (Mill.) Swingle</i>

920.06.03 Turfgrass Sod. Turfgrass sod shall be Maryland Certified Tall Fescue Sod, or Bermudagrass Sod, or Zoysiagrass Sod. Sod shall comply with the Maryland Turfgrass Law and Regulations of the State of Maryland.

Each load of turfgrass sod shall bear a Maryland State Certified Label and be in good health at the time of delivery.

Turfgrass sod shall be field grown in the State of Maryland, and be sufficiently knitted when harvested to resist breakage under normal handling.

Turfgrass sod shall be machine cut in strips at least 14 in. wide.

Prior to harvest, Tall Fescue Sod shall be mowed to a height of 2.0 to 3.5 in. Bermudagrass Sod and Zosiagrass Sod shall be mowed to a height of 0.75 to 3.0 in.

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.

920.06.04 Approved Cultivars. Refer to ‘Specifications for Seed and Seed Mixes’, a list of cultivars of species approved for use in seed mixes and specifications maintained by the Landscape Operations Division. Only cultivars included on that list may be used. When no cultivar is specified, any common type cultivar of the species may be provided.

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.

(b) **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

TEMPORARY AND GRASS ADDITIVE SEED SPECIES			
COMMON NAME, and SCIENTIFIC NAME	PURITY Min %	WEED Max %	GERM Min %
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, and conform to 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

MEADOW FORB SEED SPECIES	
COMMON NAME	SCIENTIFIC NAME
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>Symphyotrichum novae-angliae</i> (L.) G.L. Nesom
New York Aster	<i>Symphyotrichum novi-belgii</i> (L.) G.L. Nesom var. <i>elodes</i> (Torr. and A. Gray) G.L. Nesom <i>Symphyotrichum novi-belgii</i> (L.) G.L. Nesom var. <i>novi-belgii</i> <i>Symphyotrichum 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>Symphyotrichum laeve</i> (L.) A. Löve and D. Löve var. <i>laeve</i> <i>Symphyotrichum 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</i>

MEADOW FORB SEED SPECIES	
COMMON NAME	SCIENTIFIC NAME
	<i>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, and conform to 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
Longhair Sedge = Bristly Sedge	<i>Carex comosa</i> Boott
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
Deertongue cv. 'Tioga'	<i>Dichanthelium clandestinum</i> (L.) Gould
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
Shallow Sedge = Lurid Sedge	<i>Carex lurida</i> Wahlenb.
Rattlesnake Mannagrass	<i>Glyceria canadensis</i> (Michx.) Trin.
Rough Bluegrass	<i>Poa trivialis</i> L.
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
Switchgrass cv. 'Blackwell', 'Shelter'	<i>Panicum virgatum</i> L. var. <i>virgatum</i> <i>Panicum virgatum</i> L. var. <i>spissum</i> Linder
Woolgrass	<i>Scirpus cyperinus</i> (L.) Kunth

(e) Wildflower Seed. Seed shall be supplied in lots of individual species, unmixed, and conform to 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
Firewheel = Annual Gaillardia	<i>Gaillardia pulchella</i> Foug. <i>Gaillardia pulchella</i> Foug. var. <i>pulchella</i>
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.
Lemon Beebalm	<i>Monarda citriodora</i> Cerv. ex Lag.
Garden Cosmos = Pink Cosmos, cv. ‘Sensation’	<i>Cosmos bipinnatus</i> Cav.
Doubtful Knight’s-spur = Rocket Larkspur	<i>Consolida ajacis</i> (L.) Schur
Siberian Wallflower	<i>Erysimum ×marshallii</i> (Henfr.) Bois
Moroccan Toadflax = Spurred Snapdragon	<i>Linaria maroccana</i> Hook. f.
Common Sunflower cv. ‘Autumn Beauty’	<i>Helianthus annuus</i> L.
Garden Cornflower = Bachelors Button	<i>Centaurea cyanus</i> L.
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, and conform to 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>virginiana</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
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

SHRUB SEED SPECIES		
SPECIES Including Subspecies and Variety	PURITY Min %	GERM Min %
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’ unless in the following states: Maryland, Ohio, Pennsylvania, New York, New Jersey, Delaware, Virginia, West Virginia, North Carolina, Tennessee, Kentucky, Georgia, unless otherwise specified. 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.

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 920 — LANDSCAPING MATERIALS

920.05 SOIL STABILIZATION MATTING (SSM).

759 **DELETE:** 920.05.01 Soil Stabilization Matting (SSM) in its entirety.

INSERT: The following:

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.

SSM shall meet the following:

- (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.

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	<input type="checkbox"/>	No more than 2.0 x 1.0 in.
Thread	<input type="checkbox"/>	Degradable
Stitching and Spacing	<input type="checkbox"/>	No more than 4.0 in apart

* Product 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.



(b) **Type B.** Permanent; non-woven, nondegradable, UV stabilized, synthetic fibers; with non-degradable, UV stabilized, synthetic netting on top and bottom.

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	<input type="checkbox"/>	No more than 1.0 x 0.75 in.
Thread	<input type="checkbox"/>	Nondegradable, UV stabilized, synthetic
Stitching and Spacing	<input type="checkbox"/>	No more than 4.0 in. apart

* Product 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.

(c) **Type C.** Permanent; nondegradable, synthetic lattice; and easily filled with soil.

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	<input type="checkbox"/>	At least 80 %

(d) **Type D.** Degradable; woven coir.

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	<input type="checkbox"/>	At least 35 %



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- (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.

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 and 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	<input type="checkbox"/>	Excelsior – No more than 2.0 x 1.0 in. Straw and Straw / Coconut – No more than 0.75 x 0.75 in.
Thread	<input type="checkbox"/>	Degradable
Stitching and Spacing	<input type="checkbox"/>	Excelsior – No more than 4.0 in. apart Straw and Straw/Coconut – No more than 2.0 in apart

* Product 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.

760 **DELETE:** 920.05.02 Fasteners for Soil Stabilization Matting and Turfgrass Sod in its entirety.

INSERT: The following.

920.05.02 Fasteners for Soil Stabilization Matting and Turfgrass Sod. Fasteners marked “X” shall be used as specified in 709.03.05 and meet the following:

- (a) **Wood Peg.**

WOOD PEG. Wood, biodegradable, untreated; single leg is driven into the soil so that wider top is flush with turfgrass sod and SSM.	Turfgrass Sod	Soil Stabilization Matting		
		Type A and E	Type B	Type C and D
Approx. 6 in. long, 3/8 in. thick; top 1 in. wide, tapered to base.	X	X		



(b) T-Head Pin.

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	Turfgrass Sod	Soil Stabilization Matting		
		Type A and E	Type B	Type C and D
Approx. 6 in. long, 3/8 in. thick; head 1 in. wide.	X	X		

(c) Circle-Top Pin.

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.	Turfgrass Sod	Soil Stabilization Matting		
		Type A and E	Type B	Type C and D
11 gauge; leg 6 in long.	X	X		
11 gauge; leg 8 in. long.	X	X		

(d) Round-Head Pin.

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.	Turfgrass Sod	Soil Stabilization Matting		
		Type A and E	Type B	Type C and D
Approx. 6 in long; head 1 in. diameter	X	X		
Approx. 8 in long; head 1 in. diameter	X	X		

(e) U-Shape Staple.

U-SHAPE STAPLE. Steel wire; two main legs are driven into the soil so that the top of staple is flush with turfgrass sod and SSM.	Turfgrass Sod	Soil Stabilization Matting		
		Type A and E	Type B	Type C and D
11 gauge bent into U shape; legs 6 in. long; top 1 to 1-1/2 in. wide.	X	X		
8 gauge bent into U shape; legs 8 in. long; top 1 to 1-1/2 in. wide.	X	X	X	X
8 gauge bent into U shape.; legs 12 in. long; top 1 to 1-1/2 in. wide			X	X

(f) Fabric Pin.

FABRIC PIN. Steel nail; single leg is driven into the soil so that steel washer top is flush with SSM.	Turfgrass Sod	Soil Stabilization Matting		
		Type A and E	Type B	Type C and D
11 gauge approx. 12 in. long.			X	X
3/16 in. gauge. approx. 18 in. long.			X	X



**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	



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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.



**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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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



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950.12 — LUMINAIRES AND LAMPS

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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.

- (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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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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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.

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.

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

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(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.

- (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.

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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:

- (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.

**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 RC. 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.

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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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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.

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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.

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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.

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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.

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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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- (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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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:

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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 US 113 (Phase 3) located in, Worcester County, Maryland, for which Price Proposals will be received until 12:00 o'clock noon on Wednesday, November 19, 2014, this work being situated as follows:

Ms. Norie 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, requesting proposals for the work in conformance with the Contract Documents, now on file in the office of the Administration. I/We hereby certify that I/we am/are the only person, or persons, interested in this bid proposal as principals, and that an examination has been made of the work site, the Specifications, 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	250,000	EACH OF PRICE ADJUSTMENT FOR DIESEL FUEL	XXX SP	1	00	250,000	00



END OF CATEGORY NO. 1

STATE CONTRACT - WO6365170

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SCHEDULE OF PRICES

ITEM NO. CCS NO.	APPROXIMATE QUANTITIES	DESCRIPTION OF ITEMS	SECTION	UNIT PRICE		AMOUNTS	
				DOLLARS	CENTS	DOLLARS	CENTS
3001 300000	2	EACH OF .SEVERE WEATHER EVENT	XXX	49,481	00	98,962	00
3002 388130	11	EACH OF QUARTERLY EROSION AND SEDIMENT CONTROL INCENTIVE	308 SP	10,000	00	110,000	00
3003 388135	LUMP SUM	FINAL EROSION AND SEDIMENT CONTROL INCENTIVE	308 SP	110,000	00	110,000	00

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END OF CATEGORY NO. 3

STATE CONTRACT - WO6365170

FEDERAL CONTRACT - AC-NHPP-327-1(37)N

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SCHEDULE OF PRICES

ITEM NO. CCS NO.	APPROXIMATE QUANTITIES	DESCRIPTION OF ITEMS	SECTION	UNIT PRICE		AMOUNTS	
				DOLLARS	CENTS	DOLLARS	CENTS
5001 504600	322,000	EACH OF PRICE ADJUSTMENT FOR ASPHALT BINDER	504 SP	1	00	322,000	00
5002 535100	88,100	EACH OF PAVEMENT SURFACE PROFILE PAY ADJUSTMENT	535 SP	1	00	88,100	00
5003 504605	356,333	EACH OF PAYMENT ADJUSTMENT FOR PAVEMENT DENSITY	504 SP	1	00	356,333	00
5004 504610	356,333	EACH OF PAYMENT ADJUSTMENT FOR HOT MIX ASPHALT MIXTURE	504 SP	1	00	356,333	00

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END OF CATEGORY NO. 5

STATE CONTRACT - WO6365170

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ADDENDUM NO 1
8/28/2014

SCHEDULE OF PRICES

ITEM NO. CCS NO.	APPROXIMATE QUANTITIES	DESCRIPTION OF ITEMS	SECTION	UNIT PRICE		AMOUNTS	
				DOLLARS	CENTS	DOLLARS	CENTS
7001 700000	10	EACH OF .FINAL WETLAND REDUCTION INCENTIVE PER 1/10TH ACRE	XXX	8,000	00	80,000	00
7002 700000	35	EACH OF .REFORESTATION INCENTIVE PER ONE HALF OF ACRE	XXX	2,500	00	87,500	00

END OF CATEGORY NO. 7

STATE CONTRACT - WO6365170

FEDERAL CONTRACT - AC-NHPP-327-1(37)N

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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, 3001-3003, 5001-5004, 7001, 7002					
		THIS PROPOSAL SHALL BE FILLED IN BY THE BIDDER WITH PRICES IN NUMERALS AND EXTENSIONS SHALL BE MADE BY HIM.					



GENERAL MATERIAL REQUIREMENTS

CONVICT PRODUCED MATERIALS

Section 1019 of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) clarifies that materials produced by convict labor after July 1, 1991 may not be used for Federal-aid highway construction projects unless produced at a prison facility producing convict made materials for Federal-aid construction projects prior to July 1, 1987.

CONTRACT PROVISION BUY AMERICA

This section only applies to projects partially or totally financed with Federal funds. The Contractor shall comply with Section 165 of the Surface Transportation Assistance Act of 1982 as amended by Section 1041(a) and 1048(a) of the Intermodal Surface Transportation Efficiency Act of 1991 with regard to the furnishing and coating of iron and steel products.

The Contract, if awarded, will be awarded to the responsive and responsible bidder who submits the lowest total bid for the Contract based on furnishing Domestic Products unless such bid exceeds the lowest total bid based on furnishing Foreign Products by more than twenty five percent (25%). Foreign Products will not be permitted to be used as a substitution for Domestic ones after the bid has been awarded.

Furnish steel or iron construction materials, including coating, for permanently incorporated work according to 23 CFR 635.410 and as follows:

- (a)** All manufacturing processes of steel or iron materials in a product, including coating; and any subsequent process that alters the steel or iron material's physical form or shape, changes its chemical composition, or the final finish; are to occur within the United States (One of the 50 States, the District of Columbia, Puerto Rico, or in territories and possessions of the U.S.). Manufacturing begins with the initial melting and mixing, and continues through the coating stage. The processes include rolling, extruding, machining, bending, grinding, drilling, welding, and coating. The action of applying a coating to steel or iron is deemed a manufacturing process. Coating includes epoxy coating, galvanizing, aluminizing, painting, and any other coating that protects or enhances the value of steel or iron. Any process from the original reduction from ore to the finished product constitutes a manufacturing process for iron.
- (b)** The following are considered to be steel manufacturing processes:



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- (1)** Production of steel by any of the following processes:
 - (a)** Open hearth furnace.
 - (b)** Basic oxygen.
 - (c)** Electric furnace.
 - (d)** Direct reduction.

- (2)** Rolling, heat treating, and any other similar processing.

- (3)** Fabrication of the products:
 - (a)** Spinning wire into cable or strand.
 - (b)** Corrugating and rolling into culverts.
 - (c)** Shop fabrication.

- (c)** The manufacturing process for a steel/iron product is considered complete when the product is ready for use as an item (e.g., fencing, posts, girders, pipe, manhole cover, etc.) or could be incorporated as a component of a more complex product through a further manufacturing process (e.g., prestressed concrete girders, reinforced concrete pipe, traffic control devices, bearing pads, etc.). A product containing both steel and/or iron components, may be assembled outside the United States and meet Buy America requirements if the constituent steel and iron components (in excess of the minimal amounts permitted) were manufactured domestically and are not modified at the assembly location prior to final assembly.

- (d)** If domestically produced steel billets or iron ingots are exported outside of the U.S., as defined above, for any manufacturing process then the resulting product does not conform to the Buy America requirements. Additionally, products manufactured domestically from foreign source steel billets or iron ingots do not conform to the Buy America requirements because the initial melting and mixing of alloys to create the material occurred in a foreign country.

- (e)** Due to a nationwide waiver, Buy America does not apply to raw materials (iron ore and alloys), scrap (recycled steel or iron), and pig iron or processed, pelletized, and reduced iron ore.

- (f)** For the Buy America provisions to apply, the steel or iron product must be permanently incorporated into the project. If an item is rendered as a “donated material” in accordance with 23 U.S.C. 323 – Donations and Credits, it will have to comply with Buy America requirements. While States and local governments may receive a credit for donated material, this material must generally comply with Buy America requirements. Buy America does not apply to temporary steel items, e.g., temporary sheet piling, temporary



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bridges, steel scaffolding and falsework. Further, Buy America does not apply to materials which remain in place at the contractor convenience.

- (g) Certifications which document that steel and iron have been manufactured and that coatings for iron or steel have been applied in the United States shall be provided to the Contractor by the manufacturer. The Contractor shall provide the required certifications to the Engineer prior to such items being incorporated into the permanent work. Certifications shall extend to materials utilized in manufactured and fabricated products purchased by the Contractor.
- (h) Products manufactured of foreign steel or iron materials may be used, provided the cost of such products as they are delivered to the project does not exceed 0.1% of the total contract amount, or \$2,500, whichever is greater. If a supplier or fabricator wishes to use a partial fabrication process where domestic and foreign source components are assembled at a domestic location, the “as delivered cost” of the foreign components should include any transportation, assembly and testing costs required to install them in the final product.
- (i) These provisions do not apply to any manufactured product unless the final product consists of at least 90% steel or iron content when it is delivered to the job site for installation. The miscellaneous steel or iron components, subcomponents and hardware necessary to encase, assemble and construct the manufactured product are not subject to the Buy America provision. For more information refer to FHWA Memorandum of Action entitled Clarification of Manufactured Products under Buy America, dated December 21, 2012 (available at <http://www.fhwa.dot.gov/construction/contracts/121221.cfm>).



**ALTERNATE BID
USING FOREIGN PRODUCTS**

When a bidder elects to utilize Foreign Products on one or more items, the following summation indicating the Total Bid using Foreign Products must be completed in addition to the individual item bid tabulations.

The following instructions are given to the bidder in completing the Total Bid summation using Foreign Products:

- 1 - The "Bid Total" for the initial bid using Domestic Products shall be shown on line (1).
- 2 - The subtotal for Item Amounts using Domestic Products shall be shown on line (2), for those items which the Contractor elects to use Foreign Products.
- 3 - The subtotal for Item Amounts using Foreign Products shall be shown on line (3).
- 4 - The total Bid, utilizing Foreign Products shall be shown on line (4). The value is obtained by subtracting subtotal (2) from the Total Bid (1) and then adding subtotal (3).

Bid Total for Bid 1 using Domestic items	Line (1)_____
Total of Domestic Items	Line (2) - _____
Total of Foreign Items	Line (3) + _____
Bid Total using Foreign Items	Line (4)_____



BID/PROPOSAL AFFIDAVIT

A. AUTHORIZED REPRESENTATIVE AND AFFIANT

I HEREBY AFFIRM THAT:

I am the (title) _____ and the duly authorized representative of (business) _____ and that I possess the legal authority to make this Affidavit on behalf of myself and the business for which I am acting.

B. CERTIFICATION REGARDING COMMERCIAL NONDISCRIMINATION

The undersigned bidder or offeror hereby certifies and agrees that the following information is correct:

In preparing its bid on this project, the bidder or offeror 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 vendors, 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 or offeror on this project, and terminate any contract awarded based on the bid. As part of its bid or proposal, the bidder or offeror 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 or offeror 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 or Offeror agrees to comply in all respects with the State’s Commercial Nondiscrimination Policy as described under Title 19 of the State Finance and Procurement Article of the Annotated Code of Maryland.



C. AFFIRMATION REGARDING BRIBERY CONVICTIONS

I FURTHER AFFIRM THAT:

Neither I, nor to the best of my knowledge, information, and belief, the above business (as is defined in Section 16-101(b) of the State Finance and Procurement Article of the Annotated Code of Maryland), or any of its officers, directors, partners, controlling stockholders, or any of its employees directly involved in the business's contracting activities, including obtaining or performing contracts with public bodies, has been convicted of, or has had probation before judgment imposed pursuant to Criminal Procedure Article, §6-220, Annotated Code of Maryland, or has pleaded nolo contendere to a charge of, bribery, attempted bribery, or conspiracy to bribe in violation of Maryland law, or of the law of any other state or federal law, except as follows (indicate the reasons why the affirmation cannot be given and list any conviction, plea, or imposition of probation before judgment with the date, court, official or administrative body, the sentence or disposition, the name(s) of person(s) involved, and their current positions and responsibilities with the business):

D. AFFIRMATION REGARDING OTHER CONVICTIONS

I FURTHER AFFIRM THAT:

Neither I, nor to the best of my knowledge, information, and belief, the above business, or any of its officers, directors, partners, controlling stockholders, or any of its employees directly involved in the business's contracting activities including obtaining or performing contracts with public bodies, has:

1. Been convicted under state or federal statute of:
 - (a) a criminal offense incident to obtaining, attempting to obtain, or performing a public or private contract; or
 - (b) fraud, embezzlement, theft, forgery, falsification or destruction of records, or receiving stolen property;
2. Been convicted of any criminal violation of a state or federal antitrust statute;
3. Been convicted under the provisions of Title 18 of the United States Code for violation of the Racketeer Influenced and Corrupt Organization Act, 18 U.S.C. §1961, et seq., or the Mail



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Fraud Act, 18 U.S.C. §1341, et seq., for acts in connection with the submission of bids or proposals for a public or private contract;

4. Been convicted of a violation of the State Minority Business Enterprise Law, Section 14-308 of the State Finance and Procurement Article of the Annotated Code of Maryland;

5. Been convicted of a violation of the Section 11-205.1 of the State Finance and Procurement Article of the Annotated Code of Maryland;

6. Been convicted of conspiracy to commit any act or omission that would constitute grounds for conviction or liability under any law or statute described in subsection (1) through (5) above;

7. Been found civilly liable under a state or federal antitrust statute for acts or omissions in connection with the submission of bids or proposals for a public or private contract;

8. Been found in a final adjudicated decision to have violated the Commercial Nondiscrimination Policy under Title 19 of the State Finance and Procurement Article of the Annotated Code of Maryland with regard to a public or private contract; or

9. 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 Section B – C and subsections (1) through (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



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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:



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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. FINANCIAL DISCLOSURE AFFIRMATION

I FURTHER AFFIRM THAT:

I am aware of, and the above business will comply with, the provisions of Section 13-221 of the State Finance and Procurement Article of the Annotated Code of Maryland, which require that every business that enters into contracts, leases, or other agreements with the State of Maryland or its agencies during a calendar year under which the business is to receive in the aggregate \$100,000 or more shall, within 30 days of the time when the aggregate value of the contracts, leases, or other agreements reaches \$100,000, file with the Secretary of State of Maryland certain specified information to include disclosure of beneficial ownership of the business.

J. POLITICAL CONTRIBUTION DISCLOSURE AFFIRMATION

I FURTHER AFFIRM THAT:

I am aware of, and the above business will comply with, Election Law Article, §§14-101—14-108, Annotated Code of Maryland, which requires that every person that enters into contracts, leases, or other agreements with the State of Maryland, including its agencies or a political subdivision of the State, during a calendar year in which the person receives in the aggregate \$100,000 or more shall file with the State Board of Elections a statement disclosing contributions in excess of \$500 made during the reporting period to a candidate for elective office in any primary or general election.

K. DRUG AND ALCOHOL FREE WORKPLACE

(Applicable to all contracts unless the contract is for a law enforcement agency and the agency head or the agency head's designee has determined that application of COMAR 21.11.08 and this certification would be inappropriate in connection with the law enforcement agency's undercover operations.)



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I CERTIFY THAT:

1. Terms defined in COMAR 21.11.08 shall have the same meanings when used in this certification.

2. By submission of its bid or offer, the business, if other than an individual, certifies and agrees that, with respect to its employees to be employed under a contract resulting from this solicitation, the business shall:

(a) Maintain a workplace free of drug and alcohol abuse during the term of the contract;

(b) Publish a statement notifying its employees that the unlawful manufacture, distribution, dispensing, possession, or use of drugs, and the abuse of drugs or alcohol is prohibited in the business' workplace and specifying the actions that will be taken against employees for violation of these prohibitions;

(c) Prohibit its employees from working under the influence of drugs or alcohol;

(d) Not hire or assign to work on the contract anyone whom the business knows, or in the exercise of due diligence should know, currently abuses drugs or alcohol and is not actively engaged in a bona fide drug or alcohol abuse assistance or rehabilitation program;

(e) Promptly inform the appropriate law enforcement agency of every drug-related crime that occurs in its workplace if the business has observed the violation or otherwise has reliable information that a violation has occurred;

(f) Establish drug and alcohol abuse awareness programs to inform its employees about:

(i) The dangers of drug and alcohol abuse in the workplace;

(ii) The business' policy of maintaining a drug and alcohol free workplace;

(iii) Any available drug and alcohol counseling, rehabilitation, and employee assistance programs; and

(iv) The penalties that may be imposed upon employees who abuse drugs and alcohol in the workplace;

(g) Provide all employees engaged in the performance of the contract with a copy of the statement required by §K(2)(b), above;

(h) Notify its employees in the statement required by §K(2)(b), above, that as a condition of continued employment on the contract, the employee shall:



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- (i) Abide by the terms of the statement; and
 - (ii) Notify the employer of any criminal drug or alcohol abuse conviction for an offense occurring in the workplace not later than 5 days after a conviction;
- (i) Notify the procurement officer within 10 days after receiving notice under §K(2)(h)(ii), above, or otherwise receiving actual notice of a conviction;
- (j) Within 30 days after receiving notice under §K(2)(h)(ii), above, or otherwise receiving actual notice of a conviction, impose either of the following sanctions or remedial measures on any employee who is convicted of a drug or alcohol abuse offense occurring in the workplace:
 - (i) Take appropriate personnel action against an employee, up to and including termination; or
 - (ii) Require an employee to satisfactorily participate in a bona fide drug or alcohol abuse assistance or rehabilitation program; and
- (k) Make a good faith effort to maintain a drug and alcohol free workplace through implementation of §K(2)(a)—(j), above.
- 3. If the business is an individual, the individual shall certify and agree as set forth in §K(4), below, that the individual shall not engage in the unlawful manufacture, distribution, dispensing, possession, or use of drugs or the abuse of drugs or alcohol in the performance of the contract.
- 4. I acknowledge and agree that:
 - (a) The award of the contract is conditional upon compliance with COMAR 21.11.08 and this certification;
 - (b) The violation of the provisions of COMAR 21.11.08 or this certification shall be cause to suspend payments under, or terminate the contract for default under COMAR 21.07.01.11 or 21.07.03.15, as applicable; and
 - (c) The violation of the provisions of COMAR 21.11.08 or this certification in connection with the contract may, in the exercise of the discretion of the Board of Public Works, result in suspension and debarment of the business under COMAR 21.08.03.



L. CERTIFICATION OF CORPORATION REGISTRATION AND TAX PAYMENT

I FURTHER AFFIRM THAT:

- 1 The business named above is a (domestic ___) (foreign ___) corporation registered in accordance with the Corporations and Associations Article, Annotated Code of Maryland, and that it is in good standing and has filed all of its annual reports, together with filing fees, with the Maryland State Department of Assessments and Taxation, and that the name and address of its resident agent filed with the State Department of Assessments and Taxation is (IF NOT APPLICABLE, SO STATE):

Name: _____
 Address: _____

2. 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.

M. 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.

N. REPEALED



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O. 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: _____
(Authorized Representative and Affiant)



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COMPREHENSIVE SIGNATURE PAGE 1 OF 2

THE BIDDER IS HEREBY NOTIFIED THAT THIS DOCUMENT SHALL BE SIGNED IN INK IN ORDER FOR THE BID TO BE ACCEPTED. BY SIGNING, THE BIDDER CERTIFIES THAT HE/SHE WILL COMPLY IN EVERY ASPECT WITH THESE SPECIFICATIONS.

FURTHER, I DO SOLEMNLY DECLARE AND AFFIRM UNDER THE PENALTIES OF PERJURY THAT THE CONTENTS OF THIS AFFIDAVIT (PARAGRAPHS A-N) ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE, INFORMATION, AND BELIEF.

This bid form shall be filled out legibly in ink or typed. The bid, if submitted by an individual, shall be signed by an individual; if submitted by a partnership, shall be signed by such member or members of the partnership as have authority to bind the partnership; if submitted by a corporation the same shall be signed by the President and attested by the Secretary or an Assistant Secretary. If not signed by the President as aforesaid, there must be attached a copy of that portion of the By-Laws, or a copy of a Board resolution, duly certified by the Secretary, showing the authority of the person so signing on behalf of the corporation. In lieu thereof, the corporation may file such evidence with the Administration, duly certified by the Secretary, together with a list of the names of those officers having authority to execute documents on behalf of the corporation, duly certified by the Secretary, which listing shall remain in full force and effect until such time as the Administration is advised in writing to the contrary. In any case where a bid is signed by an Attorney in Fact the same must be accompanied by a copy of the appointing document, duly certified.

IF AN INDIVIDUAL:

NAME: _____

_____ Street and/or P.O. Box

_____ City State Zip Code Fed ID or SSN

_____ (SEAL) Signature Date

_____ Print Signature

WITNESS: _____ Signature

_____ Print Signature



COMPREHENSIVE SIGNATURE PAGE 2 OF 2

IF A PARTNERSHIP:

NAME OF PARTNERSHIP: _____

_____ Street and/or P.O. Box

_____ City State Zip Code Fed ID or SSN

BY: _____ (SEAL) _____

Member Signature Date

Print Signature

TITLE: _____ WITNESS: _____

Signature

Print Signature

IF A CORPORATION:

NAME OF CORPORATION: _____

_____ Street and/or P.O. Box

_____ City State Zip Code Fed ID or SSN

STATE OF INCORPORATION: _____

BY: _____ (SEAL) _____

Signature Date

Print Signature

TITLE: _____ WITNESS: _____

Secretary's Signature

Print Signature



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**MDOT DBE FORM A
FEDERALLY-FUNDED CONTRACTS
CERTIFIED DBE UTILIZATION AND FAIR SOLICITATION AFFIDAVIT
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This affidavit must be included with the bid/ proposal. If the bidder/offeror fails to accurately complete and submit this affidavit as required, the bid shall be deemed not responsive or the proposal shall be deemed not susceptible of being selected for award.

In connection with the bid/proposal submitted in response to Solicitation No. _____, I affirm the following:

1. DBE Participation (PLEASE CHECK ONLY ONE)

I have met the overall certified Disadvantaged Business Enterprise (DBE) participation goal of fifteen percent (15%). I agree that this percentage of the total dollar amount of the Contract for the DBE goal will be performed by certified DBE firms as set forth in the DBE Participation Schedule - Part 2 of the MDOT DBE Form B (Federally-Funded Contracts).

OR

I conclude that I am unable to achieve the DBE participation goal. I hereby request a waiver, in whole or in part, of the goal. Within 10 business days of receiving notice that our firm is the apparent awardee or as requested by the Procurement Officer, I will submit a written waiver request and all required documentation in accordance with COMAR 21.11.03.11. For a partial waiver request, I agree that certified DBE firms will be used to accomplish the percentages of the total dollar amount of the Contract as set forth in the DBE Participation Schedule - Part 2 of the MDOT DBE Form B (Federally-Funded Contracts).

2. Additional DBE Documentation

I understand that if I am notified that I am the apparent awardee or as requested by the Procurement Officer, I must submit the following documentation within 10 business days of receiving such notice: (a) Outreach Efforts Compliance Statement (MDOT DBE Form C - Federally-Funded Contracts); (b) Subcontractor Project Participation Statement (MDOT DBE Form D - Federally-Funded Contracts); (c) DBE Waiver Request documentation per COMAR 21.11.03.11 (if waiver was requested); and (d) Any other documentation required by the Procurement Officer to ascertain bidder’s responsibility/ offeror’s susceptibility of being selected for award in connection with the certified DBE participation goal.



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I acknowledge that if I fail to return each completed document (in 2 (a) through (d)) within the required time, the Procurement Officer may determine that I am not responsible and therefore not eligible for contract award or not susceptible of being selected for award.

3. Information Provided to DBE firms

In the solicitation of subcontract quotations or offers, DBE firms were provided not less than the same information and amount of time to respond as were non-DBE firms.

4. Products and Services Provided by DBE firms

I hereby affirm that the DBEs are only providing those products and services for which they are MDOT certified.

I solemnly affirm under the penalties of perjury that the information in this affidavit is true to the best of my knowledge, information and belief.

Company Name

Signature of Representative

Address

Printed Name and Title

City, State and Zip Code

Date



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**MDOT DBE FORM B
FEDERALLY-FUNDED CONTRACTS
DBE PARTICIPATION SCHEDULE**

PART 1 – INSTRUCTIONS FOR DBE PARTICIPATION SCHEDULE

PARTS 2 AND 3 MUST BE INCLUDED WITH THE BID/PROPOSAL. IF THE BIDDER/OFFEROR FAILS TO ACCURATELY COMPLETE AND SUBMIT PART 2 WITH THE BID/PROPOSAL AS REQUIRED, THE BID SHALL BE DEEMED NOT RESPONSIVE OR THE PROPOSAL SHALL BE DEEMED NOT SUSCEPTIBLE OF BEING SELECTED FOR AWARD.

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*** STOP ***

**FORM INSTRUCTIONS
PLEASE READ BEFORE COMPLETING THIS FORM**

1. Please refer to the Maryland Department of Transportation (MDOT) DBE Directory at www.mdot.state.md.us to determine if a firm is certified for the appropriate North American Industry Classification System (“NAICS”) Code **and** the product/services description (specific product that a firm is certified to provide or specific areas of work that a firm is certified to perform). For more general information about NAICS, please visit www.naics.com. Only those specific products and/or services for which a firm is certified in the MDOT Directory can be used for purposes of achieving the DBE participation goal.
2. In order to be counted for purposes of achieving the DBE participation goal, the firm must be certified for that specific NAICS (“DBE” for Federally-funded projects designation after NAICS Code). **WARNING:** If the firm’s NAICS Code is in **graduated status**, such services/products **will not be counted** for purposes of achieving the DBE participation goals. Graduated status is clearly identified in the MDOT Directory (such graduated codes are designated with the word graduated after the appropriate NAICS Code).
3. Examining the NAICS Code is the **first step** in determining whether a DBE firm is certified and eligible to receive DBE participation credit for the specific products/services to be supplied or performed under the contract. The **second step** is to determine whether a firm’s Products/Services Description in the DBE Directory includes the products to be supplied and/or services to be performed that are being used to achieve the DBE participation goal.
4. If you have any questions as to whether a firm is MDOT DBE certified, or if it is certified to perform specific services or provide specific products, please call MDOT’s Office of Minority Business Enterprise at 1-800-544-6056 or send an email to mbe@mdot.state.md.us.

03-05-14



MDOT DBE FORM B
FEDERALLY-FUNDED CONTRACTS
DBE PARTICIPATION SCHEDULE
PART 1 – INSTRUCTIONS FOR DBE PARTICIPATION SCHEDULE
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5. The Contractor's subcontractors are considered second-tier subcontractors. Third-tier contracting used to meet a DBE goal is to be considered the exception and not the rule. The following two conditions must be met before MDOT, its Modal Administrations and the Maryland Transportation Authority may approve a third-tier contracting agreement: (a) the bidder/offeror must request in writing approval of each third-tier contract arrangement, and (b) the request must contain specifics as to why a third-tier contracting arrangement should be approved. These documents must be submitted with the bid/proposal in Part 2 of this DBE Participation Schedule.
6. For each DBE firm that is being used as supplier/wholesaler/regular dealer/broker/manufacturer, please follow these instructions for calculating the **amount of the subcontract for purposes of achieving the DBE participation goal:**
 - A. Is the firm certified as a broker of the products/supplies? If the answer is YES, please continue to Item C. If the answer is NO, please continue to Item B.
 - B. Is the firm certified as a supplier, wholesaler, regular dealer, or manufacturer of such products/supplies? If the answer is YES, continue to Item D. If the answer is NO, continue to Item C only if the DBE firm is certified to perform trucking/hauling services under NAICS Codes 484110, 484121, 484122, 484210, 484220 and 484230. If the answer is NO and the firm is not certified under these NAICS Codes, then no DBE participation credit will be given for the supply of these products.
 - C. For purposes of achieving the DBE participation goal, you may count only the amount of any reasonable fee that the DBE firm will receive for the provision of such products/supplies - not the total subcontract amount or the value (or a percentage thereof) of such products and/or supplies. For Column 3 of the DBE Participation Schedule, please divide the amount of any reasonable fee that the DBE firm will receive for the provision of such products/services by the total Contract value and insert the percentage in Line 3.1.
 - D. Is the firm certified as a manufacturer (refer to the firm's NAICS Code and specific 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 DBE participation goal, you may count the total amount of the subcontract. For Column 3 of the DBE Participation Schedule, please divide the total amount of the subcontract by the total Contract value and insert the percentage in Line 3.1.



MDOT DBE FORM B
FEDERALLY-FUNDED CONTRACTS
DBE PARTICIPATION SCHEDULE
PART 1 – INSTRUCTIONS FOR DBE PARTICIPATION SCHEDULE
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- E. Is the firm certified as a supplier, wholesaler and/or regular dealer? If the answer is YES and the DBE firm is furnishing and installing the materials and is certified to perform these services, please divide the total subcontract amount (including full value of supplies) by the total Contract value and insert the percentage in Line 3.1. If the answer is YES and the DBE firm is only being used as a supplier, wholesaler and/or regular dealer or is not certified to install the supplies/materials, for purposes of achieving the DBE participation goal, you may only count sixty percent (60%) of the value of the subcontract for these supplies/products (60% Rule). To apply the 60% Rule, first divide the amount of the subcontract for these supplies/products only (not installation) by the total Contract value. Then, multiply the result by sixty percent (60%) and insert the percentage in Line 3.2.
7. For each DBE firm that **is not** being used as a supplier/wholesaler/regular dealer/broker/manufacturer, to calculate the **amount of the subcontract for purposes of achieving the DBE participation goal**, divide the total amount of the subcontract by the total Contract value and insert the percentage in Line 3.1.
- Example:** \$ 2,500 (Total Subcontract Amount) ÷ \$10,000 (Total Contract Value) x 100 = 25%.
8. Please note that for USDOT-funded projects, a DBE prime may count towards its DBE participation goal work performed by its own forces. Include information about the DBE prime in Part 2.
9. **WARNING:** The percentage of DBE participation, computed using the dollar amounts in Column 3 for all of the DBE firms listed in Part 2, **MUST** at least equal the DBE participation goal as set forth in MDOT DBE Form A – Federally-Funded Contracts for this solicitation. If the bidder/offeror is unable to achieve the DBE participation goals, then the bidder/offeror must request a waiver in Form A or the bid will be deemed not responsive, or the proposal not susceptible of being selected for award. You may wish to use the Goal Worksheet shown below to assist you in calculating the percentage and confirming that you have met the applicable DBE participation goal.



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PART 1 – INSTRUCTIONS FOR DBE PARTICIPATION SCHEDULE
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GOAL WORKSHEET	
Total DBE Firm Participation (Add percentages in Column 3 for all DBE firms listed in DBE Participation Schedule)	(A) _____%
The percentage amount in Box A above should be equal to the percentage amount in Box E below.	
Add <i>Countable</i> Subcontract Amounts (see 6 through 8 of Instructions) for all DBE firms listed in DBE Participation Schedule, and insert in Box B	(B) \$ _____
Insert the Total Contract Amount in Box C	(C) \$ _____
Divide Box B by Box C and Insert in Box D	(D) = _____
Multiply Box D by 100 and insert in Box E	(E) = _____%



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**MDOT DBE FORM B
FEDERALLY-FUNDED CONTRACTS
DBE PARTICIPATION SCHEDULE
PART 2 – DBE PARTICIPATION SCHEDULE**

PARTS 2 AND 3 MUST BE INCLUDED WITH THE BID/PROPOSAL. IF THE BIDDER/OFFEROR FAILS TO ACCURATELY COMPLETE AND SUBMIT PART 2 WITH THE BID/PROPOSAL AS REQUIRED, THE BID SHALL BE DEEMED NOT RESPONSIVE OR THE PROPOSAL SHALL BE DEEMED NOT SUSCEPTIBLE OF BEING SELECTED FOR AWARD.

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Prime Contractor	Project Description	Solicitation Number

LIST INFORMATION FOR EACH CERTIFIED DBE SUBCONTRACTOR YOU AGREE TO USE TO ACHIEVE THE DBE PARTICIPATION GOAL.

COLUMN 1	COLUMN 2	COLUMN 3
		Unless the bidder/offeror requested a waiver in MDOT DBE Form A – Federally Funded Contracts for this solicitation, the cumulative DBE participation for all DBE firms listed herein must equal at least the DBE participation goal set forth in Form A.
NAME OF DBE SUBCONTRACTOR AND TIER	CERTIFICATION NO. AND DBE CLASSIFICATION	FOR PURPOSES OF ACHIEVING THE DBE PARTICIPATION GOAL, refer to sections 6, 7 and 8 in Part 1 - Instructions. State the percentage amount of the products/services in Line 3.1, except for those products or services where the DBE firm is being used as a wholesaler, supplier, or regular dealer. For items of work where the DBE firm is being used as a supplier, wholesaler and/or regular dealer, complete Line 3.2 using the 60% Rule.
<input type="checkbox"/> Please check if DBE firm is a third-tier contractor (if applicable). Please submit written documents in accordance with Section 5 of Part 1 - Instructions	Certification Number: <hr/> (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 DBE Classification <hr/>	3.1. <u>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).</u> _____% (Percentage for purposes of calculating achievement of DBE Participation goal) 3.2 <u>TOTAL PERCENTAGE TO BE PAID TO THE SUBCONTRACTOR FOR ITEMS OF WORK WHERE THE DBE FIRM IS BEING USED AS A SUPPLIER, WHOLESALER AND/OR REGULAR DEALER (STATE THE PERCENTAGE AS A PERCENTAGE OF THE TOTAL CONTRACT VALUE AND THEN APPLY THE 60% RULE PER SECTION 6(E) IN PART 1 - INSTRUCTIONS).</u> _____% Total percentage of Supplies/Products x _____ 60% (60% Rule) _____% (Percentage for purposes of calculating achievement of DBE Participation goal)

Please check if Continuation Sheets are attached.



**MDOT DBE FORM B
FEDERALLY-FUNDED CONTRACTS
DBE PARTICIPATION SCHEDULE
CONTINUATION SHEET**

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Prime Contractor	Project Description	Solicitation Number

LIST INFORMATION FOR EACH CERTIFIED DBE SUBCONTRACTOR YOU AGREE TO USE TO ACHIEVE THE DBE PARTICIPATION GOAL.

COLUMN 1	COLUMN 2	COLUMN 3
		Unless the bidder/offeror requested a waiver in MDOT DBE Form A – Federally Funded Contracts for this solicitation, the cumulative DBE participation for all DBE firms listed herein must equal at least the DBE participation goal set forth in Form A.
NAME OF DBE SUBCONTRACTOR AND TIER	CERTIFICATION NO. AND DBE CLASSIFICATION	FOR PURPOSES OF ACHIEVING THE DBE PARTICIPATION GOAL, refer to sections 6, 7 and 8 in Part 1 - Instructions. State the percentage amount of the products/services in Line 3.1, except for those products or services where the DBE firm is being used as a wholesaler, supplier, or regular dealer. For items of work where the DBE firm is being used as a supplier, wholesaler and/or regular dealer, complete Line 3.2 using the 60% Rule.
<input type="checkbox"/> Please check if DBE firm is a third-tier contractor (if applicable). Please submit written documents in accordance with Section 5 of Part 1 - Instructions	Certification Number: _____ (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 DBE Classification _____	3.1. <u>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).</u> _____% (Percentage for purposes of calculating achievement of DBE Participation goal) 3.2. <u>TOTAL PERCENTAGE TO BE PAID TO THE SUBCONTRACTOR FOR ITEMS OF WORK WHERE THE DBE FIRM IS BEING USED AS A SUPPLIER, WHOLESALER AND/OR REGULAR DEALER) (STATE THE PERCENTAGE AS A PERCENTAGE OF THE TOTAL CONTRACT VALUE AND THEN APPLY THE 60% RULE PER SECTION 6(E) IN PART 1 - INSTRUCTIONS).</u> _____% Total percentage of Supplies/Products x _____ 60% (60% Rule) _____% (Percentage for purposes of calculating achievement of DBE Participation goal)

Please check if Continuation Sheets are attached.



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MDOT DBE FORM B
FEDERALLY-FUNDED CONTRACTS
DBE PARTICIPATION SCHEDULE

PART 3 – CERTIFICATION FOR DBE PARTICIPATION SCHEDULE

PARTS 2 AND 3 MUST BE INCLUDED WITH THE BID/PROPOSAL AS DIRECTED IN THE SOLICITATION.

I hereby affirm that I have reviewed the Products and Services Description (specific product that a firm is certified to provide or areas of work that a firm is certified to perform) set forth in the MDOT DBE Directory for each of the DBE firms listed in Part 2 of this DBE Form B for purposes of achieving the DBE participation goal that was identified in the DBE Form A that I submitted with this solicitation, and that the DBE firms listed are only performing those products/services/areas of work for which they are certified. I also hereby affirm that I have read and understand the form instructions set forth in Part 1 of this DBE Form B.

The undersigned Prime Contractor hereby certifies and agrees that it has fully complied with the State Minority Business Enterprise law, State Finance and Procurement Article §14-308(a)(2), Annotated Code of Maryland which provides that, except as otherwise provided by law, a contractor may not identify a certified minority business enterprise in a bid or proposal and:

- (1) fail to request, receive, or otherwise obtain authorization from the certified minority business enterprise to identify the certified minority business enterprise in its bid or proposal;
- (2) fail to notify the certified minority business enterprise before execution of the contract of its inclusion of the bid or proposal;
- (3) fail to use the certified minority business enterprise in the performance of the contract; or
- (4) pay the certified minority business enterprise solely for the use of its name in the bid or proposal.

I solemnly affirm under the penalties of perjury that the contents of Parts 2 and 3 of MDOT DBE Form B are true to the best of my knowledge, information and belief.

Company Name

Signature of Representative

Address

Printed Name and Title

City, State and Zip Code

Date



MDOT MBE/DBE FORM E
GOOD FAITH EFFORTS GUIDANCE AND DOCUMENTATION

**PART 1 – GUIDANCE FOR DEMONSTRATING GOOD FAITH EFFORTS
TO MEET MBE/DBE PARTICIPATION GOALS**

In order to show that it has made good faith efforts to meet the Minority Business Enterprise (MBE)/Disadvantaged Business Enterprise (DBE) participation goal (including any MBE subgoals) on a contract, the bidder/offeror must either (1) meet the MBE/DBE Goal(s) and document its commitments for participation of MBE/DBE Firms, or (2) when it does not meet the MBE/DBE Goal(s), document its Good Faith Efforts to meet the goal(s).

I. Definitions

MBE/DBE Goal(s) – “MBE/DBE Goal(s)” refers to the MBE participation goal and MBE participation subgoal(s) on a State-funded procurement and the DBE participation goal on a federally-funded procurement.

Good Faith Efforts – The “Good Faith Efforts” requirement means that when requesting a waiver, the bidder/offeror must demonstrate that it took all necessary and reasonable steps to achieve the MBE/DBE Goal(s), which, by their scope, intensity, and appropriateness to the objective, could reasonably be expected to obtain sufficient MBE/DBE participation, even if those steps were not fully successful. Whether a bidder/offeror that requests a waiver made adequate good faith efforts will be determined by considering the quality, quantity, and intensity of the different kinds of efforts that the bidder/offeror has made. The efforts employed by the bidder/offeror should be those that one could reasonably expect a bidder/offeror to take if the bidder/offeror were actively and aggressively trying to obtain DBE participation sufficient to meet the DBE contract goal. Mere *pro forma* efforts are not good faith efforts to meet the DBE contract requirements. The determination concerning the sufficiency of the bidder's/offeror's good faith efforts is a judgment call; meeting quantitative formulas is not required.

Identified Firms – “Identified Firms” means a list of the DBEs identified by the procuring agency during the goal setting process and listed in the federally-funded procurement as available to perform the Identified Items of Work. It also may include additional DBEs identified by the bidder/offeror as available to perform the Identified Items of Work, such as DBEs certified or granted an expansion of services after the procurement was issued. If the procurement does not include a list of Identified Firms or is a State-funded procurement, this term refers to all of the MBE Firms (if State-funded) or DBE Firms (if federally-funded) the bidder/offeror identified as available to perform the Identified Items of Work and should include all appropriately certified firms that are reasonably identifiable.



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Identified Items of Work – “Identified Items of Work” means the bid items identified by the procuring agency during the goal setting process and listed in the procurement as possible items of work for performance by MBE/DBE Firms. It also may include additional portions of items of work the bidder/offeror identified for performance by MBE/DBE Firms to increase the likelihood that the MBE/DBE Goal(s) will be achieved. If the procurement does not include a list of Identified Items of Work, this term refers to all of the items of work the bidder/offeror identified as possible items of work for performance by MBE/DBE Firms and should include all reasonably identifiable work opportunities.

MBE/DBE Firms – For State-funded contracts, “MBE/DBE Firms” refers to certified **MBE** Firms. Certified MBE Firms can participate in the State’s MBE Program. For federally-funded contracts, “MBE/DBE Firms” refers to certified **DBE** Firms. Certified DBE Firms can participate in the federal DBE Program.



II. Types of Actions MDOT will Consider

The bidder/offeror is responsible for making relevant portions of the work available to MBE/DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available MBE/DBE subcontractors and suppliers, so as to facilitate MBE/DBE participation. The following is a list of types of actions MDOT will consider as part of the bidder's/offeror's Good Faith Efforts when the bidder/offeror fails to meet the MBE/DBE Goal(s). This list is not intended to be a mandatory checklist, nor is it intended to be exclusive or exhaustive. Other factors or types of efforts may be relevant in appropriate cases.

A. Identify Bid Items as Work for MBE/DBE Firms

1. Identified Items of Work in Procurements

(a) Certain procurements will include a list of bid items identified during the goal setting process as possible work for performance by MBE/DBE Firms. If the procurement provides a list of Identified Items of Work, the bidder/offeror shall make all reasonable efforts to solicit quotes from MBE Firms or DBE Firms, whichever is appropriate, to perform that work.

(b) Bidders/Offerors may, and are encouraged to, select additional items of work to be performed by MBE/DBE Firms to increase the likelihood that the MBEDBE Goal(s) will be achieved.

2. Identified Items of Work by Bidders/Offerors

(a) When the procurement does not include a list of Identified Items of Work, bidders/offerors should reasonably identify sufficient items of work to be performed by MBE/DBE Firms.

(b) Where appropriate, bidders/offerors should break out contract work items into economically feasible units to facilitate MBE/DBE participation, rather than perform these work items with their own forces. The ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the bidder/offeror of the responsibility to make Good Faith Efforts.

B. Identify MBE Firms or DBE Firms to Solicit

1. DBE Firms Identified in Procurements

(a) Certain procurements will include a list of the DBE Firms identified during the goal setting process as available to perform the items of work. If the procurement provides



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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;

(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.



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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



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(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.



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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



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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)

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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.



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**MDOT MBE/DBE FORM E
GOOD FAITH EFFORTS GUIDANCE AND DOCUMENTATION**

PART 2 – CERTIFICATION REGARDING GOOD FAITH EFFORTS DOCUMENTATION

PAGE ___ OF ___

Prime Contractor	Project Description	Solicitation Number

PARTS 3, 4, AND 5 MUST BE INCLUDED WITH THIS CERTIFICATE ALONG WITH ALL DOCUMENTS SUPPORTING YOUR WAIVER REQUEST.

I hereby request a waiver of (1) the Minority Business Enterprise (MBE) participation goal and/or subgoal(s), (2) the Disadvantaged Business Enterprise (DBE) participation goal, or (3) a portion of the pertinent MBE/DBE participation goal and/or MBE subgoal(s) for this procurement.¹ I affirm that I have reviewed the Good Faith Efforts Guidance MBE/DBE Form E. I further affirm under penalties of perjury that the contents of Parts 3, 4, and 5 of MDOT MBE/DBE Form E are true to the best of my knowledge, information and belief.

Company Name

Signature of Representative

Address

Printed Name and Title

City, State and Zip Code

Date

¹ MBE participation goals and subgoals apply to State-funded procurements. DBE participation goals apply to federally-funded procurements. Federally-funded contracts do not have subgoals.



MDOT MBE/DBE FORM E
GOOD FAITH EFFORTS GUIDANCE AND DOCUMENTATION

**PART 3 – IDENTIFIED ITEMS OF WORK BIDDER/OFFEROR MADE AVAILABLE TO
MBE/DBE FIRMS**

PAGE __ OF __

Prime Contractor	Project Description	Solicitation Number

Identify those items of work that the bidder/offeror made available to MBE/DBE Firms. This includes, where appropriate, those items the bidder/offeror identified and determined to subdivide into economically feasible units to facilitate the MBE/DBE participation. For each item listed, show the anticipated percentage of the total contract amount. It is the bidder's/offeror's responsibility to demonstrate that sufficient work to meet the goal was made available to MBE/DBE Firms, and the total percentage of the items of work identified for MBE/DBE participation equals or exceeds the percentage MBE/DBE goal set for the procurement. Note: If the procurement includes a list of bid items identified during the goal setting process as possible items of work for performance by MBE/DBE Firms, the bidder/offeror should make all of those items of work available to MBE/DBE Firms or explain why that item was not made available. If the bidder/offeror selects additional items of work to make available to MBE/DBE Firms, those additional items should also be included below.

Identified Items of Work	Was this work listed in the procurement?	Does bidder/offeror normally self-perform this work?	Was this work made available to MBE/DBE Firms? If no, explain why?
	<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

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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
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PART 5 – ADDITIONAL INFORMATION REGARDING REJECTED MBE/DBE QUOTES

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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 FEDERALLY ASSISTED CONTRACTS:

(a) Each bidder shall provide the following information:

NAME OF FIRM: _____

Street and/or P.O. Box

City State Zip Code

____ DBE ____ Non-DBE Age of the firm ____ years
Annual gross receipts per last calendar year ____ <\$500,000 ____ \$500,000-1,000,000
____ \$1,000,000-3,000,000 ____ \$3,000,000-5,000,000 ____ \$5,000,000-10,000,000
____ >\$10,000,000

(b) Each bidder shall provide the following information for each firm quoting or considered as subcontractors and/or suppliers:

NAME OF FIRM: _____

Street and/or P.O. Box

City State Zip Code

____ DBE ____ Non-DBE Age of the firm ____ years
Annual gross receipts per last calendar year ____ <\$500,000 ____ \$500,000-1,000,000
____ \$1,000,000-3,000,000 ____ \$3,000,000-5,000,000 ____ \$5,000,000-10,000,000
____ > \$10,000,000

NAME OF FIRM: _____

Street and/or P.O. Box

City State Zip Code

____ DBE ____ Non-DBE Age of the firm ____ years
Annual gross receipts per last calendar year ____ <\$500,000 ____ \$500,000-1,000,000
____ \$1,000,000-3,000,000 ____ \$3,000,000-5,000,000 ____ \$5,000,000-10,000,000
____ > \$10,000,000



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NAME OF FIRM: _____

Street and/or P.O. Box

City State Zip Code

____ DBE ____ Non-DBE Age of the firm ____ years
Annual gross receipts per last calendar year ____ <\$500,000 ____ \$500,000-1,000,000
____ \$1,000,000-3,000,000 ____ \$3,000,000-5,000,000 ____ \$5,000,000-10,000,000
____ > \$10,000,000

NAME OF FIRM: _____

Street and/or P.O. Box

City State Zip Code

____ DBE ____ Non-DBE Age of the firm ____ years
Annual gross receipts per last calendar year ____ <\$500,000 ____ \$500,000-1,000,000
____ \$1,000,000-3,000,000 ____ \$3,000,000-5,000,000 ____ \$5,000,000-10,000,000
____ > \$10,000,000

NAME OF FIRM: _____

Street and/or P.O. Box

City State Zip Code

____ DBE ____ Non-DBE Age of the firm ____ years
Annual gross receipts per last calendar year ____ <\$500,000 ____ \$500,000-1,000,000
____ \$1,000,000-3,000,000 ____ \$3,000,000-5,000,000 ____ \$5,000,000-10,000,000
____ > \$10,000,000

Submit additional copies of this page as page 29A of 31, 29B of 31, 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



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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)

Thursday, November 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

three thousand fifty dollars dollars (\$3050.00) per calendar day

will be assessed for unauthorized extensions beyond the contracted time of completion.



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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 full 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).