Maryland Department of Transportation

State Highway Administration
Baltimore, Maryland
Request for Proposals

Contract No. PG7005170
F.A.P No. AC-NHPP-263-1(22)N & HP-1755(2)N

MD 210 at Livingston/Kerby Hill Road

MD 210 Livingston Road/Kerby Hill Road Interchange Design-Build

Prince George's County

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

The State Highway Administration will only be responsible for the completeness of documents obtained directly from the State Highway Administration Cashier's Office.
Failure to attach all addenda may cause the bid to be irregular.

VENDOR I.D. NUMBER

_____

S.H.A. USE ONLY

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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.

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

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.

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

NOTICE TO ALL HOLDERS OF THIS CONTRACT DOCUMENT

MARYLAND MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MdMUTCD) REQUIREMENTS

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

OCCUPYING WETLANDS/WATERWAYS FOR DESIGN-BUILD

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

(a) Prior to performing any work on the project, the areas of wetland will be identified and marked by orange safety fence or as directed by the Engineer. All personnel of the Contractor or sub-contractors shall be alerted to these designated areas.

(b) The Contractor or sub-contractors shall not impact any wetland or waterway, whether it be permanently or temporarily unless otherwise stipulated in the permit and approved as an authorized action by the appropriate regulatory agency. No fill shall be placed in these areas without an appropriate permit. No storage of equipment or materials will be allowed in wetlands.

(c) The Contractor or sub-contractor shall not impact a wetland or waterway that is not covered by an existing wetland permit.

(d) If the Contractor impacts any wetland or waterway for which they do not have a wetland permit, they shall be responsible for contacting the State Highway Administration's Environmental Programs Division prior to restoring the wetland areas and mitigating the wetland impacts to the full satisfaction of the environment regulatory agencies, which could include monetary compensation.

(e) The cost of restoration and mitigation of the impacted areas shall be at no additional cost to the Administration.

(f) The Design-Builder will prepare permit modifications at the conclusion design and at the conclusion of construction. The modification will be based on surveyed as-built plans and will include standard 8.5"x 11.0" plates and a revised Joint State/Federal Nontidal Wetlands and Waterways Permit application.

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

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

1. NO EXCESS FILL, CONSTRUCTION MATERIAL, OR DEBRIS SHALL BE STOCKPILED OR STORED IN NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.

2. PLACE MATERIALS IN A LOCATION AND MANNER WHICH DOES NOT ADVERSELY IMPACT SURFACE OR SUBSURFACE WATER FLOW INTO OR OUT OF NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.

3. DO NOT USE THE EXCAVATED MATERIAL AS BACKFILL IF IT CONTAINS WASTE METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIAL, OR ANY OTHER DELETERIOUS SUBSTANCE. IF ADDITIONAL BACKFILL IS REQUIRED, USE CLEAN MATERIALS FREE OF WASTE METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIAL, OR ANY OTHER DELETERIOUS SUBSTANCE.

4. PLACE HEAVY EQUIPMENT ON MATS OR SUITABLY OPERATE THE EQUIPMENT TO PREVENT DAMAGE TO NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.

5. REPAIR AND MAINTAIN ANY SERVICEABLE STRUCTURE OR FILL SO THERE IS NO PERMANENT LOSS OF NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, OR WATERWAYS, OR PERMANENT MODIFICATION OF THE 100-YEAR FLOODPLAIN IN EXCESS OF THAT LOST UNDER THE ORIGINALLY AUTHORIZED STRUCTURE OR FILL.

6. RECTIFY ANY NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, OR 100-YEAR FLOODPLAIN TEMPORARILY IMPACTED BY ANY CONSTRUCTION.

7. ALL STABILIZATION IN THE NONTIDAL WETLAND AND NONTIDAL WETLAND BUFFER SHALL CONSIST OF THE FOLLOWING SPECIES:

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

   VOLUNTARY REVEGETATION OF NATURAL WETLAND SPECIES. OTHER NON-PERSISTENT VEGETATION MAY BE ACCEPTABLE, BUT MUST BE APPROVED BY THE NONTIDAL WETLANDS AND WATERWAYS DIVISION. KENTUCKY 31 FESCUE SHALL NOT BE UTILIZED IN WETLAND OR BUFFER AREAS. THE AREA SHOULD BE SEEDED AND MULCHED TO REDUCE EROSION AFTER CONSTRUCTION ACTIVITIES HAVE BEEN COMPLETED.

8. AFTER INSTALLATION HAS BEEN COMPLETED, MAKE POST CONSTRUCTION GRADES AND ELEVATIONS THE SAME AS THE ORIGINAL GRADES AND ELEVATIONS IN TEMPORARILY IMPACTED AREAS.

9. TO PROTECT AQUATIC SPECIES, IN-STREAM WORK IS PROHIBITED AS DETERMINED BY THE CLASSIFICATION OF THE STREAM:

   A. USE I WATERS: IN-STREAM WORK SHALL NOT BE CONDUCTED DURING THE PERIOD MARCH 1 THROUGH JUNE 15, INCLUSIVE DURING ANY YEAR.
   B. USE III WATERS: IN-STREAM WORK SHALL NOT BE CONDUCTED DURING THE PERIOD OCTOBER 1 THORUGH APRIL 30, INCLUSIVE, DURING ANY YEAR.
   C. USE IV WATERS: IN-STREAM WORK SHALL NOT BE CONDUCTED DURING THE PERIOD MARCH 1 THROUGH MAY 31, INCLUSIVE, DURING ANY YEAR.

10. STORMWATER RUNOFF FROM IMPERVIOUS SURFACES SHALL BE CONTROLLED TO PREVENT THE WASHING OF DEBRIS INTO THE WATERWAY.

11. CULVERTS SHALL BE CONSTRUCTED AND ANY RIPRAP PLACED SO AS NOT TO OBSTRUCT THE MOVEMENT OF AQUATIC SPECIES, UNLESS THE PURPOSE OF THE ACTIVITY IS TO IMPOUND WATER.

REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS

I. GENERAL

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

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

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

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

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

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

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

II. NONDISCRIMINATION

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

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

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

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

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

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

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

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

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

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

6. Training and Promotion:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

III. NONSEGREGATED FACILITIES

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

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

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

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

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

1. Minimum wages

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

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

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

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

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

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

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

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

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

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

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

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

2. Withholding

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

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

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

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

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

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

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

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

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

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

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

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

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

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

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

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

b. Trainees (programs of the USDOL).

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

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

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

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

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

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

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

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

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

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

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

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

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

10. Certification of eligibility.

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

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

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

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

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

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

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

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

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

VI. SUBLETTING OR ASSIGNING THE CONTRACT

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

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

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

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

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

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

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

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

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

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

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

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

VII. SAFETY: ACCIDENT PREVENTION

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

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

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

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

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

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

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

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

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

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

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

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

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

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

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

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.
2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

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

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

1**. Instructions for Certification – First Tier Participants:**

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

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

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

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

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

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

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

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

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

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

* * * * *

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

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

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

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

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

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

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

2. **Instructions for Certification - Lower Tier Participants:**

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

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

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

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

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

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

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

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

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

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

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

* * * * *

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

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

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

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

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

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

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

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

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

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

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

CONTRACT GOALS

FOR THE PURPOSE OF THIS CONTRACT, A GOAL OF **27**% 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 27**%** percent of the portion of the contract price allocable to professional services.

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

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

A. GENERAL

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

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

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

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

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

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

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

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

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

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

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

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

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

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

1. Found by the MDOT to be socially and economically disadvantaged on a case-by-case basis;

2. Any individual in the following groups, members of which are rebuttably presumed to be socially and economically disadvantaged.

a. "Black Americans," which includes persons having origins in any of the Black racial groups of Africa;

b. "Hispanic Americans," which includes persons of Mexican, Puerto Rican, Cuban, Dominican, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race;

c. "Native Americans," which includes persons who are American Indian, Eskimos, Aleuts, or Native Hawaiians;

d. "Asian-Pacific Americans," which included persons whose origins are from Japan, China, Taiwan, Korea, Burma (Myanmar), Vietnam, Laos, Cambodia (Kampuchea), Thailand, Malaysia, Indonesia, the Philippines, Brunei, Samoa, Guam, the U.S. Trust Territories of the Pacific Islands (Republic of Palau), the Commonwealth of the Northern Marianas Islands, Macao, Fiji, Tonga, Kirbati, Juvalu, Nauru, Federated States of Micronesia, or Hong Kong;

e. "Subcontinent Asian American," which includes persons whose origins are from India, Pakistan, Bangladesh, Bhutan, the Maldives Islands, Nepal or Sri Lanka;

f. Women;

3. Only those persons whose personal net worth does not exceed $750,000 may be found to be economically disadvantaged.

B. DBE/MBE and Good Faith Effort Requirements

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

2. In making a good faith effort to achieve the DBE goal, prior to completing the Certified DBE Utilization and Fair Solicitation Affidavit and the DBE Participation Schedule and prior to submitting a bid or initial proposal the bidders (or offerors) including those bidders or offerors that are certified DBEs must:

a. Identify specific work categories within the scope of the procurement appropriate for subcontracting and/or procurement of materials and/or services;

b. **Solicit DBEs in writing at least 10 days before bids or initial proposals are due,** describing the identified work categories and providing instructions on how to bid on the subcontracts and/or procurement of materials and/or services;

c. Attempt to make personal contact with the DBEs solicited and to document these attempts;

d. Assist DBEs to fulfill, or to seek waiver of, bonding requirements; and

e. Attend prebid or other meetings the procurement agency schedules to publicize contracting opportunities to DBEs.

3. All firms bidding on a Federal-Aid Contract shall submit the name and address of all subcontractors, service providers and suppliers that submitted quotes on the Contract. All subcontractors, service providers and suppliers shall complete and submit the form entitled Contractor Information, to the Administration.

4. The bidder shall seek commitments from disadvantaged business enterprises by subcontracting and/or procurement of materials and/or services, the combined value of which equals or exceeds the appropriate percent (goal) of the total value of the prime contract. A bidder may count toward its DBE goals expenditures for materials and supplies obtained from DBE regular dealers and/or manufacturers provided that the DBEs assume the actual and contractual responsibility for the provision of the materials and supplies. The bidder may count its entire expenditure to a DBE manufacturer (i.e., a supplier that produces goods from raw materials or substantially alters them before resale). The bidder may count sixty (60) percent of its expenditures to a DBE regular dealer that is not a manufacturer, provided that the DBE supplier performs a commercially useful function in the supply process. The apparent low bidder shall submit to the Administration, within ten (10) business days after notification that it is the apparent low bidder, an acceptable Affirmative Action Plan for the utilization of Disadvantaged Business Enterprises in this Contract. The Contract will not be awarded without the Bidder's AAP being approved by the Administration.

The Affirmative Action Plan shall include as a minimum:

a. The name of an employee designated as the bidder's liaison officer for minority affairs.

b. A complete DBE Subcontractor Project Participation Affidavit (MDOT-OP-019-2), using contractors whose names appear in the DBE/MBE directory or who are otherwise certified by MDOT as being a disadvantaged business enterprise. Except as permitted by law and approved by the Administration, this affidavit shall include all DBE firms identified on the DBE Participation Schedule with a percentage of participation that meets or exceeds the percentage of participation indicated in the bid or initial proposal.

c. A completed Outreach Efforts Compliance Statement (MDOT-OP 018-2).

5. When a bidder intends to attain the appropriate goal for disadvantaged business enterprise participation by use of a joint venture, the bidder shall submit a Joint Venture Disclosure Affidavit (Form D-EEO-006-A) showing the extent of disadvantaged business participation. If a bidder intends to use a joint venture as a subcontractor to meet its goal, the affidavit shall be submitted through the bidder by the proposed subcontractor and be signed by all parties. A DBE, even in a joint venture arrangement shall be certified as a DBE by MDOT prior to being included in the Affirmative Action Plan.

6. Where the proposed DBE participation does not meet the DBE contract goals, sufficient evidence to demonstrate that the bidder has taken all necessary and reasonable steps to make a good faith effort to meet these goals shall be required.

7. Determination of Bid Responsiveness for Federal-Aid Contracts

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

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

a. A detailed statement of efforts made prior to bid to contact and negotiate with DBEs including: (i) the dates, names, addresses, and telephone numbers of DBEs who were contacted; (ii) a description of the information provided to DBEs requesting the plans, specifications, and anticipated time schedule for portions of the work to be performed and (iii) a detailed statement of the reasons why additional prospective agreements with DBEs were not reached;

b. A detailed statement of the efforts made to select portions of the work proposed to be performed by DBEs in order to increase the likelihood of achieving the stated goals;

c. For each DBE that the Contractor considers not qualified, but from which a bid has been received, a detailed statement of the reasons for the bidder's conclusion; and

d. For each DBE contacted but unavailable, (i) a Minority Contractor Unavailability Certificate (Form OOC46) signed by the disadvantaged business enterprise, or (ii) a statement from the bidder shall be submitted that states that the DBE refused to sign the Certificate.

8. Guidance concerning good faith efforts. The following is a list of the types of actions and factors that will be used to determine the bidder's or offeror's good faith efforts to obtain DBE participation. It is not intended to be a mandatory checklist, nor is it intended to be exclusive or exhaustive. Other factors or types of efforts may be relevant in appropriate cases.

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

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

(2) Selecting portions of the work to be performed by DBEs in order to increase the likelihood that the DBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the bidder or offeror might otherwise prefer to perform these work items with its own forces.

(3) Providing interested DBEs with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.

(4) (a) Negotiating in good faith with interested DBEs. It is the bidder's or offeror's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to facilitate DBE participation.

(b) A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBEs is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable. Also, the ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidders and offerors are not, however, required to accept higher quotes from DBEs if the price difference is excessive or unreasonable.

(5) Not rejecting DBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The contractor's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the contractor's efforts to meet the project goal.

(6) Making efforts to assist interested DBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or contractor.

(7) Making efforts to assist interested DBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.

(8) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state, and Federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBEs.

(9) In determining whether a bidder or offeror has made good faith efforts, you may take into account the performance of other bidders or offerors in meeting the contract goal. For example, when the apparent successful bidder or offeror fails to meet the contract goal, but others meet it, the Administration may reasonably raise the question of whether, with additional reasonable efforts, the apparent successful bidder or offeror could have met the goal. If the apparent successful bidder or offeror fails to meet the goal, but meets or exceeds the average DBE participation obtained by other bidders or offerors, the Administration may view this, in conjunction with other factors, as evidence of the apparent successful bidder or offeror having made good faith efforts.

9. Bidder Use of DBE Special Services

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

10. Bidder Records

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

11. Bidder Cooperation

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

12. Bidder DBE Modifications

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

C. RECORDS AND REPORTS

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

a. The name of disadvantaged and non-disadvantaged subcontractors and suppliers, the type of work materials or services being performed on or incorporated in this project, and the monetary value of such work materials or services.

b. Documentation of all correspondence, contacts, telephone calls, etc., to obtain the services of disadvantaged business enterprises on this project.

c. The progress and efforts made in seeking out disadvantaged contractor organizations and individual disadvantaged contractors for work on this project.

2. Information required to be submitted for Federally Assisted contracts in accordance with 49 CFR Part 26:

a. All bidders (not only the apparent successful bidder) shall provide the following information:

(1) The age of the bidding firm; and

(2) The annual gross receipts of the bidding firm.

b. All bidders (not only the apparent successful bidder) shall provide the following information for each firm quoting or considered as subcontractors:

(1) The name of firm; and

(2) The address of firm.

c. The Administration will contact each of the firms quoting or considered as subcontractors to obtain:

(1) The age of the firm; and

(2) The annual gross receipts of the firm

If this information already has been gathered by the Administration on a firm and it is current, it will not be requested.

3. The Contractor shall submit reports on a monthly basis of those contracts and other business transactions executed with disadvantaged business enterprises with respect to the records referred to in Subparagraph 1.a above, in such form, manner, and content as prescribed by the Administration. The reports shall be due monthly on the 15th calendar day of each month. If the Contractor cannot submit their report on time, they shall notify the Administration's Representative and request additional time to submit the report. Failure of the Contractor to report in a timely manner may result in a finding of noncompliance. Additional reports may be required by the Administration upon written request.

4. To ensure compliance with the certified DBE contract participation goals, the Contractor shall:

a. Submit monthly, a report listing unpaid invoices, over 30 days, from all certified DBE subcontractors and the reason payment has not been made;

b. Include in its agreement with certified DBE subcontractors a requirement that the DBE subcontractors are to submit monthly to the Administration, a report identifying the prime Contractor and listing the following:

1. Payment received from the Contractor in the preceding 30 days; and

2. Invoices for which the subcontractor has not been paid.

5. All such records shall be retained for a period of three years following acceptance of final payment and shall be available for inspection by the U.S. Department of Transportation, the Maryland Department of Transportation, and the Administration.

D. ADMINISTRATIVE PROCEDURES FOR ENFORCEMENT

1. Whenever the Administration believes the prime Contractor or any subcontractor may not be operating in compliance with the terms of these provisions, the Administration Representative will conduct an investigation. If the Administration Representative finds the prime Contractor or any subcontractor not in compliance with these provisions, he will make a report of non-compliance and notify such Contractor in writing of the steps that will, in the judgment of the Administration, bring the Contractor into compliance. If the Contractor fails or refuses to comply fully with such steps, the Administration Representative will make a final report of noncompliance to the Administrator, who may direct the imposition of one or more of the sanctions listed below:

a. Suspension of work on a project, pending correction;

b. Withholding payment or a percentage thereof, pending correction;

c. Referral of DBE/MBE to MDOT Office of MBE for review for decertification or minority business fraud investigation;

d. Referral to MDOT Office of MBE for review/referral to the Attorney General's Office for review for initiation of debarment;

e. Referral to the Attorney General's Office for review for debarment or for criminal prosecution through the MDOT Office of General Counsel; or

f. Any other action as appropriate.

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

2. If the documents used to determine the status of a DBE contain false, misleading, or misrepresenting information, the matter may be referred to the MDOT Office of MBE for appropriate action.

3. Loss of DBE Certification

a. When a prime Contractor has made a commitment to use a DBE who has lost its certification but the subcontract has not been executed prior to the notice of loss of certification, the prime Contractor is required to obtain an eligible, certified DBE for the contract or demonstrate to MDOT that it has made a good faith effort to do so.

b. When a prime Contractor has executed a contract with a DBE subcontractor before the notice of loss of certification, the prime Contractor may continue to use the firm on the contract and may continue to receive credit towards its DBE goal, i.e., contract goal, for the work of that subcontractor.

c. The work carried out by a DBE Prime Contractor would be counted by MDOT up to the loss of certification. The work performed after the loss of certification would not be considered DBE participation.

d. When a DBE subcontractor has lost its certification, MDOT may not continue to count the DBE participation which takes place after the loss of certification as DBE work when counting participation towards the overall goal of the modal administration or the Department.

e. If a DBEs loss of certification is the result of exceeding the size standards while performing on a contract, the DBE participation may be counted for both the contract goal and the overall goal.

E. SUBCONTRACTING.

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

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

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

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

NOTICE TO CONTRACTORS
CONCERNING THE MBE/DBE GOAL ON THIS CONTRACT

The Maryland Department of Transportation is committed to providing the maximum amount of contracting opportunities to certified Minority Business Enterprises (MBEs) and Disadvantaged Business Enterprises (DBEs). The previously established policy excluded consideration of the cost of supplying structural steel for MBE/DBE participation since there were no structural steel manufacturers certified by MDOT. This exemption is no longer applicable since MBE/ DBE firms have been certified under this category.

The Administration reserves the right to verify the accuracy of the dollar value included on the Contractor's Affirmative Action Plan, including the value associated with the manufacture, supply, and installation of structural steel.

MBE/DBE COMPLIANCE FIELD MEETING

A MBE/DBE compliance Field Meeting will be conducted to review the responsibilities of the Administration and the Contractor's personnel relative to MBE/DBE Compliance and documentation. The meeting will be held within two weeks after starting work on the project.

The Construction Project Engineer, who will notify the following of the date, time and location, will arrange the meeting. At least one week advanced notice will be required.

(a) Administrative Representatives.

(1) Director, Office of Equal Opportunity or Designee

(2) District Equal Opportunity Officer

(3) Regional Constructional Engineer

(4) Construction Project Engineer

(5) Construction Inspection Division Inspector

(b) Contract Representatives.

(1) Superintendent - Prime Contractor

(2) Equal Opportunity Officer - Prime Contractor

(3) Owner/Superintendent/Foreman MBE/ DBE - Subcontractor

The Construction Project Engineer and Equal Opportunity Representative will jointly conduct the meeting. The Contractor shall notify the appropriate subcontractors and ensure their attendance.

TRAFFIC CONTROL PLAN CERTIFICATION FOR DESIGN-BUILD

PRIOR TO THE COMMENCEMENT OF WORK ON THIS PROJECT, THE SUCCESSFUL PROPOSER WILL BE REQUIRED TO COMPLETE A TRAFFIC CONTROL PLAN CERTIFICATION, CONTAINING THE INFORMATION SHOWN BELOW. THE CERTIFICATION FORM WILL BE PROVIDED TO THE SUCCESSFUL PROPOSER UPON AWARD OF THE CONTRACT.

The Administration's Traffic Control Plan (TCP) has been reviewed and the following course of action shall be followed:

Option 1 ___ See Note Below
The TCP is accepted and shall be used on this project.

Option 2 ___ See Note Below
The TCP is accepted; however, revisions and/or additions shall be submitted for approval in conformance with the Administration's Specifications 104.01.

Option 3
The TCP is not accepted and revision shall be submitted for approval in accordance with the Administration's Specifications 104.01.

It is understood that the effective implementation of the approved TCP is the responsibility of the Contractor. Minor modifications may be made by the Traffic Manager if field conditions warrant and prior concurrence is obtained from the Engineer. Significant changes to the TCP will be submitted to the Engineer in writing, for approval, in conformance with the Administration's Specifications 104.01.

_____ _____
(DATE) (SIGNATURE)

_____
(PRINT SIGNATURE)

_____
(TITLE)

Note: Option 1 and 2 shall not be used on this project.
This is a Design-build project and the Design-Build Team must prepare a TCP based on the requirements in the Administrations Specifications 104.01.

PREVAILING WAGE
INSTRUCTIONS FOR THE CONTRACTOR

PAYROLLS.

Non-Federally Funded Contracts. The Division of Labor and Industry, Prevailing Wage Unit is requiring that all certified payroll records be submitted electronically. For instructions on how to register and submit go online to www.dllr.state.md.us/prevwage and follow the instructions for registering. The regulation addressing this change can be found at COMAR 21.11.11.02. For Non-Federally funded projects, which include prevailing wage rates**,** the prime Contractor and each subcontractor, shall submit the certified payroll electronically and provide one hard scopy to the Project Engineer. All wages shall be paid in conformance with the State Finance and Procurement Article, Section 17-201-17-226 of the Annotated Code of Maryland and the Fair Labor Standards Amendments of 1974 (P.L. 93259). If the award amount of a Non-Federally funded job is less than $500,000, the project will be exempt from prevailing wage requirements.

A review has been made of the wage conditions in the locality and, based on the information available, the wage rates and fringe payments listed are determined by the Commissioner of the Department of Labor and Industry to be prevailing for the Contract for the described classes of labor in conformance with the law. It shall be the responsibility of the Contractor to fully comply with the law and to contact the Office of the Commissioner of Labor and Industry for interpretation of the provisions of the law.

Federally Funded Contracts. For Federally funded projects, the prime Contractor and each subcontractor shall submit one copy of the certified payroll to the Project Engineer.

General Requirements for Federally and Non-Federally Funded Contracts. All payrolls are subject to the following requirements:

(a) All payrolls shall be numbered, beginning at No. 1, and consecutively numbered through the end of the Contract.

(b) Contract and FAP numbers shall be shown on all payrolls (as applicable).

(c) All payroll submissions shall include:

(1) Federally Funded – employees' full name, classification, and Individual Identifying Number (IIN) e.g. (last four digits of social security number). Refer to FHWA 1273 (IV),(3),(b)1) for further requirements related to weekly payrolls.

(2) Non-Federally Funded – employees' full name, classification, address and social security number.

(d) All payrolls shall show the employee's basic hourly wage rate, overtime rate (if applicable), and the number of hours worked (tabulated both daily and weekly).

(e) When fringe benefits are required, indicate separately the amount of employer contributions to fringe benefit funds and/or programs. The fringe benefits shall be individually identified, but may be tabulated on a separate sheet. When required fringe benefits are paid in cash, add the required fringe benefit amount to the basic hourly rate to obtain the total prevailing wage rate for the employee.

(f) The employee's net pay and the itemized deductions shall be included in all payrolls.

(g) A Contractor may make deductions that are required by law or required by a collective bargaining agreement (between the Contractor and a bona fide labor organization). Deductions are also permitted if they are identified in a written agreement between the employee and employer that was made at the beginning of employment, provided that the Contractor presents the agreement to the Administration before the employee begins working on the Contract. Each payroll shall also include the U.S. Department of Labor and Hour Public Contracts Division Statement of Compliance Form WH-347 (or its equivalent), signed by an appropriate official of the Contractor/subcontractor. The Contractor's name, address, and telephone number shall also be shown.

(h) On Non-Federally funded projects, all apprentices shall be registered with the Maryland Apprenticeship and Training Council.

(i) Contractors employing a classification of worker for which a wage rate was not included on the original wage decision, shall submit to either the Wage and Hour Team (Federally Funded) or Department of Labor and Licensing (DLLR), (Non-Federally Funded), a request for an additional classification and rate prior to the employee's employment at the project.

(j) Payrolls for Non-Federally Funded projects shall be submitted within 14 calendar days after the end of each payroll period.

(k) Payrolls for Federally Funded projects shall be submitted within 7 calendar days after the end of each payroll period.

(l) Contractors and Subcontractors are required to maintain complete social security numbers and home addresses for employees. Government agencies are entitled to request or review all relevant payroll information, including social security numbers and addresses of employees. Contractors and Subcontractors are required to provide such information upon request.

OVERTIME.

Non-Federally Funded Contracts. Overtime rates shall be paid by the prime Contractors and subcontractors under their Contracts and agreements with their employees, which in no event shall be less than time and a half the prevailing hourly rate of wages for all hours worked in excess of ten hours in any one calendar day or forty hours in any one calendar week and work performed on Sundays and legal holidays.

Fringe benefits shall be paid for all hours worked, including the overtime hours. However, the fringe benefit amounts may be excluded from the half time premium due as overtime compensation.

Federally Funded Contracts. Overtime rates shall be paid as specified in Form FHWA 1273. Fringe benefits shall be paid for all hours worked, including the overtime hours. However, the fringe benefit amounts may be excluded from the half time premium due as overtime compensation.

PENALTIES.

Non-Federally Funded Contracts. When the Contractor is delinquent in submitting payroll records, processing of partial payment estimates will be held in abeyance, pending receipt of the records. The Contractor shall be liable to the Administration for liquidated damages in the amount of $10.00 for each calendar day the records are late.

The Contractor shall be liable to the Administration for liquidated damages in the amount of $20.00 for each day that an employee is paid less than the prevailing wage.

Federally Funded Contracts. When the Contractor is delinquent in submitting payroll records, processing of partial payment estimates will be held in abeyance pending receipt of the records.

ADDITIONAL CLASSIFICATIONS.

Federally Funded Contracts. If the wage determination lacks a necessary classification the Prime Contractor is responsible to submit the request for the additional classification, with a proposed rate, to the State Highway Administration's Wage and Hour Team. The request is to include a copy of the projects wage determination.

Non-Federally Funded Contracts. If the wage determination lacks a necessary classification the Prime Contractor is responsible to submit the request for the additional classification, with a proposed rate, to the Department of Labor and Licensing (DLLR).

INQUIRIES.

Request for information or questions shall be addressed to:

Maryland State Highway Administration
Office of Construction
Wage and Hour Team
7450 Traffic Drive, Building #4
Hanover, MD 21076
or
Email: wageandhourteam@sha.state.md.us

General Decision Number: MD150100 01/02/2015 MD100

Superseded General Decision Number: MD20140100

State: Maryland

Construction Type: Highway

Counties: Calvert, Charles, Prince George's and St Mary's 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).

Note: Executive Order (EO) 13658 establishes an hourly minimum wage of $10.10 for 2015 that applies to all contracts subject to the Davis-Bacon Act for which the solicitation is issued on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.10 (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/02/2015

SUMD2014-013 08/27/2014

	Rates	Fringes
CARPENTER	$ 26.01	12.05
CEMENT MASON/CONCRETE FINISHER	$ 19.56	5.08
ELECTRICIAN	$ 35.10	16.53
IRONWORKER, REINFORCING	$ 26.86	15.27
IRONWORKER, STRUCTURAL	$ 27.44	15.27
LABORER: Asphalt, Includes Raker, Shoveler, Spreader and Distributor	$ 17.19	15.85
Laborer: Common or General including Flagger	$ 16.13	3.51

LABORER: Concrete Surfacer	$ 23.97	0.00
LABORER: Grade Checker	$ 18.86	15.85
LABORER: Luteman	$ 13.43	0.00
LABORER: Mason Tender - Cement/Concrete	$ 16.84	7.26
LABORER: Pipelayer	$ 19.14	8.62
MILLWRIGHT	$ 31.59	8.58
OPERATOR: Backhoe/Excavator/Trackhoe	$ 22.56	0.00
OPERATOR: Bobcat/Skid Steer/Skid Loader	$ 15.28	4.18
OPERATOR: Broom/Sweeper	$ 23.49	12.15
OPERATOR: Bulldozer	$ 26.25	0.00
OPERATOR: Crane	$ 29.30	15.05
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	$ 19.46	5.31
PAINTER: Spray	$ 32.66	8.97
PAINTER: Steel	$ 32.66	8.97
TRUCK DRIVER: Dump Truck	$ 19.11	0.00

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 a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

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

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

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

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

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

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

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

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

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

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

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

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END OF GENERAL DECISION

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

1. The Offeror's or Bidders attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Specifications" set forth herein.

2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate work force in each trade on all construction work in the covered area, are as noted in Appendix A and B:

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

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

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

4. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is noted on appendix B.

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

1. As used in these specifications:

a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;

b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;

c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.

d. "Minority" includes:

(i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

(ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish culture or origin regardless of race);

(iii) Asian and Pacific Islander (all persons having origins in any of the original people of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and,

(iv) American Indians or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7.a through 7.p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. The Contractor is expected to make substantially uniform progress toward its goal in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with reason therefore, along with whatever additional actions the Contractor may have taken.

d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7.b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the

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

g. Review, at least annually, the company's EEO Policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to insure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7.a through 7.p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more if its obligations under 7.a through 7.p of these specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female work force participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's non-compliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).

10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

14. The Contractors shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and

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

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

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

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

APPENDIX A

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

AREA COVERED: Nationwide

GOALS AND TIMETABLES

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

APPENDIX B

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

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

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

TRAINING PROVISIONS

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

The on-the-job training shall be aimed at developing full journeypersons in the type of trade or job classification involved. On this Contract **3** persons will be trained.

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

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

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

The MTU schedule shall include:

1. The proposed training programs.

2. The number of trainees to be trained in each classification.

3. Anticipated starting and ending dates for training in each classification.

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

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

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

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

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

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

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

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

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

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

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

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

1. Contributes to the cost of the training.

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

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

1. Systematic and direct recruitment likely to yield qualified minority and women applicants is conducted through:

a. Public and private referral sources.

b. Advising the existing workforce of training opportunities.

c. Unions (if applicable).

2. Acceptable training has been provided to trainees enrolled in the program.

3. The number of specified trainees have completed the minimum hours required in an approved training program.

4. Trainees completing approved programs are retained in the workforce as journeypersons.

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

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

1. Certificate of Completion when a trainee completes the total number of hours required to complete a training program.

2. Certificate of Training when a trainee does not totally complete the required program hours.

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

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

1. Withholding a percentage of the progress payment.

2. Other action appropriate and/or within the discretion of the Administrator.

NOTICE TO ALL HOLDERS OF THIS CONTRACT DOCUMENT

HIGH VISIBILITY SAFETY APPAREL POLICY

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

STATEMENT OF POLICY.

(a) The High Visibility Safety Apparel Policy provides a standardized apparel program.

(b) The program seeks to improve the visibility of all persons who work on Administration highways and rights-of-way.

(c) All apparel shall contain the appropriate class identification label.

(d) Compliance with this policy is retroactive and becomes effective immediately. All affected employees shall receive high visibility apparel awareness training.

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

(a) For Administration employees, this apparel shall have a fluorescent yellow-green background material color and be the outermost garment worn.

(b) Retro-reflective material color for Administration employee apparel shall be silver or white and be visible at a minimum distance of 1,000 feet. The retro-reflective safety apparel shall be designed to clearly recognize and differentiate the wearer from the surrounding work environment. The retro-reflective material may be contrasted by fluorescent orange background material not exceeding one and one half inches on either side of the retro-reflective material.

(c) For non-Administration employees, this apparel shall be either fluorescent orange-red or fluorescent yellow-green background material color and be the outermost garment worn.

(d) Retro-reflective material color for non-Administration employee apparel shall either be orange, yellow, white, silver, yellow-green, or a fluorescent version of these colors, and be visible at a minimum distance of 1,000 feet. The retro-reflective safety apparel shall be designed to clearly recognize and differentiate the wearer from the surrounding work environment.

REFERENCES.

(a) ANSI/ISEA 107/2004 standard – American National Safety Institute/International Safety Equipment Association

(b) MUTCD 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

Section 810.03.04	¶ 1, Line 3

Category 900 – Materials

Section 910.02.03	¶ 1, Line 3
Section 915.01.06	¶ 1, Line 4, 7
Section 921.10	¶ 1, Line 3

PROJECT DESCRIPTION

Refer to TC Section 2.07.02 – Project Overview

SPECIFICATIONS

All work on this project shall conform to the Maryland Department of Transportation, State Highway Administration's Specifications entitled, "Standard Specifications for Construction and Materials" dated July 2008 revisions thereof, or additions thereto, and the Special Provisions included in this Request for Proposals.

EMPLOYMENT AGENCY

Prince George's One-Stop Career Center
1801 McCormick Drive, 1st floor, Largo, Maryland 20774
Telephone (301) 618-8400 Fax: (301) 386-5533
largo@dllr.state.md.us

NOTICE TO CONTRACTOR

"NO EXCUSE BONUS"

The Administration desires to expedite construction on this Contract to minimize the inconvenience to the traveling public and reduce the time of construction. In order to achieve this, a "No Excuse Bonus" provision is established for the Milestone described below. The Administration will pay the Design-Builder a "No Excuse Bonus" in the amount of **$1,275,000** if the work is completed as described below on or before **November 27, 2018**, which is the "Bonus Completion Date".

Milestone 1 – Milestone 1 is defined as the calendar date when the interchange of MD 210 at Livingston Road/Kerby Hill Road is open to traffic. This includes all bridges, lanes, ramps and service roads to allow traffic to safely flow along MD 210, Livingston Road and Kerby Hill Road in the configuration it would at the completion of the project. To be in the final configuration, all lanes must be open except during allowable temporary lane closures. Lanes, however, do not have to be in their final location. Safe flow of traffic will include all necessary functional traffic control devices and lighting, pavement markings, barriers and other work required to be complete.

The "No Excuse Bonus" will be paid only if "Milestone 1" is completed as set forth above on or before the "Bonus Completion Date" and subject to the conditions precedent set forth below. For the purposes of the calculation and determination of entitlement to the "No Excuse Bonus" stated above, the "Bonus Completion Date" will not be adjusted for any reason, cause or circumstances whatsoever, regardless of fault, save and except in the instance of a catastrophic event where there is a declared state of emergency directly and substantially affecting the Design-Builder's operations on the Contract.

The parties anticipate that delays may be caused by or arise from any a number of events during the course of the Contract, including, but not limited to, work performed, work deleted, change orders, supplemental agreements, delays, disruptions, differing site conditions, utility conflicts, design changes or defects, time extensions, extra work, right of way issues, permitting issues, actions of suppliers, subcontractors or other contractors, actions by third parties, approval process delays, expansion of physical limits of project to make it functional, weather, weekends, holidays, suspensions 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 impact on performance by the Design-Builder are specifically contemplated and acknowledged by the parties entering into this Contract, and shall not extend the "Bonus Completion Date" set forth above. 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 prior to the "Bonus Completion Date", regardless of whether the Design-Builder successfully does so or not, shall be the sole responsibility of the Design-Builder in every instance.

In the event that a catastrophic event where there is a declared state of emergency directly and substantially affecting the Design-Builder's operations on the Contract, the Design-Builder and the Administration shall agree as to the number of calendar days to extend the "Bonus Completion Date". In the event that the Design-Builder and the Administration are unable to agree to the number of calendar days to extend the "Bonus Completion Date", the Administration shall unilaterally determine the number of calendar days to extend the "Bonus Completion Date" reasonably necessary and due solely to such catastrophic event and the Design-Builder shall have no right whatsoever to contest such determination, save and except that the Design-Builder establishes the number of calendar days determined by the Administration were arbitrary and without any reasonable basis.

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 or later, 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 15-25, and 34-38 of 43 of the Contract Provisions, Proposal Form Packet—State, or complete the AAP information on pages 16-26 and 35-39 of 44 of the Contract Provisions, Proposal Form Packet—State Small Business Reserve Procurement. Failure to complete the information may be grounds for the Price Proposal 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 Bidder/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 Bidder/Offeror shall register using the X-10 Vendor Electronic Funds (EFT) Registration Request Form. The instructions and the form are located on the internet at compnet.comp.state.md.us/gad.

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

BRIDGE UNDERCLEARANCE. The minimum underclearances shall be maintained whenever resurfacing a roadway. This may require grinding the existing pavement prior to placing the resurfacing material. Immediately after completing the resurfacing operation and when the lane closures are still in the effect, the Contractor, in the presence of the Engineer, shall measure the minimum vertical underclearance. The Engineer will submit results to the Office of Structures. The cost of these measurements will be incidental to other pertinent items specified in the Contract Documents.

REQUEST FOR INFORMATION. All requests for additional information or clarification of the RFP shall be submitted as outlined in TC Section 2.

RIGHT-OF-WAY STATUS

It is anticipated that the total right-of-way clearing will be April 1, 2015. The Administration will clear right-of-way in a phased approach to facilitate advanced utility relocations beginning along MD 210 Northbound. The second phase will include property along MD 210 Southbound, near the intersection with Kerby Hill Road. The Status of the R/W acquisition is as follows:

In accordance with the requirements of Title 23, Code of Federal Regulations, Part 635, this is to certify that of the ninety-one (91) parcels needed for construction on the above-captioned contract, two (2) are in the possession of the State Highway Administration (SHA) at this time.

106943 - Frank Vince & Saprina Mitchell; optioned

106944 - Brian H.J. & Wonhi Yong; optioned

The status of the eighty-nine (89) parcels not in our possession is as follows:

The following eighty-nine (89) parcels are having their appraisals completed and approved. Once approved, first- offers will be made.

106934 - JOSEPH F. & MARY D. EDELEN, JR; appraisal being reviewed

106935 - PARKER FIVE, LLC; appraisal being reviewed

106936 - DANIEL & KATHERINE CULBRETH; appraisal being reviewed

106937 - PG AIRCORP ASSOC LIMITED PARTNERSHIP; appraisal being reviewed

106938 - MARK H. ALLEN & COLLEN WHELAN; appraisal being reviewed

106939 - JOSEPH B. CORTEZ; appraisal being reviewed

106940 - PG AIRPARK ASSOC. LTD PARTNERSHIP; appraisal being reviewed

106941 - MB EQUITY HOMES, LLC; appraisal being reviewed

106942 - KAZCO PROPERTIES, INC.; appraisal being reviewed

106943 - FRANK VINCE &SAPRINA MITCHELL; appraisal being reviewed

106944 – BRIAN H J &WONHI YOUNG; appraisal being reviewed

106945 - PHYLLIS BARNHART &ELLA WEEMS; appraisal being reviewed

106946 - WILSON TOWERS LTD PARTNERSHIP; appraisal being reviewed

106947 - PRINCE GEORGE ' S COUNTY BOARD OF EDUCATION; appraisal being reviewed

106948 - HENRY L. &MARIA L. BALAGTAS; appraisal being reviewed

106949 - JAMES P. COLLINS; appraisal being reviewed

106950 - RONNIE L. DIGGS; appraisal being reviewed

106951 - NATALIA P. SORIANO; appraisal being reviewed

106952 - IRA K. &MADELIN H. JONES; appraisal being reviewed

106953 - COLLEN R. WHELAN; appraisal being reviewed

106954 - ROBERT L. &DOROTHY ASBERRY; appraisal being reviewed

106955 - SIMON Q. RIEL; appraisal being reviewed

106956 - LULU G. HESTER &T.D. ALEXANDER; appraisal being reviewed

106957 - ISAAC W. & CYNTHIA L. BROWN; appraisal being reviewed

106958 - MARY L. SMITH; appraisal being reviewed

106959 - WOODROW &VERGIE M. NICHOLAS; appraisal being reviewed

106960 - MARGARET ALFORD; appraisal being reviewed

106961 - SHALOM MINISTRIES CHRISTIAN CENTER; appraisal being reviewed

106962 - NATIONAL CAPITAL PRESBYTERY, INC.; appraisal being reviewed

106963 - JAMES COLLINS; appraisal being reviewed

106964 - JERALD I THOMAS; appraisal being reviewed

106965 - C.H. BROOKE KERBY; appraisal being reviewed

106966 - JOSE S. & LETICIA C. CASTRENCE; appraisal being reviewed

106967 - DAISY P. NAPPIER; appraisal being reviewed

106968 - ROUTE 210 ASSOCIATION L.C.; appraisal being reviewed

106969 - CHARLES S. BLUEMENTHAL; appraisal being reviewed

106970 - PG AIRCORP ASSOC. LIMITED PARTNERSHIP; appraisal being reviewed

106971 - CHARLES &BARBARA LEMWAY; appraisal being reviewed

106972 - RICHARD H. TYER; appraisal being reviewed

106973 - JOSEPH &MARY EDELEN; appraisal being reviewed

106974 - JOHN E. &BERTHA W. ALDERSON; appraisal being reviewed

106975 - CINDA WESSON; appraisal being reviewed

106976 - PARKER FIVE, LLC; appraisal being reviewed

106977-CHARLESM.WASHINGTON;appraisalbeingreviewed

106978 - DAISY 0 . TORRES; appraisal being reviewed

106979-SHARLAR.JENKINS;appraisalbeingreviewed

106980-NICHOLASH.PRADA;appraisalbeingreviewed

106981-PAULA. &PHYLLISA.C. COTTON;appraisalbeing reviewed

106982 - RALPH &BRIDGET V. PETERSON; appraisal being reviewed

106983 - ROLLAMAS, VALENTINA &VON FRANCO; appraisal being reviewed

106984 - FLEX ROCHA; appraisal being reviewed

106985 - PG AIRPARK ASSOC. LTD PARTNERSHIP; appraisal being reviewed

106986 - JAMES A. & PATRICIA A. JONES, JR; appraisal being reviewed

106987 - ROUTE 210 ASSOCIATES LC 2; appraisal being reviewed

106988 - ROUTE 210 ASSOCIATES LC 2; appraisal being reviewed

106989 - WILSON TOWERS LLLP; appraisal being reviewed

106990 - LAWRENCE &SHARON COLQUITT; appraisal being reviewed

106991 - MNCPP; appraisal being reviewed

106992 - NATIONAL CAPITAL PRESBYTERY INC.; appraisal being reviewed

106993 - VALENCIA & MARCHETTE 0. WATERS; appraisal being reviewed

106994 - ALLYOU ZEKARIAS; appraisal being reviewed

106995 - LINDA F. HILL; appraisal being reviewed

106996 - NELSON &ONEYDA TORRES; appraisal being reviewed

106997 - BARBARA K. HUFFORD; appraisal being reviewed

106998 - STATE OF MARYLAND; appraisal being reviewed

106999 - EDWARD &CARMEN POKORA; appraisal being reviewed

107000 - JAMES COLLINS; appraisal being reviewed

107001 - IRA K. &MADELINE H. JONES; appraisal being reviewed

107002 - LARRY M. & BETTY J. BAUCUM; appraisal being reviewed

107003 - DIANE LOCKLEAR; appraisal being reviewed

107232 - JAMES P. & SANDRA N. COLLINS; appraisal being reviewed

107351 - CLEAR CHANNEL; appraisal being reviewed

107392 - MERTON C. HUTCHINSON; appraisal being reviewed

107393 - MATTIE M. J. &DAVID S. BOND; appraisal being reviewed

107394 - LAURA E. STEWART; appraisal being reviewed

107395 - MARCUS A. KINGSBERRY; appraisal being reviewed

107396 - MNCPP; appraisal being reviewed

107397 - IGNACIO B. &JOSEFINA G. SUMARY, JR.; appraisal being reviewed

107398 - LENNIE &JOHNNY M. NOBLEZADA; appraisal being reviewed

107399 - LEANG K. CHEA, et al; appraisal being reviewed

107400 - ESTHER &MEYNARDO E. CONSTRERAS; appraisal being reviewed

107401 - KENNETH H. JOHNSON; appraisal being reviewed

107402 - MARIA L.C. PADILLA; appraisal being reviewed

107403 - CRYSTAL &FRANCIS D. HERBERT; appraisal being reviewed

107404 - ST. CYR ZENO W. II; appraisal being reviewed

107405 - JOSE MARQUEZ, et al; appraisal being reviewed

107406 - KATHY L. &MICHAEL L. WALKER; appraisal being reviewed

107410 - TONY M. WASHINGTON; appraisal being reviewed

107505 - BROOKSIDE PARK CONDOMINIUM, INC.; appraisal being reviewed

106938 - MARK H. ALLEN & COLLEEN WHELAN; appraisal being reviewed

106939 - JOSEPH B. CORTEZ; appraisal being reviewed

106942 - KAZCO PROPERTIES, INC.; appraisal being reviewed

REQUIRED PERMITS

All permits obtained by SHA shall be inserted here upon receipt. For permit information, please refer to TC Section 2.07.02.05.7 – Permits.

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

Lawrence J. Hogan, Jr.
Governor

Ben Grumbles
Acting Secretary

Boyd K. Rutherford
Lieutenant Governor

January 30, 2015

Dana Havlik, Chief
Highway Hydraulics Division
State Highway Administration
707 North Calvert Street
Baltimore, MD 21202

Re: MDE No. 13-SF-0356
Contract No. PG7005170
MD 210 at Kerby Hill/Livingston Road Interchange Improvements
Letter of Intent, Stormwater Management Concept Approval

Dear Ms. Havlik:

The Water Management Administration (WMA) has reviewed the submittal received January 28, 2015 for the above referenced project in Prince George's County. The review was in accordance with Sections 4-106 and 4-205 of the Department of the Environment Article, Annotated Code of Maryland with regard to Sediment Control and Stormwater Management. The following comments are a result of the review:

This project will be advertised as a Design Build project. The Conceptual Stormwater Management design includes a total of thirty (30) points of investigation (POIs) and lines of investigation (LOIs) for the project, all within the Washington Metropolitan Watershed (02-14-02). The IART for the project is 12.74 ac. The Concept proposes fourteen (14) micro-bioretention facilities, eight (8) bio-swales, one (1) retention pond for water quality, and two (2) wet extended detention ponds for water quality and quantity. With these facilities, the project provides a water quality banking credit of 0.37 ac in the Washington Metropolitan Watershed bank. In addition, the project provides the minimum 1" treatment for new development by ESD practices. ESD practices treat 6.60 ac of impervious area, exceeding the net increase of impervious area for the project of 6.57 ac. Several variances from Cpv and peak 10-year control are requested. These variances may be acceptable if sufficient supporting information is provided as described below. The variances should not be considered approved at concept design. The Conceptual Stormwater Management design is acceptable. However, there are multiple remaining issues with the concept design that must be addressed with the next submittal (Site Design Phase) as noted in the following comments. In addition, Final Design plans and more detailed computations will be required at Final Design.

Stormwater Management

1. The PS plan sheets show the standard resurfacing hatch shading as "pavement rehabilitation" in the legend. Since this project is Design Build and there are no typical sections provided, please confirm that the intent of pavement rehabilitation is resurfacing and that these areas are not full depth paving within the LOD. The concept acceptance and following comments are based on the assumption of these areas representing resurfacing.
2. The SWM report indicates that the utility path will be constructed so that it will be considered pervious. The concept acceptance will be based on the condition that this utility path is pervious construction. Inadequate construction details at final design will affect the SWM concept.

3. Some of the POI locations are difficult to confirm based on either the scale of the drainage area maps or the survey information included on the roadway plans. For example for POI 6, storm drain leaves the median at Sta. 676+75; however, it is unclear how that storm drain reaches the POI location at Sta. 678+50. Storm drain connections are not shown on either the drainage area maps or the roadway plans. At Final Design, please clarify the POI locations with appropriate supporting data.
4. SWM facility (micro-bioretention, bio-swale, and pond) computations are adequate for concept design.
5. Please ensure that final design provides pre-treatment for all Chapter 3 ponds.
6. The minimum required ESDv for quantity control is not met at most POIs. Variances from Cpv are requested based on site constraints and stable outfalls at POIs 6, 8, 10, 14, 21, 22, 28, and 29. These variances will be considered on a case by case basis at Final Design considering the final design site conditions. Every effort should be made to provide the minimum ESDv for quantity control at each POI.
7. Additional information is required for the variance requests. Please note that variances may not be appropriate for POIs with unstable outfalls, existing erosion, or increases in discharges/velocities that could cause erosion.
   a. All variance request documentation for both Cpv and 10-year control needs to include velocity computations for existing and proposed conditions to demonstrate the stability of the outfalls.
   b. Please provide photographs showing the conditions of the outfall itself (for example, showing the conditions of the existing end section/headwall in addition to the channel looking downstream.) If the outfall is underwater, please indicate as such with the photographs.
   c. In support of the Cpv variances, please provide a summary table of 1-year discharges in Carey Branch and the tributary to Henson Creek similar to the 10-year discharges for those streams provided in Appendix E. The cumulative effect of combining minor variances to one stream will be evaluated.
   d. Some of the variance requests reference the drainage area and discharge in Carey Branch within the project limits. Please provide supporting data for this drainage area and discharge (for 1-year and 10-year conditions) in support of the variance requests.
   e. For POI 22, please provide computations demonstrating adequate capacity for the existing cross culvert under the access road downstream of the POI in support of the 10-year variance request.
8. For POIs with direct discharge to Carey Branch (without a vegetated channel between the POI and the stream), a variance from 10-year control may be appropriate if there are no increases in Carey Branch at that POI location based on the cumulative effect of the upstream POI discharges. Documentation of direct discharge and final design discharge computations are required to evaluate these variances.

Erosion and Sediment Control

1. Since this project is a Design Build project, ESC plans were not submitted. ESC is required with Final Design.
2. Prior to any earth disturbance, an NPDES permit application must be submitted to and approved by WMA.
3. Please provide an MDE transmittal form with all future submittals.

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,

Matthew Keem for

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

MEK/DFD

MARYLAND DEPARTMENT OF THE ENVIRONMENT

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

Lawrence J. Hogan, Jr., Governor
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Ben Grumbles, Acting Secretary

STORMWATER MANAGEMENT AND SEDIMENT & EROSION CONTROL
APPROVAL STATE/FEDERAL PROJECTS

MDE NUMBER: 13-SF-0356

APPROVED BY: Matthew Nash
Sediment & Stormwater Plan Review Division

EFFECTIVE DATE: February 26, 2015

IN COMPLIANCE WITH: Environment Article, Sections 4-106 and 4-205 Annotated Code of Maryland

APPROVAL IS HEREBY GRANTED: State Highway Administration
ADDRESS: 707 North Calvert Street
Baltimore, MD 21202
Attn: Ms. Dana Havlik

HEREINAFTER KNOWN AS OWNER,
FOR THE PLANS AND SPECIFICATIONS PRESENTED FOR: Contract No.PG7005170
AI No. 107975

MD 210 at Kerby Hill/Livingston Road Interchange Improvements – Advanced Clearing and Grubbing for Utility Installation - Prince George's County

PREPARED BY: RJM Engineering, Inc.

PLANS DATED: January 27, 2015 REVISIONS DATED: February 6, 2015

This APPROVAL is granted subject to the following conditions:

1. This Approval shall become null and void if the construction authorized herein has not begun within two (2) years from the granting of this Approval. If the construction authorized herein has not been completed within five (5) years from the granting of this Approval, the Approval shall become null and void except that these limits may be extended at the discretion of the Department.
2. The Approval is subject to all laws and regulations now in effect and may be revoked if it is subsequently determined that this authorization violates other laws of the State. Construction shall comply with approved terms.
3. The location and dimensions of all Sediment Control structures, excavation and filling shall be in accordance with plans approved by the Department of the Environment Water Management Administration (MDE/WMA). Owner or authorized agent must obtain written approval from the MDE/WMA for any plan modifications or changes. A copy of the approved plan with any approved modifications and this Approval shall be available at the construction site for reference during the construction period.
4. Off-site borrow or waste sites require local county and Soil Conservation District approvals if they are located on private property or MDE/WMA approval if on State or Federal property. Local approval numbers shall be furnished to the MDE/WMA Inspector.
5. The Owner or his authorized agent shall notify the MDE/WMA Compliance Program at (410) 537-3510, at least seven (7) days prior to initiation of the project and five (5) days after work ends.
6. This project has an earth disturbance greater than 1.0 acre. Prior to any earth disturbance, 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.
7. This clearing and grubbing project does not create or demolish impervious area. No water quality banking credit is being given; these plans will serve as the existing conditions for the upcoming subsequent phase of MD 210 at Kerby Hill Road Interchange Improvements 13-SF-0356 Project.

MEK/JSR

Maryland DNR Forest Service

8023 Long Hill Road
Pasadena, MD 21122

REFORESTATION LAW PROJECT REVIEW

Contract Number: PG700B21 **PDMS#:**
County: Prince George's **Reviewed by:** Horace Henry
Constructing Agency: Maryland State Highway Administration (SHA)

To: Rebecca Lichtenstein
Office of Environmental Design
Maryland State Highway Administration (SHA)
707 North Calvert Street, Mail Stop C-102
Baltimore, MD 21202

Date: 07/21/14
Project: MD 210 @ Kirby Hill/Livingston Road Interchange Improvements

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I refer to the above referenced project (MD 210 @ Kirby Hill/Livingston Road Interchange Improvements). Based on the Reforestation Site Review Form submitted and a site visit conducted on July 18, 2014, the following conditions pertain:

__X__ 1. The area to be cleared is estimated to be 14.08 acres.

__X__ 2. The area available for on-site replacement is estimated to be 7.23 acres.

__X__ 3. Replacement on a one-to-one basis of the remaining 6.85 acres (14.08 – 7.23 acres) is to be conducted off-site as set fort in Natural Resources Article §5-103. This reforestation must be completed within two years or three growing seasons after the completion of the project.

__X__ 3. Other conditions:

- The SHA contractor is responsible for the on-site replacement, while SHA is accountable for the off-site replacement. Please indicate, as soon as it is determined, the location and schedule of the proposed off-site planting.
- Please be advised that state and local agencies that are unable to locate public lands for mitigation planting must provide a detailed explanation of why they cannot fulfill the planting obligations before any payment (in lieu of planting) will be accepted into the Reforestation Law Fund.
- Any impacts to M-NCPPC TCP's and resulting mitigation must be negotiated directly with M-NCPPC.

Attached is a copy of the completed review form for your records. A copy of this form has also been placed on file with our Reforestation Law Compliance Section. If you should have any questions, please contact: Horace Henry— phone #: 410-360-9774 or horace.henry@maryland.gov

OHD RCVD JUL 22,2014

Horace Henry
Southern Region Urban & Community Forestry Coordinator

SHA61.1-F830.10 Rev. 04/24/96 DNR/RCS 399 (June 19, 1995)

Maryland Department of Natural Resources
Forest Service

REFORESTATION SITE REVIEW

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

Contract Number : PG 700B21 PDMS #:

County: Prince George's County Constructing Agency: Maryland State Highway Administration

Project Description: MD 210 at Kerby Hill / Livingston Road Interchange Improvements

Contact Person & Title: Rebecca Lichtenstein

Contact Address: 707 N. Calvert Street, Baltimore, MD 21202 Room #: Mail Stop C-102

Contact Telephone #:(410) 545-8911 Contact Fax #:(410) 209-5001

Estimated Target Dates: Construction Bidding: October 21, 2014
Construction: To Be Determined
Completion: To Be Determined

Estimated Tree Clearing and Reforestation Summary:-

Estimated acreage to be cleared: 14.08 Ac. acres

Acres available for on-site replacement: 7.23 Ac. acres

Note: *if on-site replacement is impossible, the constructing agency is expected to locate alternate reforestation sites on public lands.**

Acres available at the off-site location(s): To Be Determined acres

Proposed location for off-site planting (attach location map): To Be Determined

Date form was completed by constructing agent:

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

****

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

Date Received: 07/07/14 Field Review Date: 07/18/14 Forestry Reviewer: HORACE HENRY Estimated Acres to be cleared: 14.08 Telephone #:( ) 410-360-9774

Dominant Tree Species Found: Hickory, Tulip Poplar, Black Cherry, Red cedar, Black Locust, Sycamore, Red maple, Southern R. oak +

Areas of Special Concern: Stream Realignment Area

Watershed in which this project is located: Washington Metro Designation # (per map/key) Potomac River, upper tidal #02140201

Has site been previously reviewed: Yes/No If yes, date:

Verified acres to be planted on site (amount) : 7.23 acres

For any necessary notes regarding appropriate replacement planting species, spacing, need for shelters, etc., see back of this document.

SHA61.1-F830.10 Rev. 04/24/96 DNR/RCS 399 (June 19, 1995)

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

AUTHORIZATION NUMBER: 14-NT-0174/201460761

EFFECTIVE DATE: August 11, 2014

EXPIRATION DATE: August 11, 2017

AUTHORIZED PERSON: Maryland Department of Transportation
State Highway Administration
707 N. Calvert Street
Baltimore, MD 21202

Attn: Mr. Todd Nichols

IN ACCORDANCE WITH ENVIRONMENT ARTICLE §5-503(a) AND §5-906(b), ANNOTATED CODE OF MARYLAND (2007 REPLACEMENT VOLUME), COMAR 26.17.04 AND 26.23.01, AND 26.08.02 AND THE ATTACHED CONDITIONS OF AUTHORIZATIONS, MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION (AUTHORIZED PERSON"), IS HEREBY AUTHORIZED BY THE WATER MANAGEMENT ADMINISTRATION ("ADMINISTRATION") TO CONDUCT A REGULATED ACTIVITY IN A NONTIDAL WETLAND, BUFFER, OR EXPANDED BUFFER, AND/OR TO CHANGE THE COURSE, CURRENT OR CROSS-SECTION OF WATERS OF THE STATE, IN ACCORDANCE WITH THE ATTACHED PLANS APPROVED BY THE ADMINISTRATION ON **AUGUST 11, 2014**, ("APPROVED PLAN") AND PREPARED BY **MARYLAND STATE HIGHWAY ADMINISTRATION** AND INCORPORATED HEREIN, AS DESCRIBED BELOW:

This approval authorizes permanent impacts to 1,959 square feet of emergent nontidal wetlands, 5,611 square feet of 25-foot nontidal wetland buffer, 1,925 linear feet (37,018 square feet) of stream, and fill in the 100-year floodplain, as well as, temporary impacts to 109 linear feet (2,655 square feet) of stream associated with the construction of a grade separated interchange This project is the first breakout of the MD 210 Corridor Project and begins north of Wilson Bridge Drive and continues to the southern end of MD 210 Service Road B. The work approved under this authorization includes the construction of a grade separated interchange; realignment of Livingston Road and Kerby Hill Road approaching the interchange; a new service road, bridge structures, retaining walls, and noise barriers; new pavement construction and repair of existing roadways and shoulders; reforestation; closed/open drainage systems; stormwater management facilities; stream restoration and relocation; signing, marking, lighting, and signalization; and culvert extensions.The project is located at MD 210 (Indian Head Highway) and Livingston Road/Kerby Hill Road in Prince George's County.

MD Grid Coordinates: N 123620± E 400224± SHA FMIS No. PG700B21

Jeffrey L. Thompson for
Amanda L. Sigillito
Division Chief
Nontidal Wetlands Division

Attachments: Conditions of Authorization, Best Management Practices, Impact Plates
cc: Nontidal Wetlands Division, Compliance Program w/ file
Mary Frazier, United States Army Corps of Engineers

SPECIAL CONDITIONS

1. **Wetland and Waterway Impacts – Plan Submittal** – Prior to any disturbance to State regulated wetlands and waterways, including the 100-year floodplain, detailed plan submittals for the proposed impacts must be submitted and approved by the Nontidal Wetlands and Waterways Division (Division). Submittals 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 Division 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.
2. **Submittal Review** – No work within a regulated resource area shall begin without written approval of the above plan submittals by the Division. The Division 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 Division is unable to return comments or approval within 14 days, the Division will notify the Permittee and provide an estimate for when the comments or approval is expected.
3. **Stream Relocation Design** – Where perennial or intermittent streams must be relocated, a design report shall be submitted and approved prior to initiation of relocation activities. Design report shall include hydrologic and hydraulic analysis of existing and proposed conditions, details of geomorphic approach to stream stabilization, proposed plantings, and maintenance of streamflow. Stream relocations shall utilize natural channel design techniques to the extent practical, and include provision for maximizing water quality and reduce thermal impacts.
4. **Stormwater Management** – No stormwater Management structures shall be placed in wetlands or waterways. Proposed stormwater features shall be submitted to the Division 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.
5. **Culvert Length** – Culvert length shall be minimized to the greatest extent practicable. Culverts greater than 150 in length will require an environmental study to demonstrate that adverse impacts are adequately mitigated (COMAR 26.17.04.06). New culverts shall be appropriately sized and depressed. Where existing culverts are being extended, appropriate measures to promote / restore passage of aquatic life may be required.
6. **Changes to Approved Impacts** – Should final design result in necessary impacts to wetlands and waterways other than those approved in this authorization, an approved MDE Nontidal Wetlands and Waterways Division Permit Modification shall be required prior to the initiation of work in the areas.
7. **Associated Impacts** – Impacts to wetlands, buffers, and waterways, both temporary and permanent, resulting from activities associated to this project; including utility relocation, disposal of materials, access, temporary storage facilities, or related activities; are subject to all conditions of this permit including review and approval of submittals prior to initiation of work within the resource and mitigation requirements.

GENERAL CONDITIONS

1. **Validity:** Authorization is valid only for use by Authorized Person. Authorization may be transferred only with prior written approval of the Administration. In the event of transfer, transferee agrees to comply with all terms and conditions of Authorization.
2. **Initiation of Work, Modifications and Extension of Term**: Authorized Person shall initiate authorized activities with two (2) years of the Effective Date of this Authorization or the Authorization shall expire. Authorized Person may submit written requests to the Administration for (a) extension of the period for initiation of work, (b) modification of Authorization, including the Approved Plan, or, (c) not later than 45 days prior to Expiration Date, an extension of the term. Requests for modification shall be in accordance with applicable regulations and shall state reasons for changes, and shall indicate the impacts on nontidal wetlands, streams, and the floodplain, as applicable. The Administration may grant a request at its sole discretion.
3. **Responsibility and Compliance**: Authorized Person is fully responsible for all work performed and activities authorized by this Authorization shall be performed in compliance with this Authorization and Approved Plan. Authorized Person agrees that a copy of the Authorization and Approved Plan shall be kept at the construction site and provided to its employees, agents and contractors. A person (including Authorized Person, its employees, agents or contractors) who violates or fails to comply with the terms and conditions of this Authorization, Approved Plan or an administrative order may be subject to penalties in accordance with §5-514 and §5-911, Department of the Environment Article, Annotated Code of Maryland (2007 Replacement Volume).

4. **Failure to Comply**: If Authorized Person, its employees, agents or contractors fail to comply with this Authorization or Approved Plan, the Administration may, in its discretion, issue an administrative order requiring Authorized Person, its employees, agents and contractors to cease and desist any activities which violate this Authorization, or the Administration may take any other enforcement action available to it by law, including filing civil or criminal charges.
5. **Suspension or Revocation**: Authorization may be suspended or revoked by the Administration, after notice of opportunity for a hearing, if Authorized Person: (a) submits false or inaccurate information in Permit application or subsequently required submittals; (b) deviates from the Approved Plan, specifications, terms and conditions; (c) violates, or is about to violate terms and conditions of this Authorization; (d) violates, or is about to violate, any regulation promulgated pursuant to Title 5, Department of the Environment Article, Annotated Code of Maryland as amended; (e) fails to allow authorized representatives of the Administration to enter the site of authorized activities at any reasonable time to conduct inspections and evaluations; (f) fails to comply with the requirements of an administrative action or order issued by the Administration; or (g) does not have vested rights under this Authorization and new information, changes in site conditions, or amended regulatory requirements necessitate revocation or suspension.
6. **Other Approvals**: Authorization does not authorize any injury to private property, any invasion of rights, or any infringement of federal, State or local laws or regulations, nor does it obviate the need to obtain required authorizations or approvals from other State, federal or local agencies as required by law.
7. **Site Access:** Authorized Person shall allow authorized representatives of the Administration access to the site of authorized activities during normal business hours to conduct inspections and evaluations necessary to assure compliance with this Authorization. Authorized Person shall provide necessary assistance to effectively and safely conduct such inspections and evaluations.
8. **Inspection Notification:** Authorized Person shall notify the Administration's Compliance Program at least five (5) days before starting authorized activities and five (5) days after completion. For Allegany, Garrett, and Washington counties, Authorized Person shall call 301-689-1480. For Carroll, Frederick, Howard, Montgomery and Prince George's counties, Authorized Person shall call 301-665-2850. For Baltimore City, Anne Arundel, Baltimore, Calvert, Charles and St. Mary's counties, Authorized Person shall call 410-537-3510. For Caroline, Cecil, Dorchester, Harford, Kent, Queen Anne's, Somerset, Talbot, Wicomico and Worcester, Authorized Person shall call 410-901-4020. If Authorization is for a project that is part of a mining site, please contact the Land Management Administration's Mining Program at 410-537-3557 at least five (5) days before starting authorized activities and five (5) days after completion.
9. **Sediment Control:** Authorized Person shall obtain approval from 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 provided that all work is performed in accordance with the authorized project description and associated conditions.
    _X_ **Coastal Zone Consistency:** This Authorization constitutes official notification that authorized activities are consistent with the Maryland Coastal Zone Management Program, as required by Section 307 of the Federal Coastal Zone Management Act of 1972, as amended. Activities within the following counties are not subject to this requirement: Allegany, Carroll, Frederick, Garrett, Howard, Montgomery, and Washington.
11. **Best Management Practices During Construction:** Authorized Person, its employees, agents and contractors shall conduct authorized activities in a manner consistent with the Best Management Practices specified by the Administration.
12. **Disposal of Excess:** Unless otherwise shown on the Approved Plan, all excess fill, spoil material, debris, and construction material shall be disposed of outside of nontidal wetlands, nontidal wetlands buffers, and the 100-year floodplain, and in a location and manner which does not adversely impact surface or subsurface water flow into or out of nontidal wetlands.
13. **Temporary Staging Areas:** Temporary construction trailers or structures, staging areas and stockpiles shall not be located within nontidal wetlands, nontidal wetlands buffers, or the 100-year floodplain unless specifically included on the Approved Plan.

14. **Temporary Stream Access Crossings:** Temporary stream access crossings shall not be constructed or utilized unless shown on the Approved Plan. If temporary stream access crossings are determined necessary prior to initiation of work or at any time during construction, Authorized Person, its employees, agents or contractors shall submit a written request to the Administration and secure the necessary permits or approvals for such crossings before installation of the crossings. Temporary stream access crossings shall be removed and the disturbance stabilized prior to completion of authorized activity or within one (1) year of installation.
15. **Discharge:** Runoff or accumulated water containing sediment or other suspended materials shall not be discharged into waters of the State unless treated by an approved sediment control device or structure.
16. **Instream Construction Prohibition:** 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): **Carey Branch** is a **Use I** waterway; in-stream work may not be conducted from **March 1st**, through **June 15th**, inclusive, of any year.
17. **In-stream Blasting:** Authorized Person 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 this Authorization or Approved Plan shall be the minimum necessary to conduct permitted activities. All disturbed areas shall be stabilized vegetatively no later than seven (7) days after construction is completed or in accordance with the approved grading or sediment and erosion control plan.
19. **Restoration of Construction Site:** Authorized Person shall restore the construction site upon completion of authorized activities. Undercutting, meandering or degradation of the stream banks or channel bottom, any deposition of sediment or other materials, and any alteration of wetland vegetation, soils, or hydrology, resulting directly or indirectly from construction or authorized activities, shall be corrected by Authorized Person as directed by the Administration.
20. **Mitigation:** Permittee shall mitigate for the loss of cumulative wetland impacts associated with the MD 210 Corridor Improvements once the combined impacts from the separate phases exceed 5,000 square feet.

U.S. ARMY CORPS OF ENGINEERS AUTHORIZATION

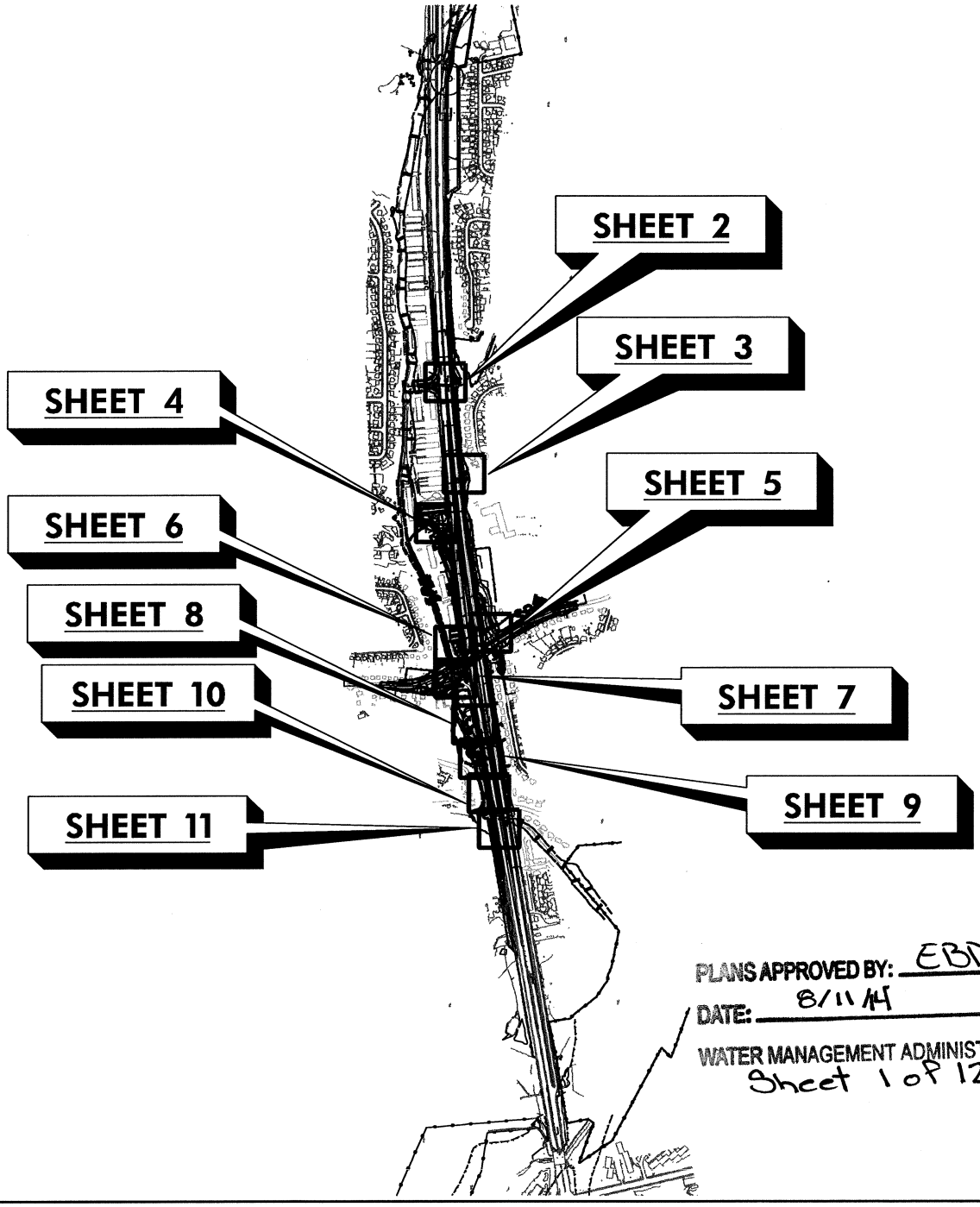
The U.S. Army Corps of Engineers has reviewed this activity and issued an individual permit 2008-01510 on May 21, 2008. Information regarding the terms and conditions of the permit were sent directly to the Permittee.

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: 8/11/14

WATER MANAGEMENT ADMINISTRATION

Sheet 1 of 12

KEY SHEET

WETLAND IMPACTS

TEMPORARY WETLAND IMPACTS = 0

PERMANENT WETLAND IMPACTS = 1,959 SF

WATERS OF THE US (WUS) IMPACTS

TEMPORARY WUS IMPACTS = 2,655 SF / 109 LF

PERMANENT WUS IMPACTS = 37,018 SF / 1,925 LF

25' WETLAND BUFFER IMPACTS

TEMPORARY 25' WETLAND BUFFER IMPACTS = 0

PERMANENT 25' WETLAND BUFFER IMPACTS = 5,611 SF

IMPACTS TO 100 YR FLOODPLAIN

FLOODPLAIN IMPACTS = 97,948 SF

0 750 1500 3000

SCALE 1" = 1500'

SHA State Highway Administration — Maryland Department of Transportation

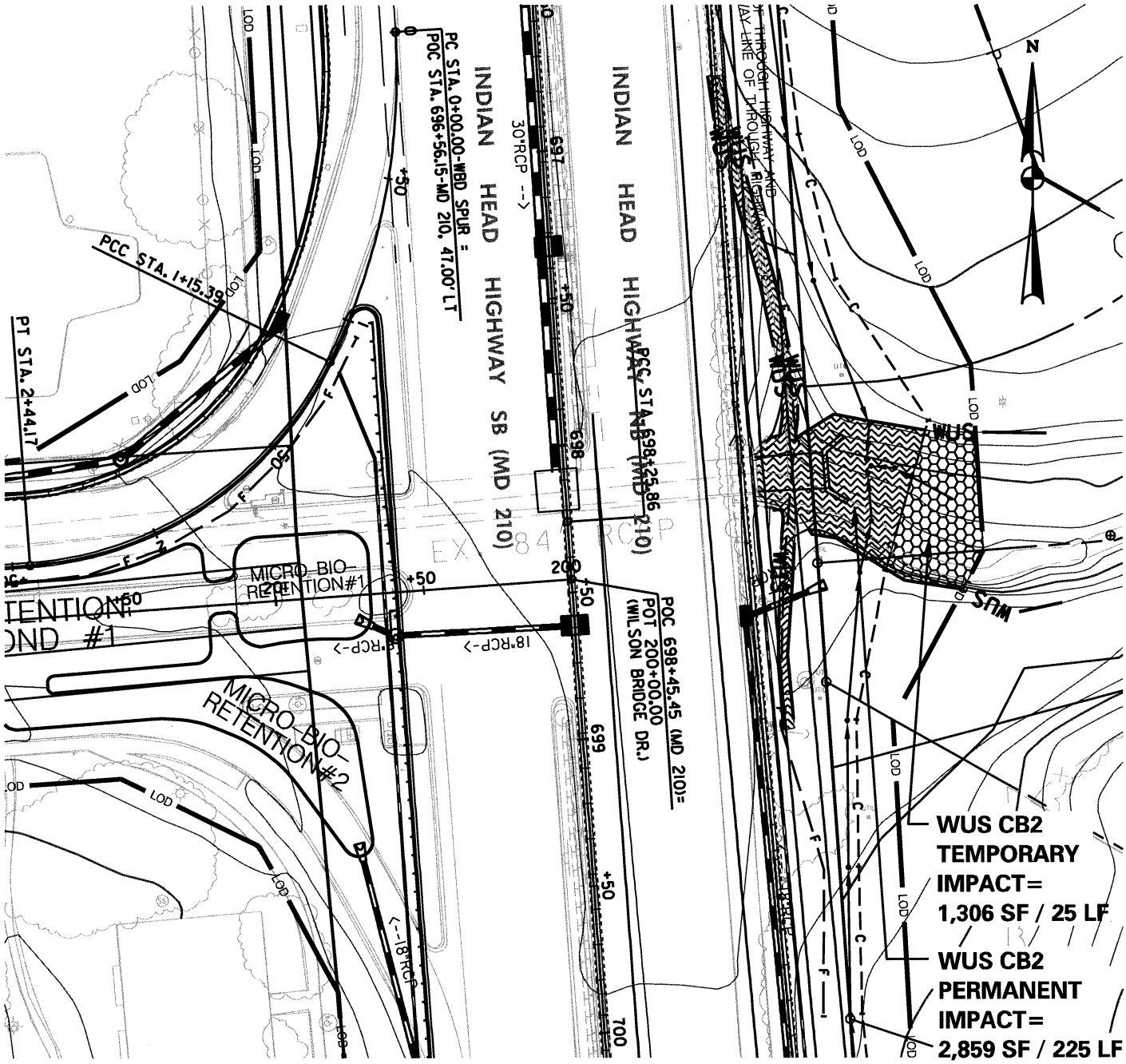
MD 210 @ KERBY HILL RD/ LIVINGSTON RD

INTERCHANGE IMPROVEMENTS

CONTRACT NO.:	PG700B21
COUNTY:	PRINCE GEORGE'S
APPLICATION BY:	STATE HIGHWAY ADMINISTRATION

SHEET 1 OF 11 INDEX

JULY, 2014



LEGEND

WETLAND BOUNDARY	● ● ● ● ● ●	WATERS OF THE U.S.	WUS
25' WETLAND BUFFER	B	LIMIT OF DISTURBANCE	LOD
100 YR. FLOODPLAIN			

WETLAND IMPACTS	25' WETLAND BUFFER IMPACTS
TEMPORARY WETLAND IMPACTS = 0	TEMPORARY 25' WETLAND BUFFER IMPACTS = 0
PERMANENT WETLAND IMPACTS = 0	PERMANENT 25' WETLAND BUFFER IMPACTS = 0
WATERS OF THE US (WUS) IMPACTS	**IMPACTS TO 100 YR FLOODPLAIN**
TEMPORARY WUS IMPACTS = 1,306 SF / 25 LF	FLOODPLAIN IMPACTS = 0
PERMANENT WUS IMPACTS = 2,859 SF / 225 LF	

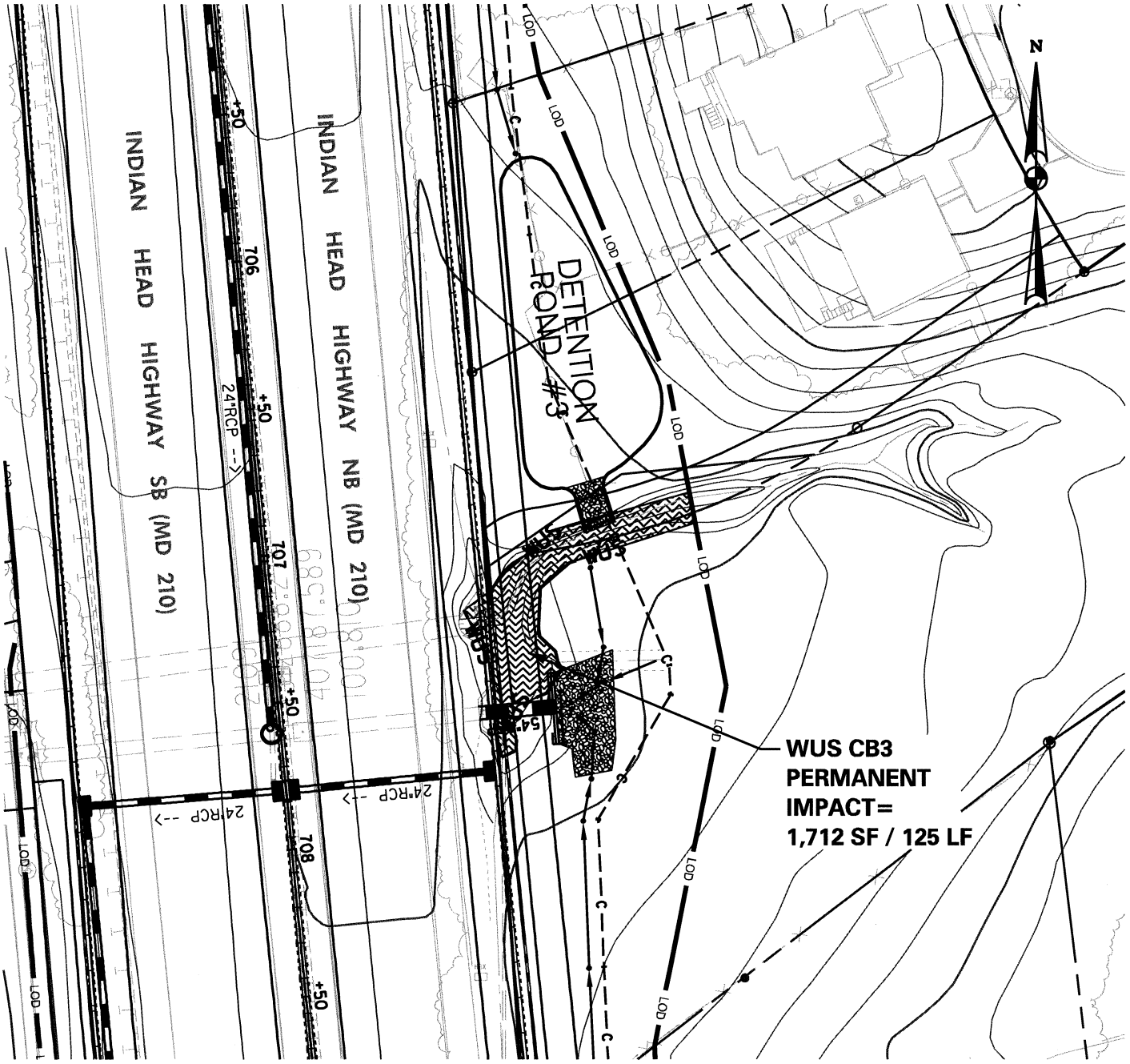
0 25 50 100
SCALE 1" = 50'

SHA State Highway Administration — Maryland Department of Transportation

MD 210 @ KERBY HILL RD/ LIVINGSTON RD

INTERCHANGE IMPROVEMENTS

CONTRACT NO.:	PG700B21
COUNTY:	PRINCE GEORGE'S
APPLICATION BY:	STATE HIGHWAY ADMINISTRATION
SHEET 2 OF 11	
JULY, 2014	



LEGEND

WETLAND BOUNDARY	● ● ● ● ● ●	WATERS OF THE U.S.	WUS
25' WETLAND BUFFER	B	LIMIT OF DISTURBANCE	LOD
100 YR. FLOODPLAIN			

WETLAND IMPACTS

- TEMPORARY WETLAND IMPACTS = 0
- PERMANENT WETLAND IMPACTS = 0

25' WETLAND BUFFER IMPACTS

- TEMPORARY 25' WETLAND BUFFER IMPACTS = 0
- PERMANENT 25' WETLAND BUFFER IMPACTS = 0

WATERS OF THE US (WUS) IMPACTS

- TEMPORARY WUS IMPACTS = 0
- PERMANENT WUS IMPACTS = 1,712 SF / 125 LF

IMPACTS TO 100 YR FLOODPLAIN

- FLOODPLAIN IMPACTS = 0

0 25 50 100
SCALE 1" = 50'

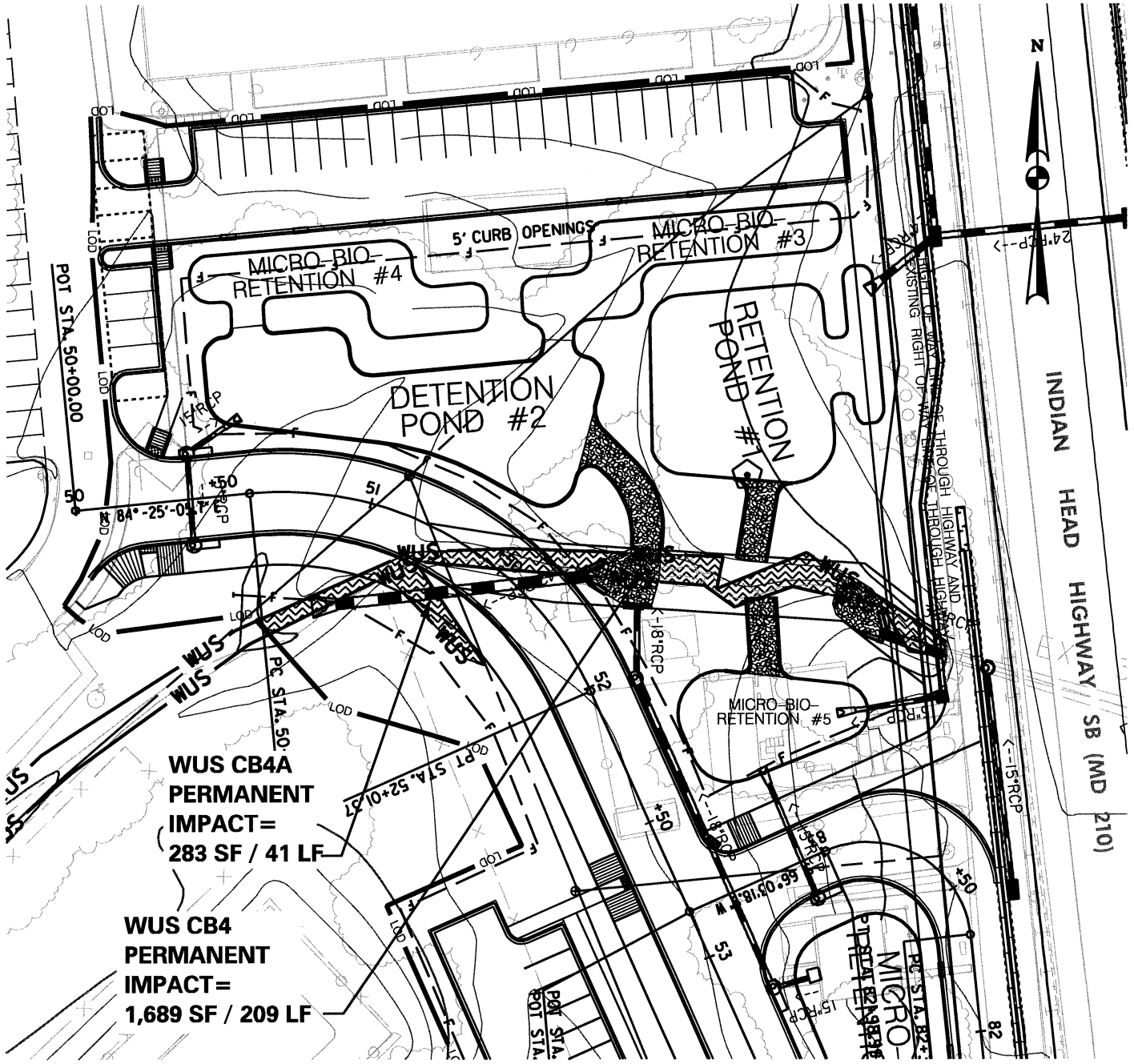
SHA State Highway Administration — Maryland Department of Transportation

MD 210 @ KERBY HILL RD/
LIVINGSTON RD

INTERCHANGE IMPROVEMENTS

CONTRACT NO.:	PG700B21
COUNTY:	PRINCE GEORGE'S
APPLICATION BY:	STATE HIGHWAY ADMINISTRATION

SHEET 3 OF 11
JULY, 2014



LEGEND

WETLAND BOUNDARY	● ● ● ● ● ●	WATERS OF THE U.S.	WUS
25' WETLAND BUFFER	B	LIMIT OF DISTURBANCE	LOD
100 YR. FLOODPLAIN			

WETLAND IMPACTS

- TEMPORARY WETLAND IMPACTS = 0
- PERMANENT WETLAND IMPACTS = 0

25' WETLAND BUFFER IMPACTS

- TEMPORARY 25' WETLAND BUFFER IMPACTS = 0
- PERMANENT 25' WETLAND BUFFER IMPACTS = 0

WATERS OF THE US (WUS) IMPACTS

- TEMPORARY WUS IMPACTS = 0
- PERMANENT WUS IMPACTS = 1,972 SF / 250 LF

IMPACTS TO 100 YR FLOODPLAIN

- FLOODPLAIN IMPACTS = 0

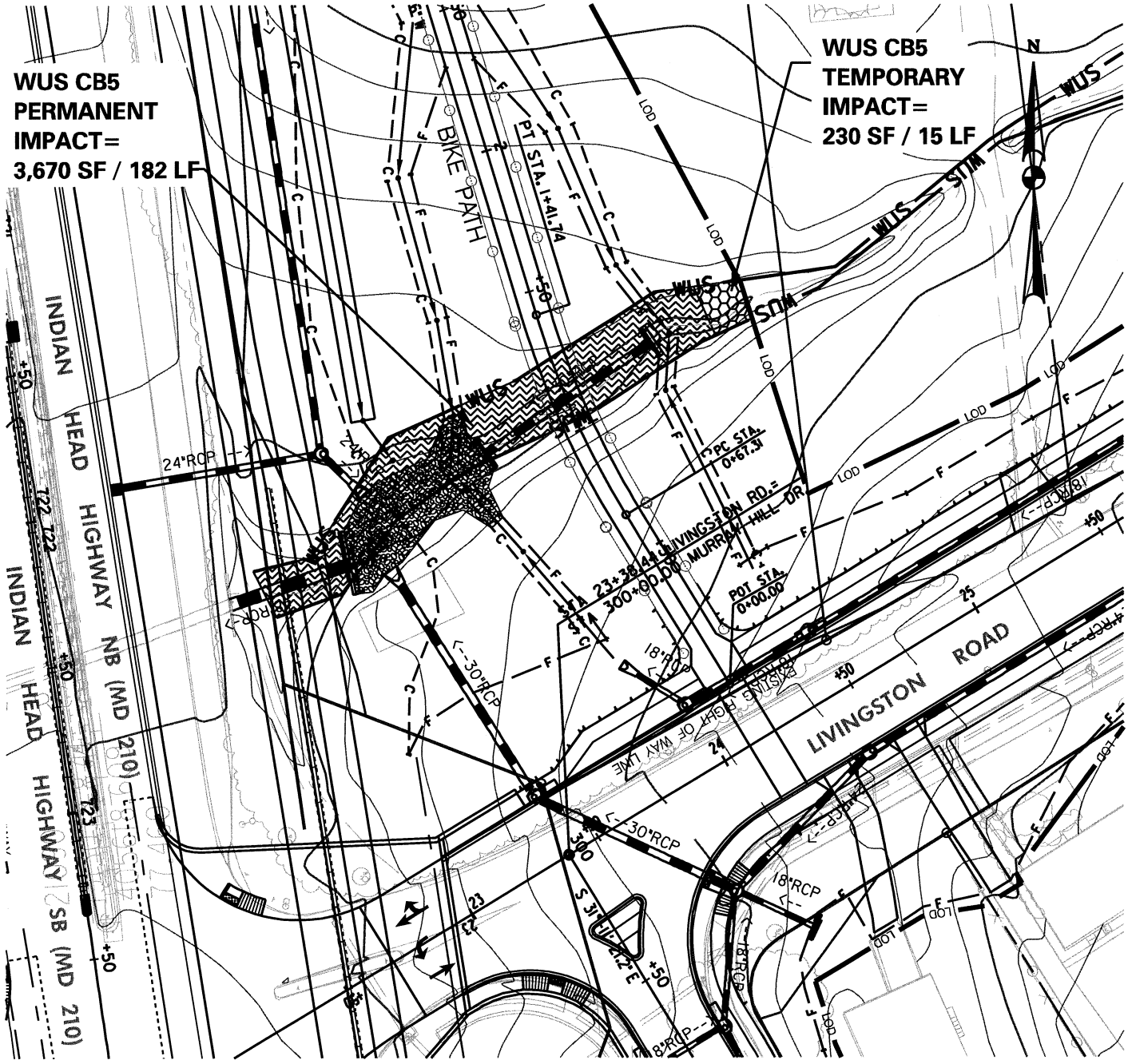
0 25 50 100
SCALE 1" = 50'

SHA State Highway Administration — Maryland Department of Transportation

MD 210 @ KERBY HILL RD/ LIVINGSTON RD

INTERCHANGE IMPROVEMENTS

CONTRACT NO.:	PG700B21
COUNTY:	PRINCE GEORGE'S
APPLICATION BY:	STATE HIGHWAY ADMINISTRATION
SHEET 4 OF 11	
JULY, 2014	



LEGEND

WETLAND BOUNDARY	● ● ● ● ● ●	WATERS OF THE U.S.	WUS
25' WETLAND BUFFER	B	LIMIT OF DISTURBANCE	LOD
100 YR. FLOODPLAIN			

WETLAND IMPACTS

- TEMPORARY WETLAND IMPACTS = 0
- PERMANENT WETLAND IMPACTS = 0

25' WETLAND BUFFER IMPACTS

- TEMPORARY 25' WETLAND BUFFER IMPACTS = 0
- PERMANENT 25' WETLAND BUFFER IMPACTS = 0

WATERS OF THE US (WUS) IMPACTS

- TEMPORARY WUS IMPACTS = 230 SF / 15 LF
- PERMANENT WUS IMPACTS = 3,670 SF / 182 LF

IMPACTS TO 100 YR FLOODPLAIN

- FLOODPLAIN IMPACTS = 0

0 25 50 100
SCALE 1" = 50'

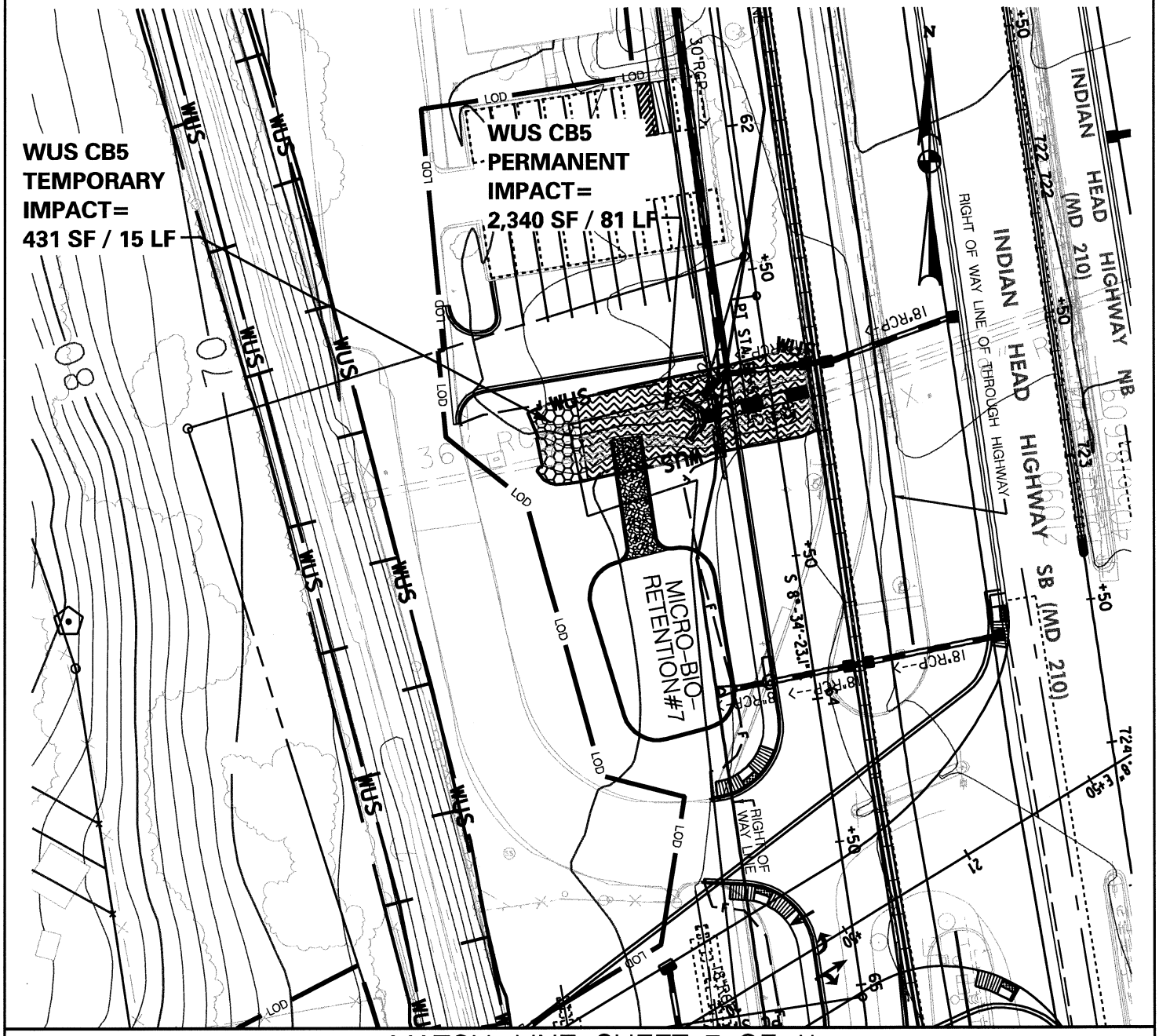
SHA State Highway Administration — Maryland Department of Transportation

MD 210 @ KERBY HILL RD/
LIVINGSTON RD

INTERCHANGE IMPROVEMENTS

CONTRACT NO.:	PG700B21
COUNTY:	PRINCE GEORGE'S
APPLICATION BY:	STATE HIGHWAY ADMINISTRATION

SHEET 5 OF 11
JULY, 2014



MATCH LINE SHEET 7 OF 11

LEGEND

WETLAND BOUNDARY	● ● ● ● ● ●	WATERS OF THE U.S.	WUS
25' WETLAND BUFFER	B	LIMIT OF DISTURBANCE	LOD
100 YR. FLOODPLAIN			

WETLAND IMPACTS

- TEMPORARY WETLAND IMPACTS = 0
- PERMANENT WETLAND IMPACTS = 0

25' WETLAND BUFFER IMPACTS

- TEMPORARY 25' WETLAND BUFFER IMPACTS = 0
- PERMANENT 25' WETLAND BUFFER IMPACTS = 0

WATERS OF THE US (WUS) IMPACTS

- TEMPORARY WUS IMPACTS = 431 SF / 15 LF
- PERMANENT WUS IMPACTS = 2,340 SF / 81 LF

IMPACTS TO 100 YR FLOODPLAIN

- FLOODPLAIN IMPACTS = 0

0 25 50 100
SCALE 1" = 50'

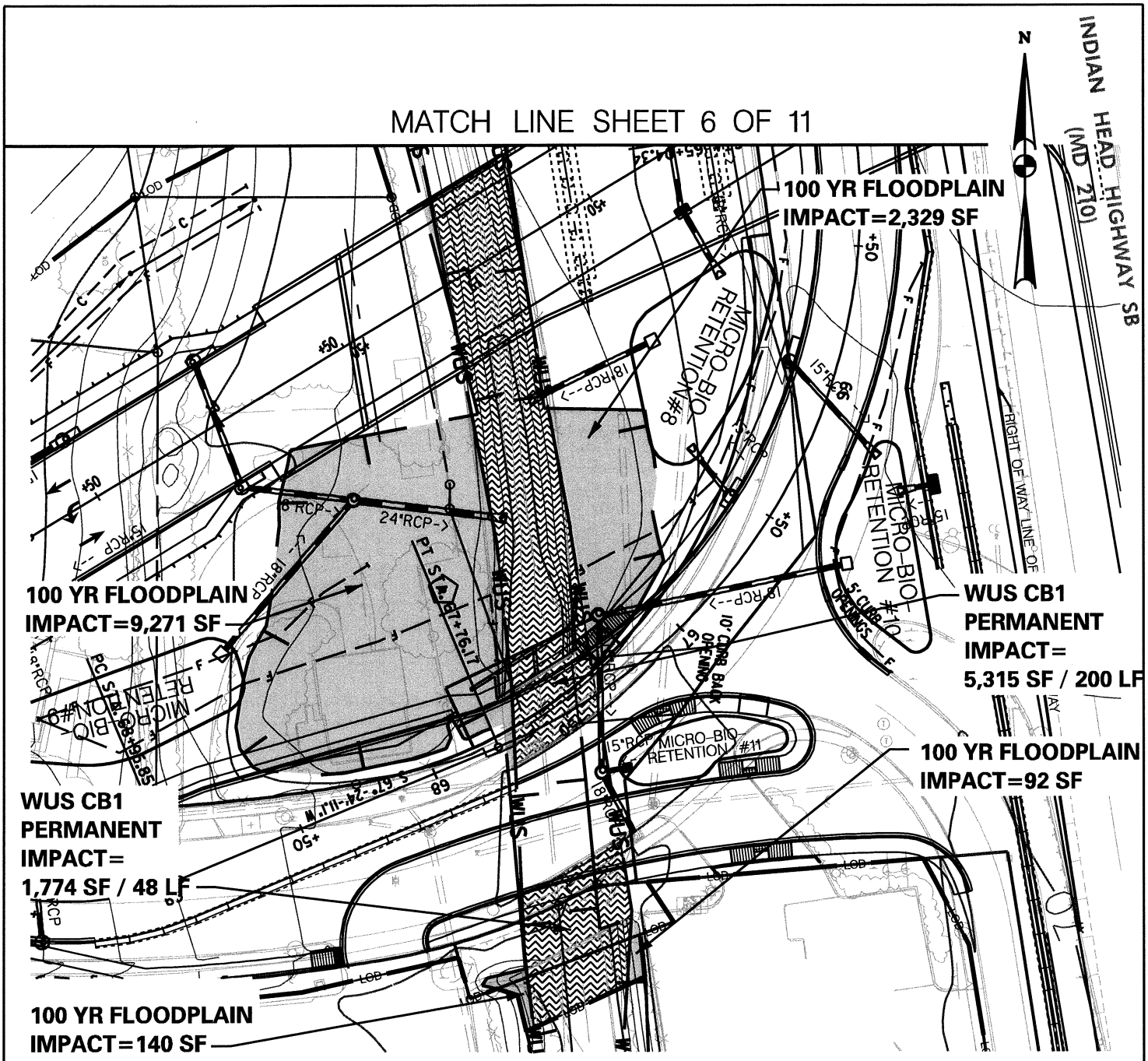
SHA State Highway Administration — Maryland Department of Transportation

MD 210 @ KERBY HILL RD/
LIVINGSTON RD

INTERCHANGE IMPROVEMENTS

CONTRACT NO.:	PG700B21
COUNTY:	PRINCE GEORGE'S
APPLICATION BY:	STATE HIGHWAY ADMINISTRATION

SHEET 6 OF 11
JULY, 2014



LEGEND

WETLAND BOUNDARY	● ● ● ● ● ●	WATERS OF THE U.S.	WUS
25' WETLAND BUFFER	B	LIMIT OF DISTURBANCE	LOD
100 YR. FLOODPLAIN			

WETLAND IMPACTS	25' WETLAND BUFFER IMPACTS
TEMPORARY WETLAND IMPACTS = 0	TEMPORARY 25' WETLAND BUFFER IMPACTS = 0
PERMANENT WETLAND IMPACTS = 0	PERMANENT 25' WETLAND BUFFER IMPACTS = 0
WATERS OF THE US (WUS) IMPACTS	**IMPACTS TO 100 YR FLOODPLAIN**
TEMPORARY WUS IMPACTS = 0	FLOODPLAIN IMPACTS = 11,832 SF
PERMANENT WUS IMPACTS = 7,089 SF / 248 LF	

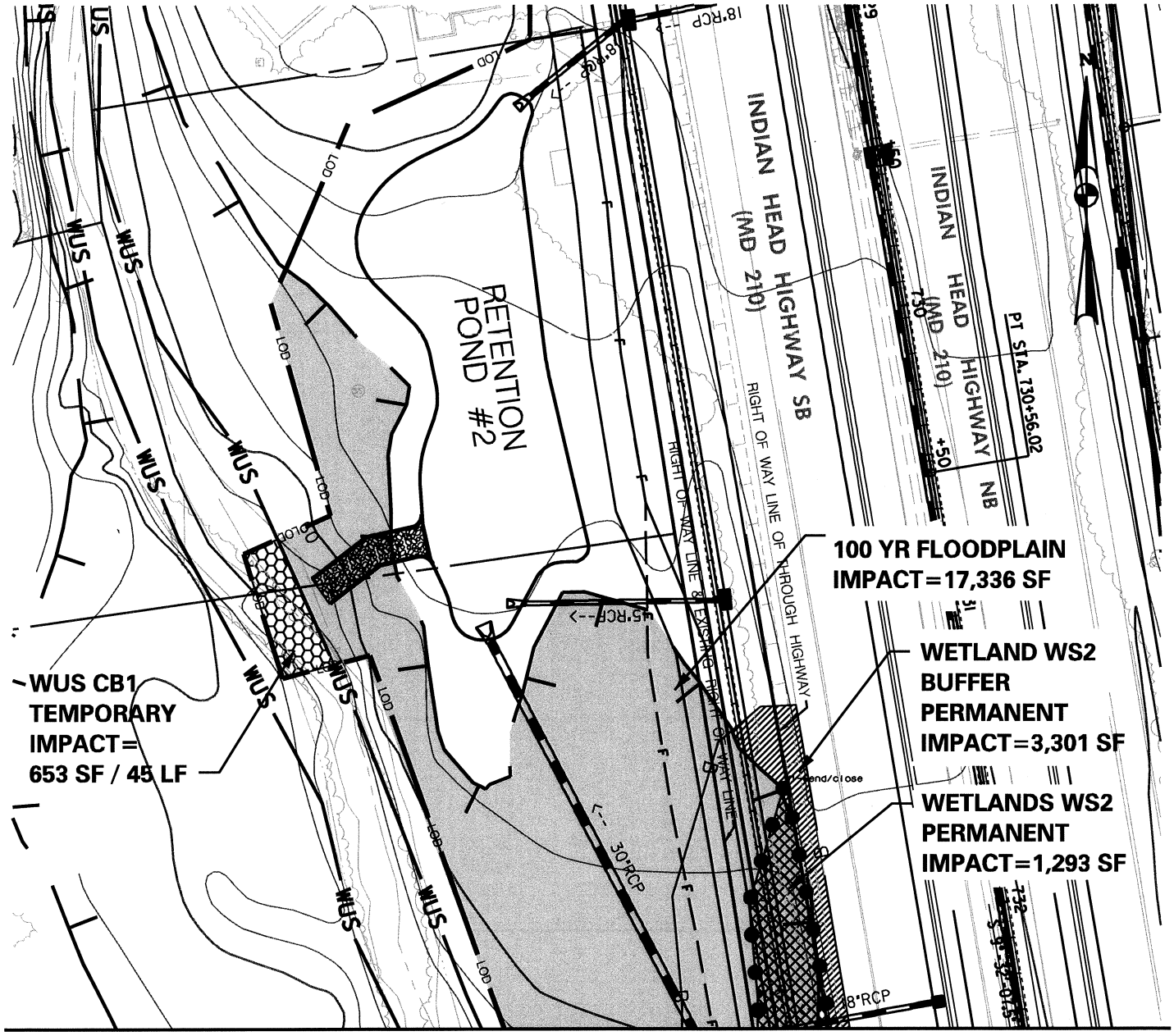
0 25 50 100
SCALE 1" = 50'

SHA State Highway Administration
Maryland Department of Transportation

MD 210 @ KERBY HILL RD/
LIVINGSTON RD

INTERCHANGE IMPROVEMENTS

CONTRACT NO.:	PG700B21
COUNTY:	PRINCE GEORGE'S
APPLICATION BY:	STATE HIGHWAY ADMINISTRATION
SHEET 7 OF 11	
JULY, 2014	



MATCH LINE SHEET 9 OF 11

LEGEND

WETLAND BOUNDARY	● ● ● ● ● ●	WATERS OF THE U.S.	WUS
25' WETLAND BUFFER	B	LIMIT OF DISTURBANCE	LOD
100 YR. FLOODPLAIN			

WETLAND IMPACTS	25' WETLAND BUFFER IMPACTS
TEMPORARY WETLAND IMPACTS = 0	TEMPORARY 25' WETLAND BUFFER IMPACTS = 0
PERMANENT WETLAND IMPACTS = 1,293 SF	PERMANENT 25' WETLAND BUFFER IMPACTS = 3,301 SF
WATERS OF THE US (WUS) IMPACTS	**IMPACTS TO 100 YR FLOODPLAIN**
TEMPORARY WUS IMPACTS = 653 SF / 45 LF	FLOODPLAIN IMPACTS = 17,336 SF
PERMANENT WUS IMPACTS = 0	

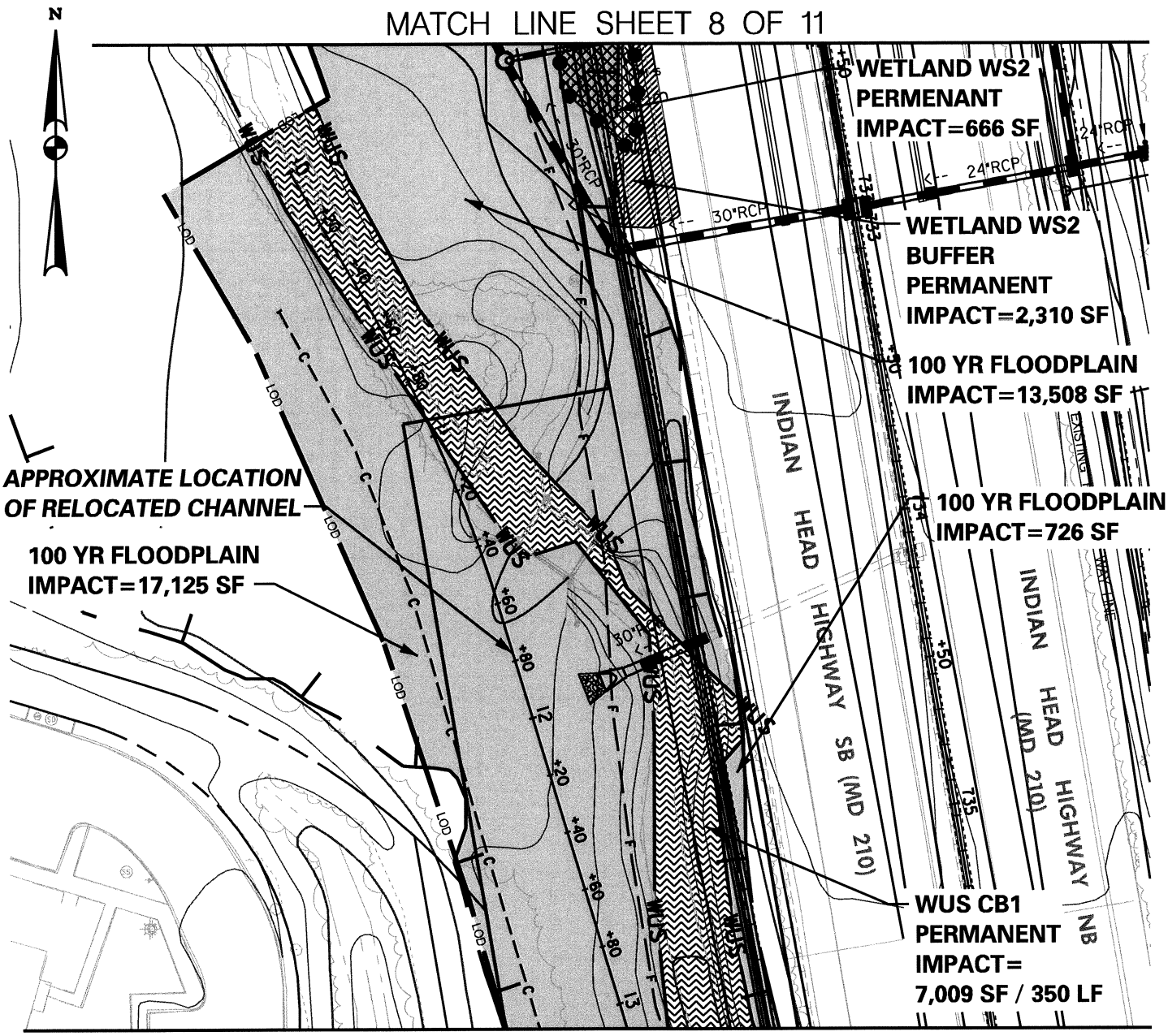
0 25 50 100
SCALE 1" = 50'

SHA State Highway Administration
Maryland Department of Transportation

MD 210 @ KERBY HILL RD/
LIVINGSTON RD

INTERCHANGE IMPROVEMENTS

CONTRACT NO.:	PG700B21
COUNTY:	PRINCE GEORGE'S
APPLICATION BY:	STATE HIGHWAY ADMINISTRATION
SHEET 8 OF 11	
JULY, 2014	



LEGEND

WETLAND BOUNDARY	● ● ● ● ● ●	WATERS OF THE U.S.	WUS
25' WETLAND BUFFER	B	LIMIT OF DISTURBANCE	LOD
100 YR. FLOODPLAIN			

WETLAND IMPACTS

- TEMPORARY WETLAND IMPACTS = 0
- PERMANENT WETLAND IMPACTS = 666 SF

25' WETLAND BUFFER IMPACTS

- TEMPORARY 25' WETLAND BUFFER IMPACTS = 0
- PERMANENT 25' WETLAND BUFFER IMPACTS = 2,310 SF

WATERS OF THE US (WUS) IMPACTS

- TEMPORARY WUS IMPACTS = 0
- PERMANENT WUS IMPACTS = 7,009 SF / 350 LF

IMPACTS TO 100 YR FLOODPLAIN

- FLOODPLAIN IMPACTS = 31,359 SF

0 25 50 100
SCALE 1" = 50'

SHA State Highway Administration — Maryland Department of Transportation

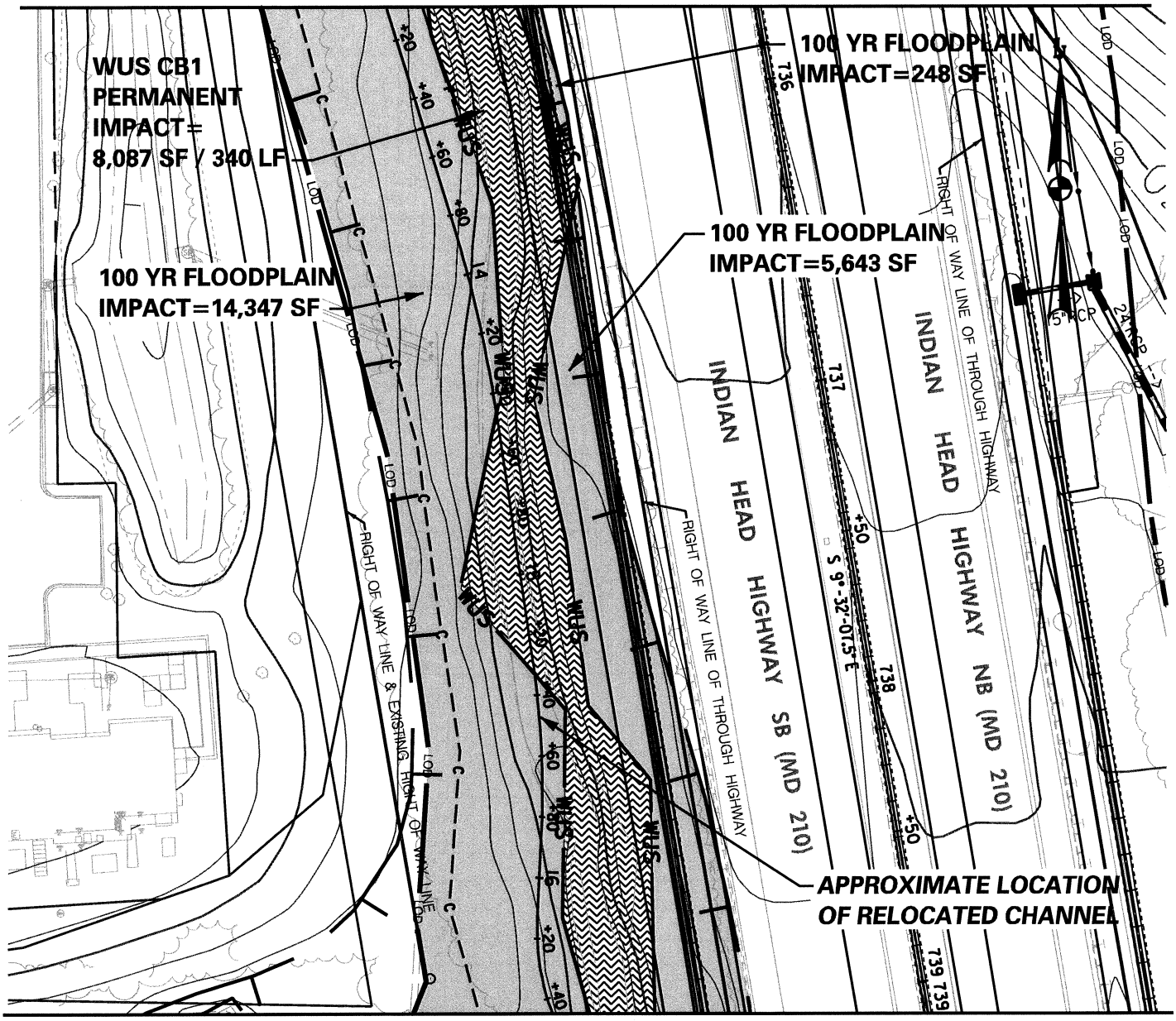
MD 210 @ KERBY HILL RD/
LIVINGSTON RD

INTERCHANGE IMPROVEMENTS

CONTRACT NO.:	PG700B21
COUNTY:	PRINCE GEORGE'S
APPLICATION BY:	STATE HIGHWAY ADMINISTRATION

SHEET 9 OF 11
JULY, 2014

MATCH LINE SHEET 9 OF 11



MATCH LINE SHEET 11 OF 11

LEGEND

WETLAND BOUNDARY	● ● ● ● ● ●	WATERS OF THE U.S.	WUS
25' WETLAND BUFFER	B	LIMIT OF DISTURBANCE	LOD
100 YR. FLOODPLAIN			

WETLAND IMPACTS	25' WETLAND BUFFER IMPACTS
TEMPORARY WETLAND IMPACTS = 0	TEMPORARY 25' WETLAND BUFFER IMPACTS = 0
PERMANENT WETLAND IMPACTS = 0	PERMANENT 25' WETLAND BUFFER IMPACTS = 0
WATERS OF THE US (WUS) IMPACTS	**IMPACTS TO 100 YR FLOODPLAIN**
TEMPORARY WUS IMPACTS = 0	FLOODPLAIN IMPACTS = 20,238 SF
PERMANENT WUS IMPACTS = 8,087 SF / 340 LF	

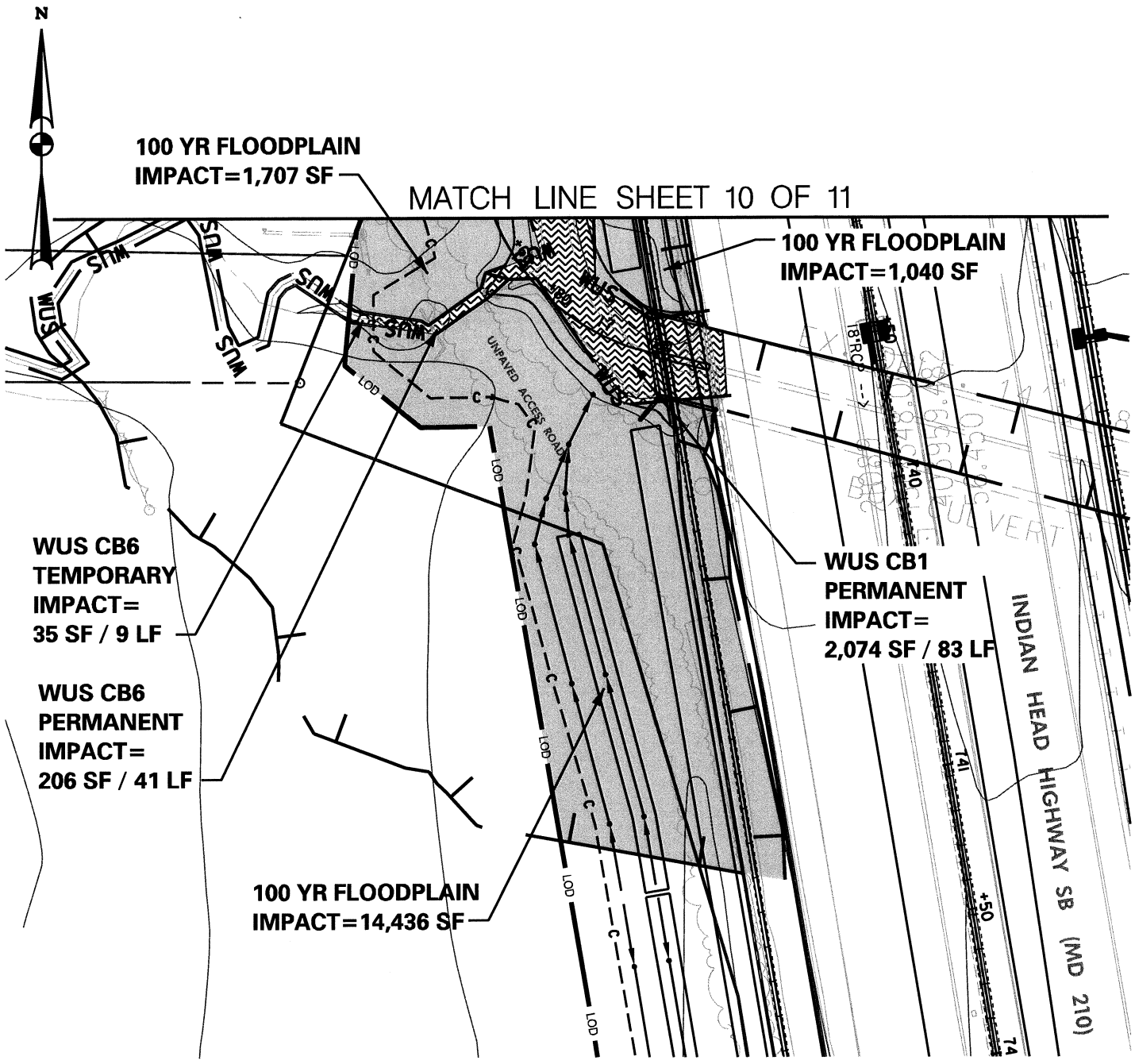
0 25 50 100
SCALE 1" = 50'

SHA State Highway Administration — Maryland Department of Transportation

MD 210 @ KERBY HILL RD/
LIVINGSTON RD

INTERCHANGE IMPROVEMENTS

CONTRACT NO.:	PG700B21
COUNTY:	PRINCE GEORGE'S
APPLICATION BY:	STATE HIGHWAY ADMINISTRATION
SHEET 10 OF 11	
JULY, 2014	



LEGEND

WETLAND BOUNDARY	● ● ● ● ● ●	WATERS OF THE U.S.	WUS
25' WETLAND BUFFER	B	LIMIT OF DISTURBANCE	LOD
100 YR. FLOODPLAIN			

WETLAND IMPACTS

- TEMPORARY WETLAND IMPACTS = 0
- PERMANENT WETLAND IMPACTS = 0

25' WETLAND BUFFER IMPACTS

- TEMPORARY 25' WETLAND BUFFER IMPACTS = 0
- PERMANENT 25' WETLAND BUFFER IMPACTS = 0

WATERS OF THE US (WUS) IMPACTS

- TEMPORARY WUS IMPACTS = 35 SF / 9 LF
- PERMANENT WUS IMPACTS = 2,280 SF / 124 LF

IMPACTS TO 100 YR FLOODPLAIN

- FLOODPLAIN IMPACTS = 17,183 SF

0 25 50 100
SCALE 1" = 50'

SHA State Highway Administration — Maryland Department of Transportation

MD 210 @ KERBY HILL RD/
LIVINGSTON RD

INTERCHANGE IMPROVEMENTS

CONTRACT NO.:	PG700B21
COUNTY:	PRINCE GEORGE'S
APPLICATION BY:	STATE HIGHWAY ADMINISTRATION
SHEET 11 OF 11	
JULY, 2014	

MD 210 AT KERBY HILL ROAD/LIVINGSTON ROAD
CONTRACT NO.: PG700B21

Sheet	System Name	Land Use	Waters Type[1]	Waterway or Wetland Classification	Stream Use Designation	DNR 12-digit watershed	Tidal or Non-Tidal	Critical or Non-Critical Area	Wetland Impacts				Stream Impacts					Floodplain Impacts (s.f./acres)	Notes
									Direct		Buffer		Area of Stream Impact		Length of Stream Affected				
									Temporary (s.f./acres)	Permanent (s.f./acres)	Temporary (s.f./acres)	Permanent (s.f./acres)	Temporary (s.f./acres)	Permanent (s.f./acres)	Temporary (l.f.)	Permanent (l.f.)	Length /Av. Width at OHWM (ft.)[2]		
2	WUS CB2	N/A	RPW	Perennial	I	020700100301	N/T	N/C	0	0	0	0	1,306/ 0.03	2,859/ 0.07	25	225	250/22	0	Unnamed tributary to Carey Branch, which conveys flow to Henson Creek, a TNW.
3	WUS CB3	N/A	NRPW	Ephemeral	I	020700100301	N/T	N/C	0	0	0	0	0	1,712/ 0.04	0	125	125/18	0	Unnamed tributary to Carey Branch, which conveys flow to Henson Creek, a TNW.
4	WUS CB4	N/A	RPW	Perennial	I	020700100301	N/T	N/C	0	0	0	0	0	1,689/ 0.04	0	209	209/8	0	Unnamed tributary to Carey Branch, which conveys flow to Henson Creek, a TNW.
4	WUS CB4A	N/A	NRPW	Ephemeral	I	020700100301	N/T	N/C	0	0	0	0	0	283/ <0.01	0	41	41/8	0	Unnamed tributary to Carey Branch, which conveys flow to Henson Creek, a TNW.
5	WUS CB5	N/A	RPW	Perennial	I	020700100301	N/T	N/C	0	0	0	0	230/ <0.01	3,670/ 0.08	15	182	197/20	0	Unnamed tributary to Carey Branch, which conveys flow to Henson Creek, a TNW.
6	WUS CB5	N/A	RPW	Perennial	I	020700100301	N/T	N/C	0	0	0	0	431/ 0.01	2,340/ 0.05	15	81	96/28	0	Unnamed tributary to Carey Branch, which conveys flow to Henson Creek, a TNW.
7	N/A	Wooded/ Developed	N/A	100 YR FP		020700100301	N/T	N/C	0	0	0	0	0	0	0	0	0	11,832/ 0.27	Carey Branch 100-yr floodplain
7	WUS CB1	N/A	RPW	Perennial	I	020700100301	N/T	N/C	0	0	0	0	0	7,089/ 0.16	0	248	226/30	0	Carey Branch, a tributary to Henson Creek, a TNW.
8	N/A	Wooded/ Developed	N/A	100 YR FP		020700100301	N/T	N/C	0	0	0	0	0	0	0	0	0	17,336/ 0.40	Carey Branch, a tributary to Henson Creek, a TNW.
8	WUS CB1	N/A	RPW	Perennial	I	020700100301	N/T	N/C	0	0	0	0	653/ 0.01	0	45	0	45/18	0	Carey Branch, a tributary to Henson Creek, a TNW.
8	WETLAND WS2	Roadside	RPWWN	PEM2B/ PFO1B		020700100301	N/T	N/C	0	1,293/ 0.03	0	3,301/ 0.08	0	0	0	0	0	0	Nontidal wetland associated with Carey Branch, a tributary to Henson Creek, a TNW.
9	N/A	Wooded/ Developed	N/A	100 YR FP		020700100301	N/T	N/C	0	0	0	0	0	0	0	0	0	31,359/ 0.72	Carey Branch 100-yr floodplain
9	WUS CB1	N/A	RPW	Perennial	I	020700100301	N/T	N/C	0	0	0	0	0	7,009/ 0.16	0	350	350/20	0	Carey Branch, a tributary to Henson Creek, a TNW. This segment to be relocated and restored.
9	WETLAND WS2	Roadside	RPWWN	PEM2B/ PFO1B		020700100301	N/T	N/C	0	666/ 0.02	0	2,310/ 0.05	0	0	0	0	0	0	Nontidal wetland abutting SB MD 210
10	N/A	Wooded/ Developed	N/A	100 YR FP	I	020700100301	N/T	N/C	0	0	0	0	0	0	0	0	0	20,238/ 0.46	Carey Branch 100-yr floodplain
10	WUS CB1	N/A	RPW	Perennial	I	020700100301	N/T	N/C	0	0	0	0	0	8,087/ 0.19	0	340	340/25	0	Carey Branch, a tributary to Henson Creek, a TNW. This segment to be relocated and restored.
11	N/A	Wooded/ Developed	N/A	100 YR FP	I	020700100301	N/T	N/C	0	0	0	0	0	0	0	0	0	17,183/ 0.39	Carey Branch 100-yr floodplain
11	WUS CB1	N/A	RPW	Perennial	I	020700100301	N/T	N/C	0	0	0	0	0	2,074/ 0.05	0	83	40/20	0	Carey Branch, a tributary to Henson Creek, a TNW. This segment to be relocated and restored.
11	WUS CB6	N/A	RPW	Intermittent	I	020700100301	N/T	N/C	0	0	0	0	35/ <0.01	206/ <0.01	9	41	32/6	0	Unnamed tributary to Carey Branch, which conveys flow to Henson Creek, a TNW.
Total Impacts to Wetlands and Waterways									0	1,959/ 0.05	0	5,611/ 0.13	2,655/ 0.06	37,018/ 0.84	109	1,925		97,948/ 2.24	

[1] TNW = Traditional Navigable Waters, including territorial seas; TNWW = Wetlands adjacent to TNWs; RPW = Relatively Permanent Waters (RPWs) that flow directly or indirectly into TNWs; NRPW = Non-RPWs that flow directly or indirectly into TNWs; RPWWD = Wetlands directly abutting RPWs that flow directly or indirectly into TNWs; RPWWN = Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs; NRPWW = Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs; ISOLATE = Isolated (interstate or intrastate) waters, including isolated wetlands; UPLAND = Uplands; TNWRPW = Tributary consisting of both RPWs & non-RPWs.
[2] Length and average width at the approximate ordinary high water mark of each stream being impacted.

Sheet 12 of 12

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

AUG 12 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/MD 210 Corridor Study Project) 2008-1510, issued May 21, 2008, to construct intersection improvements at Kerby Hill Road and Livingston Road intersections, in Carey Branch and adjacent wetlands, near Fort Washington, Prince George's County, Maryland.

The Corps will update our files with the impact drawings and impact summary table for this initial break-out project from I-95/I-495 to MD 228. We acknowledge that the initial break-out project will result in 1,959 square feet (SF) of permanent wetland impacts, and 1,925 linear feet (LF) [37,018 SF] of permanent impacts and 109 LF [2,655 SF] of temporary impacts to waters of the U.S. Please attach the enclosed plans, which include sheets 1-11, dated July 2014, to your original DA authorization and include the plans in the information posted at the construction site.

The Corps acknowledges that Special Condition 16, Compensatory Mitigation Plan, and Special Condition 19, Independent Environmental Monitor, are deferred to the next phase of the MD 210 project. However, for this initial break-out phase, the Corps requires submittal and approval of a design report for the relocation of perennial or intermittent streams prior to initiation of stream relocation activities. The report must include hydrologic and hydraulic analysis of existing and proposed conditions, details of geomorphic approach to stream stabilization, proposed plantings, and maintenance of stream flow details. In addition, the report must provide a monitoring plan to assure relocation success.

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.

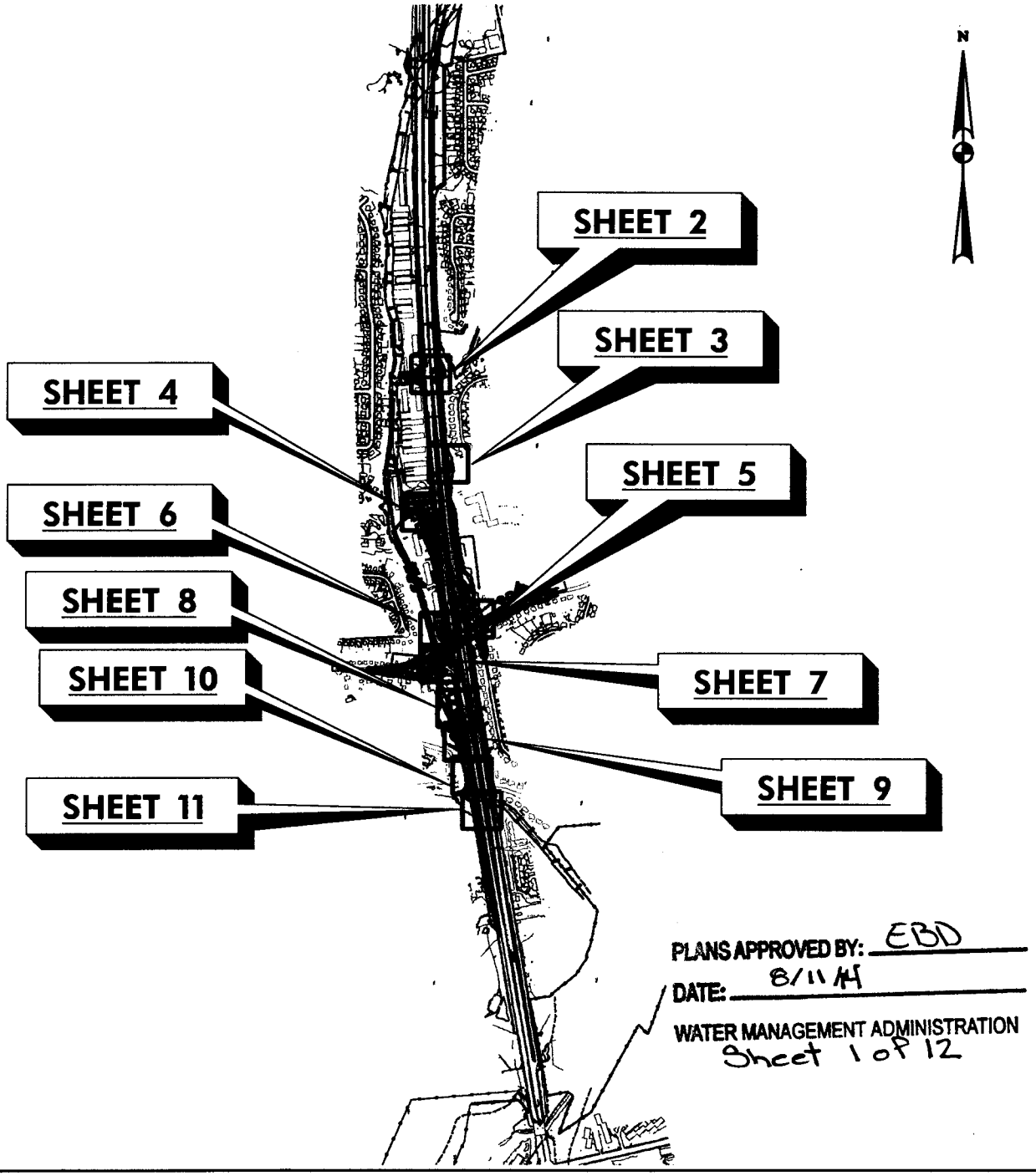
By Authority of the Secretary of the Army:

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

Joseph P. DaVia
Chief, Maryland Section Northern

Enclosures

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



PLANS APPROVED BY: EBD

DATE: 8/11/14

WATER MANAGEMENT ADMINISTRATION

Sheet 1 of 12

KEY SHEET

WETLAND IMPACTS

TEMPORARY WETLAND IMPACTS = 0

PERMANENT WETLAND IMPACTS = 1,959 SF

WATERS OF THE US (WUS) IMPACTS

TEMPORARY WUS IMPACTS = 2,655 SF / 109 LF

PERMANENT WUS IMPACTS = 37,018 SF / 1,925 LF

25' WETLAND BUFFER IMPACTS

TEMPORARY 25' WETLAND BUFFER IMPACTS = 0

PERMANENT 25' WETLAND BUFFER IMPACTS = 5,611 SF

IMPACTS TO 100 YR FLOODPLAIN

FLOODPLAIN IMPACTS = 97,948 SF

0 750 1500 3000

SCALE 1" = 1500'

SHA State Highway Administration Maryland Department of Transportation

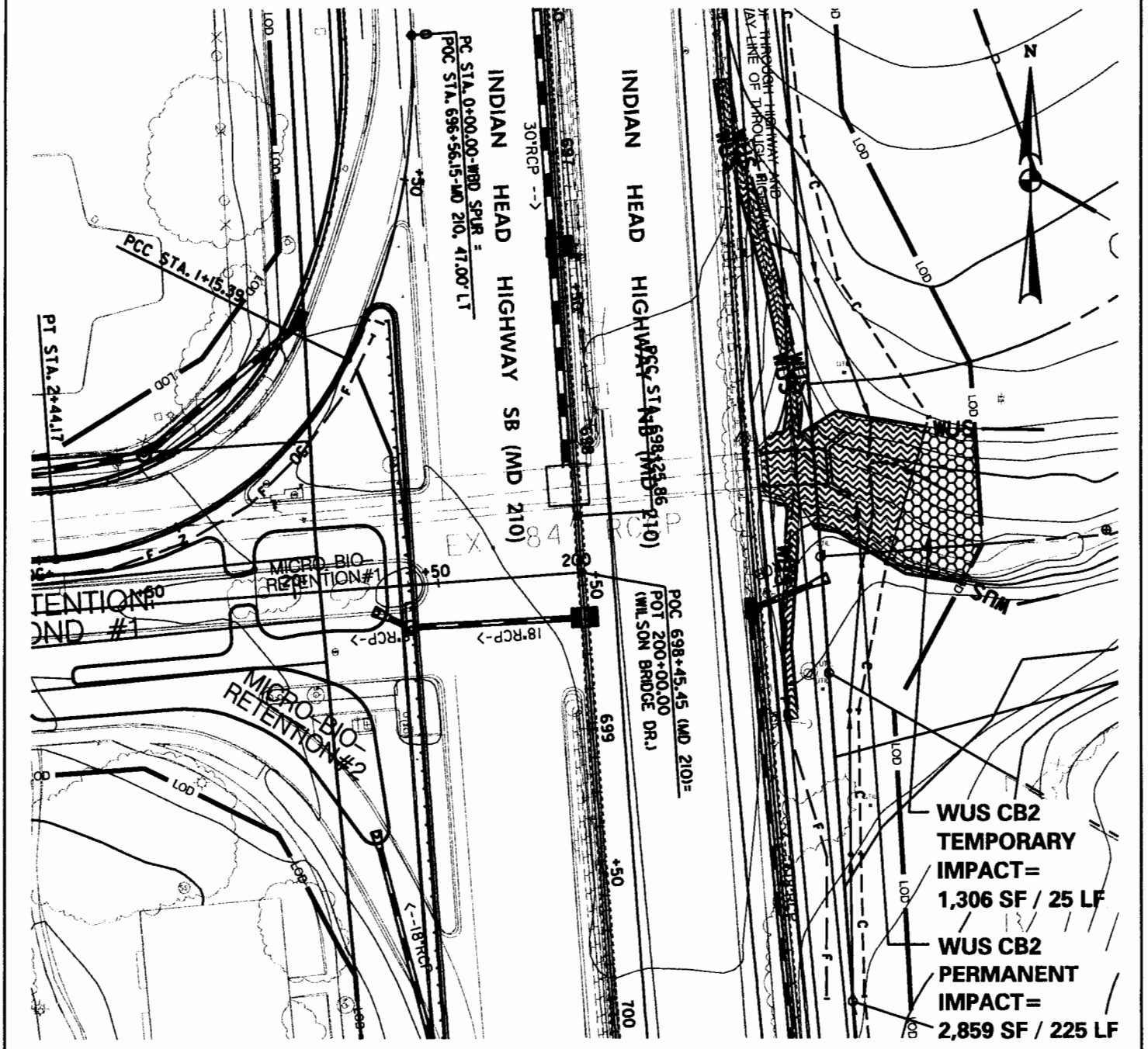
MD 210 @ KERBY HILL RD/ LIVINGSTON RD

INTERCHANGE IMPROVEMENTS

CONTRACT NO.:	PG700B21
COUNTY:	PRINCE GEORGE'S
APPLICATION BY:	STATE HIGHWAY ADMINISTRATION

SHEET 1 OF 11 INDEX

JULY, 2014



LEGEND

WETLAND BOUNDARY	● ● ● ● ● ●	WATERS OF THE U.S.	WUS
25' WETLAND BUFFER	B	LIMIT OF DISTURBANCE	LOD
100 YR. FLOODPLAIN			

WETLAND IMPACTS	25' WETLAND BUFFER IMPACTS
TEMPORARY WETLAND IMPACTS = 0	TEMPORARY 25' WETLAND BUFFER IMPACTS = 0
PERMANENT WETLAND IMPACTS = 0	PERMANENT 25' WETLAND BUFFER IMPACTS = 0
WATERS OF THE US (WUS) IMPACTS	**IMPACTS TO 100 YR FLOODPLAIN**
TEMPORARY WUS IMPACTS = 1,306 SF / 25 LF	FLOODPLAIN IMPACTS = 0
PERMANENT WUS IMPACTS = 2,859 SF / 225 LF	

0 25 50 100
SCALE 1" = 50'

SHA State Highway Administration, Maryland Department of Transportation

MD 210 @ KERBY HILL RD/ LIVINGSTON RD

INTERCHANGE IMPROVEMENTS

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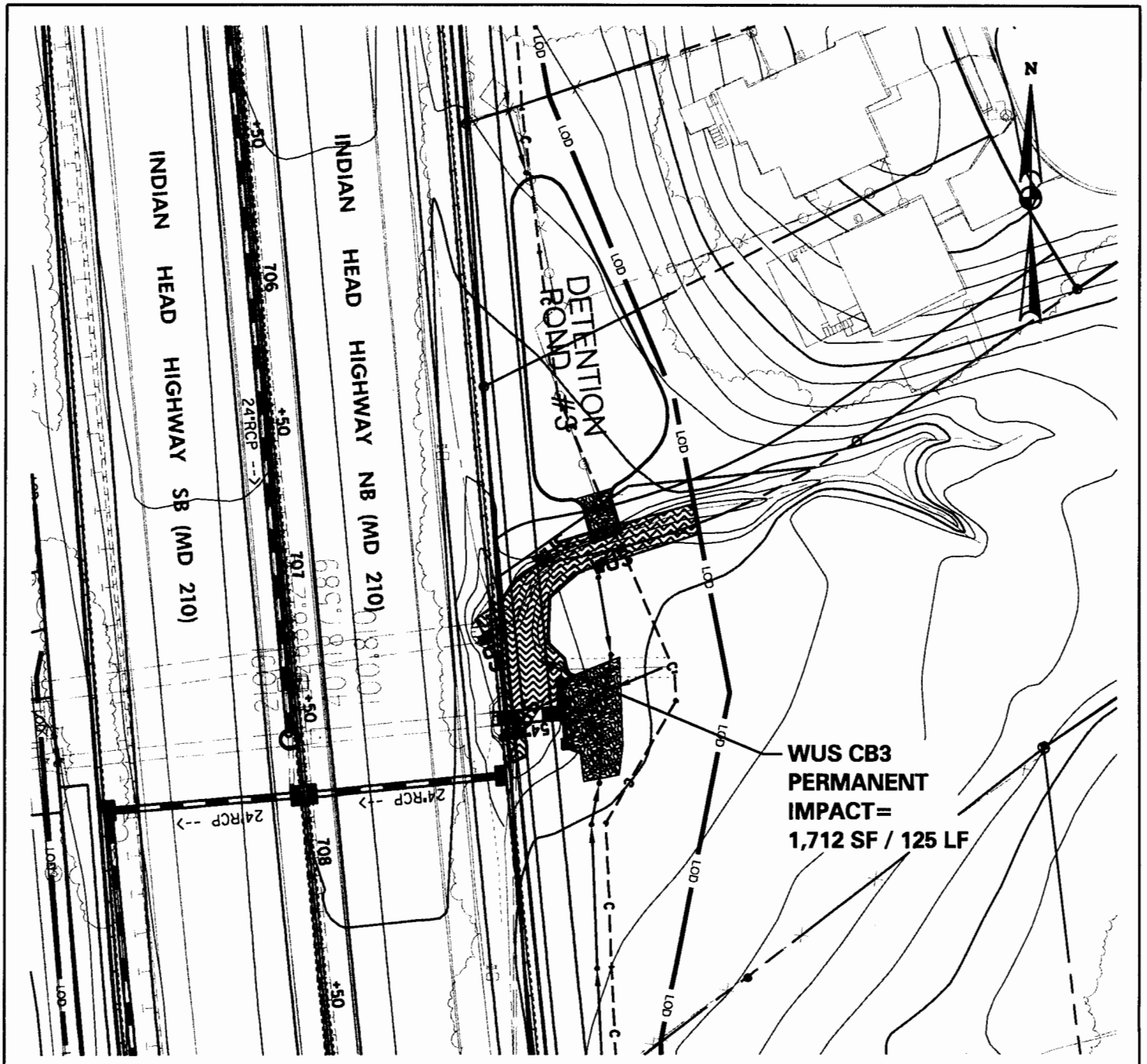
JULY, 2014



LEGEND

WETLAND BOUNDARY	WATERS OF THE U.S. — WUS
25' WETLAND BUFFER — B	LIMIT OF DISTURBANCE — LOD
100 YR. FLOODPLAIN	

WETLAND IMPACTS	25' WETLAND BUFFER IMPACTS
TEMPORARY WETLAND IMPACTS = 0	TEMPORARY 25' WETLAND BUFFER IMPACTS = 0
PERMANENT WETLAND IMPACTS = 0	PERMANENT 25' WETLAND BUFFER IMPACTS = 0
WATERS OF THE US (WUS) IMPACTS	**IMPACTS TO 100 YR FLOODPLAIN**
TEMPORARY WUS IMPACTS = 0	FLOODPLAIN IMPACTS = 0
PERMANENT WUS IMPACTS = 1,712 SF / 125 LF	

0 25 50 100
SCALE 1" = 50'

SHA State Highway Administration — Maryland Department of Transportation

MD 210 @ KERBY HILL RD/ LIVINGSTON RD

INTERCHANGE IMPROVEMENTS

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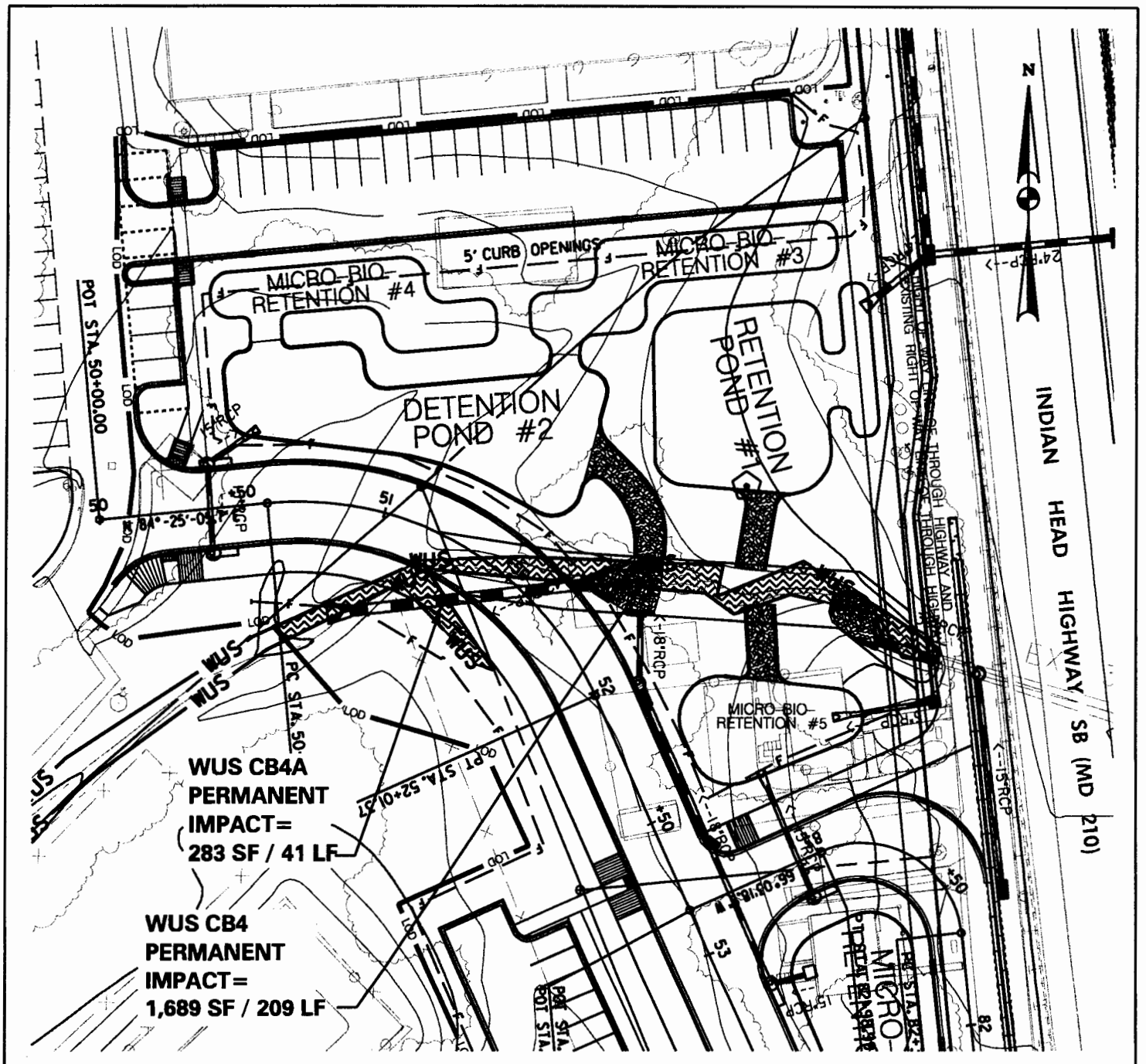
SHEET 3 OF 11	
JULY, 2014	



LEGEND

WETLAND BOUNDARY	● ● ● ● ● ●	WATERS OF THE U.S.	WUS
25' WETLAND BUFFER	B	LIMIT OF DISTURBANCE	LOD
100 YR. FLOODPLAIN			

WETLAND IMPACTS	25' WETLAND BUFFER IMPACTS
TEMPORARY WETLAND IMPACTS = 0	TEMPORARY 25' WETLAND BUFFER IMPACTS = 0
PERMANENT WETLAND IMPACTS = 0	PERMANENT 25' WETLAND BUFFER IMPACTS = 0
WATERS OF THE US (WUS) IMPACTS	**IMPACTS TO 100 YR FLOODPLAIN**
TEMPORARY WUS IMPACTS = 0	FLOODPLAIN IMPACTS = 0
PERMANENT WUS IMPACTS = 1,972 SF / 250 LF	

0 25 50 100
SCALE 1" = 50'

SHA State Highway Administration — Maryland Department of Transportation

MD 210 @ KERBY HILL RD/ LIVINGSTON RD

INTERCHANGE IMPROVEMENTS

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SHEET 4 OF 11	
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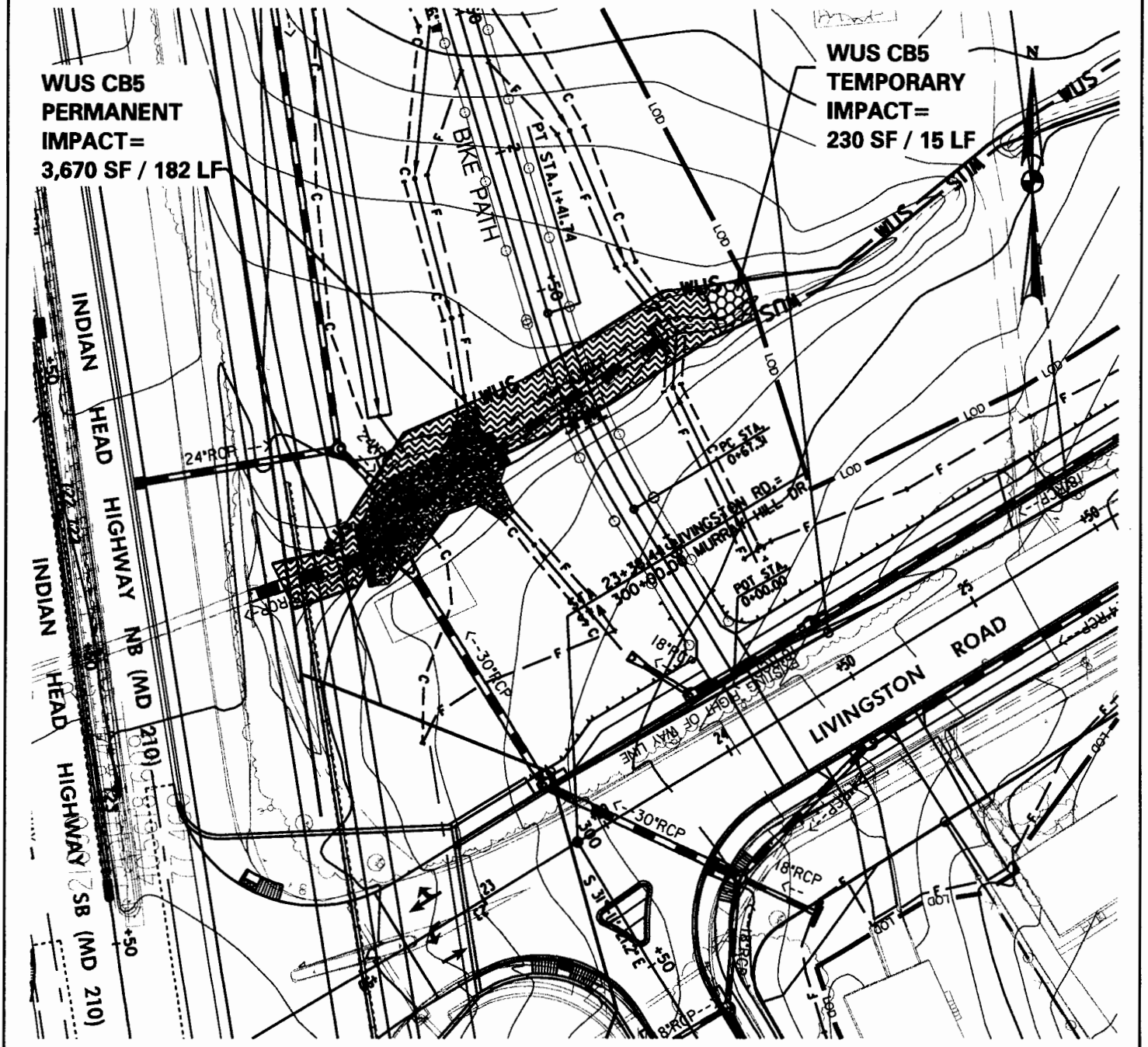

LEGEND

WETLAND BOUNDARY	WATERS OF THE U.S. — WUS
25' WETLAND BUFFER — B	LIMIT OF DISTURBANCE — LOD
100 YR. FLOODPLAIN	

WETLAND IMPACTS	25' WETLAND BUFFER IMPACTS
TEMPORARY WETLAND IMPACTS = 0	TEMPORARY 25' WETLAND BUFFER IMPACTS = 0
PERMANENT WETLAND IMPACTS = 0	PERMANENT 25' WETLAND BUFFER IMPACTS = 0
WATERS OF THE US (WUS) IMPACTS	**IMPACTS TO 100 YR FLOODPLAIN**
TEMPORARY WUS IMPACTS = 230 SF / 15 LF	FLOODPLAIN IMPACTS = 0
PERMANENT WUS IMPACTS = 3,670 SF / 182 LF	

0 25 50 100
SCALE 1" = 50'

SHA State Highway Administration — Maryland Department of Transportation

MD 210 @ KERBY HILL RD/
LIVINGSTON RD

INTERCHANGE IMPROVEMENTS

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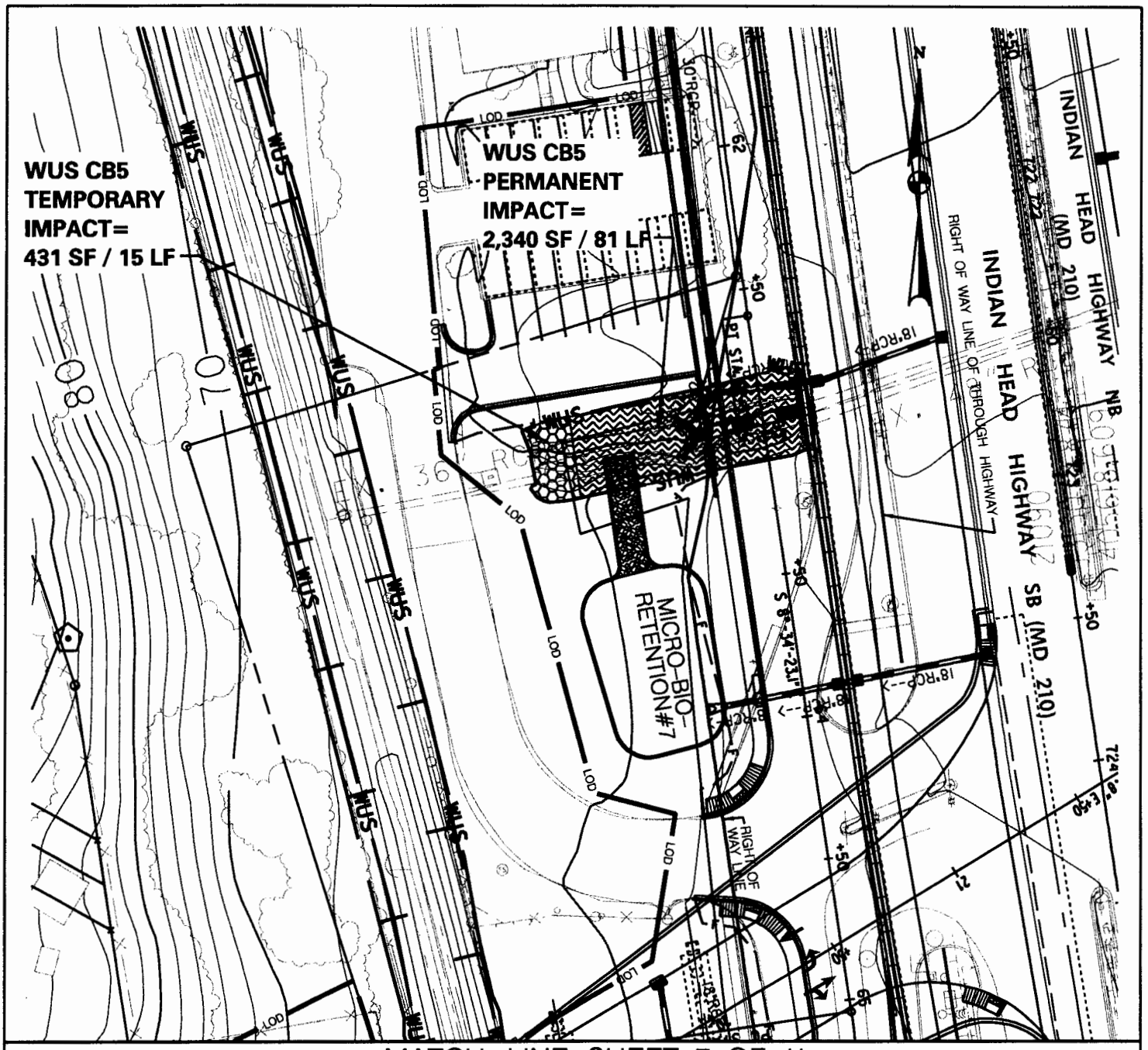
SHEET 5 OF 11	
JULY, 2014	



LEGEND

WETLAND BOUNDARY	● ● ● ● ● ●	WATERS OF THE U.S.	WUS
25' WETLAND BUFFER	B	LIMIT OF DISTURBANCE	LOD
100 YR. FLOODPLAIN			

WETLAND IMPACTS

- TEMPORARY WETLAND IMPACTS = 0
- PERMANENT WETLAND IMPACTS = 0

25' WETLAND BUFFER IMPACTS

- TEMPORARY 25' WETLAND BUFFER IMPACTS = 0
- PERMANENT 25' WETLAND BUFFER IMPACTS = 0

WATERS OF THE US (WUS) IMPACTS

- TEMPORARY WUS IMPACTS = 431 SF / 15 LF
- PERMANENT WUS IMPACTS = 2,340 SF / 81 LF

IMPACTS TO 100 YR FLOODPLAIN

- FLOODPLAIN IMPACTS = 0

0 25 50 100
SCALE 1" = 50'

SHA State Highway Administration
Maryland Department of Transportation

MD 210 @ KERBY HILL RD/
LIVINGSTON RD

INTERCHANGE IMPROVEMENTS

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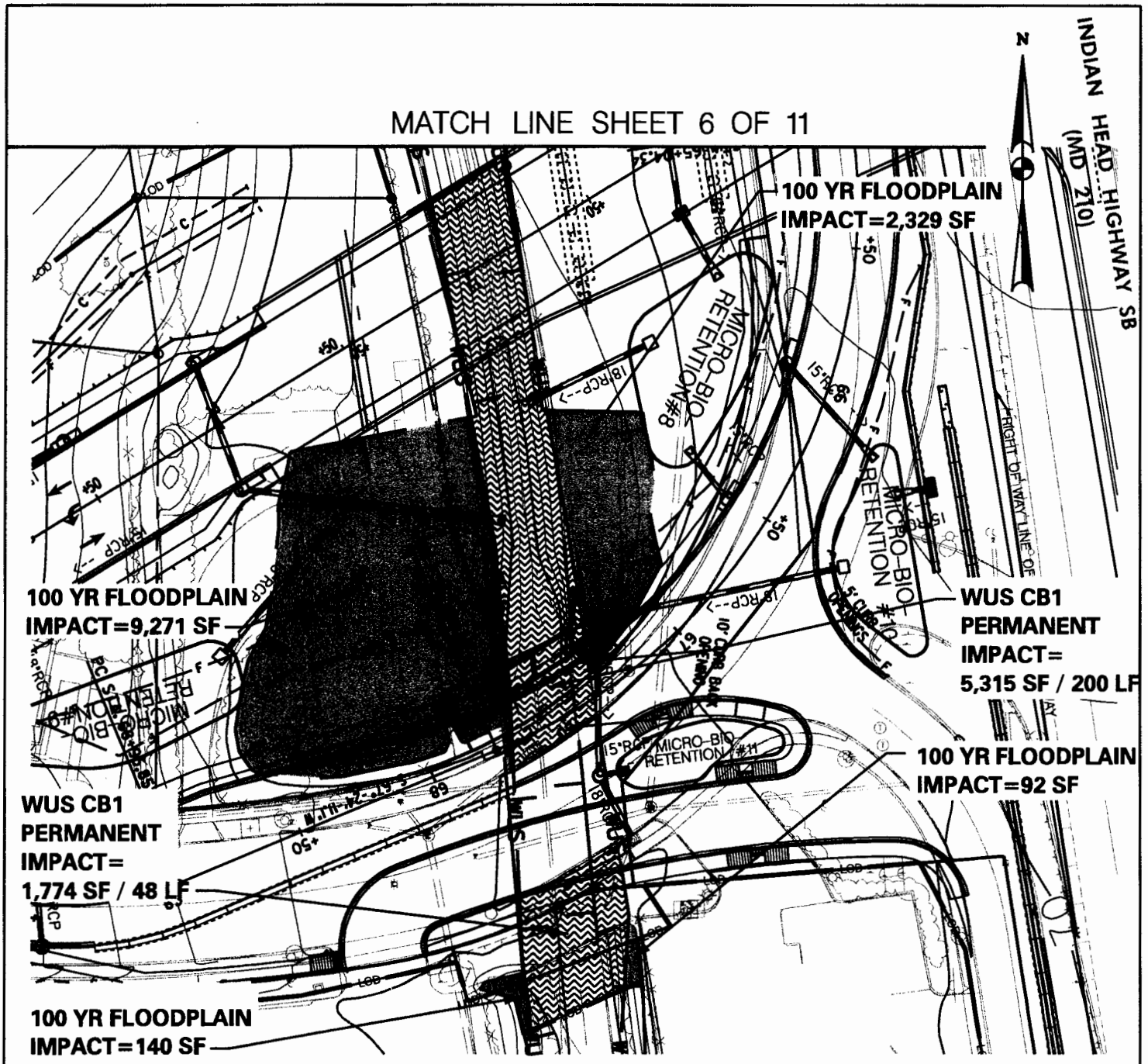
JULY, 2014



LEGEND

WETLAND BOUNDARY	● ● ● ● ● ●	WATERS OF THE U.S.	WUS
25' WETLAND BUFFER	B	LIMIT OF DISTURBANCE	LOD
100 YR. FLOODPLAIN			

WETLAND IMPACTS

- TEMPORARY WETLAND IMPACTS = 0
- PERMANENT WETLAND IMPACTS = 0

25' WETLAND BUFFER IMPACTS

- TEMPORARY 25' WETLAND BUFFER IMPACTS = 0
- PERMANENT 25' WETLAND BUFFER IMPACTS = 0

WATERS OF THE US (WUS) IMPACTS

- TEMPORARY WUS IMPACTS = 0
- PERMANENT WUS IMPACTS = 7,089 SF / 248 LF

IMPACTS TO 100 YR FLOODPLAIN

- FLOODPLAIN IMPACTS = 11,832 SF

0 25 50 100
SCALE 1" = 50'

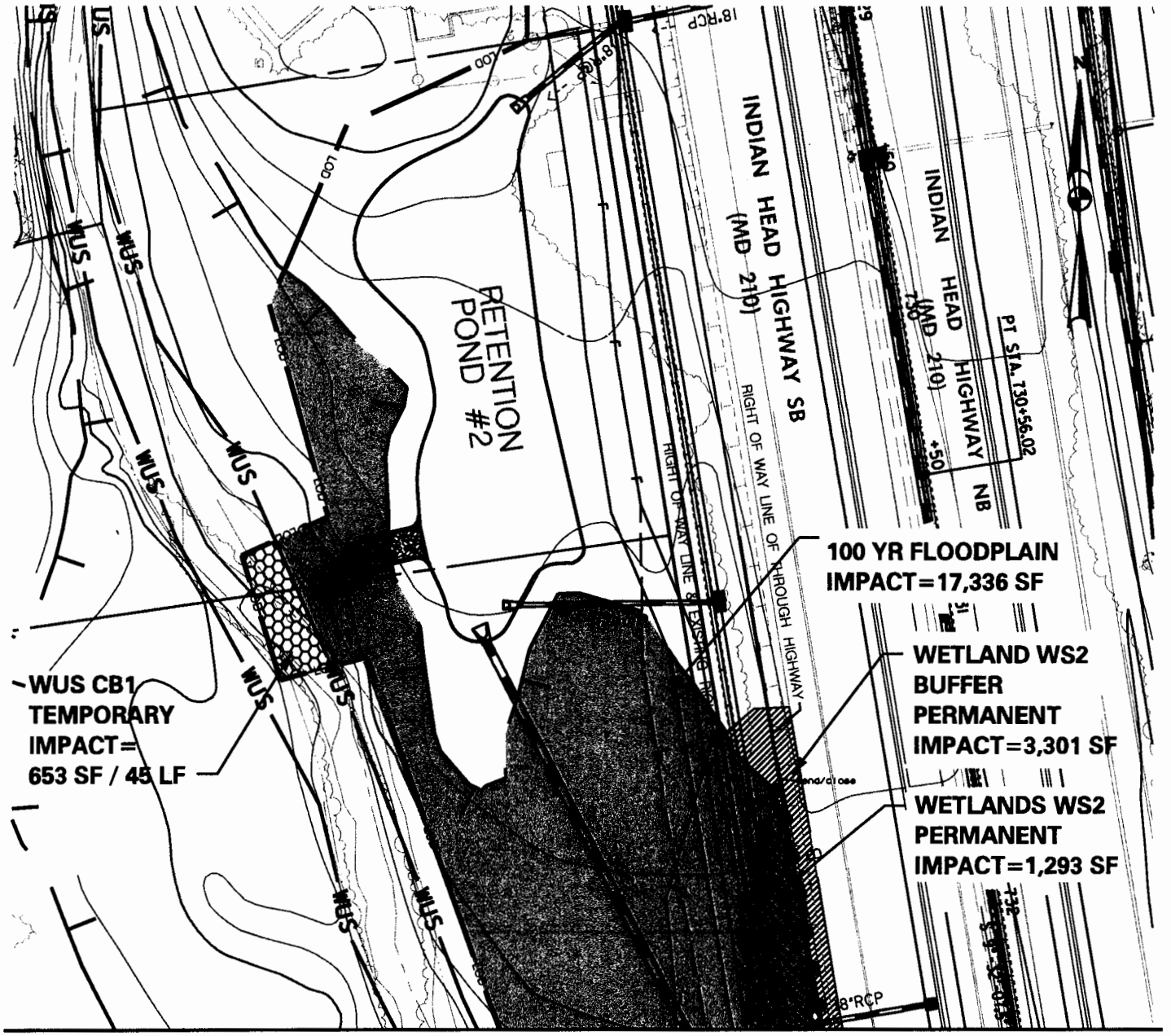
SHA State Highway Administration, Maryland Department of Transportation

MD 210 @ KERBY HILL RD/
LIVINGSTON RD

INTERCHANGE IMPROVEMENTS

CONTRACT NO.:	PG700B21
COUNTY:	PRINCE GEORGE'S
APPLICATION BY:	STATE HIGHWAY ADMINISTRATION

SHEET 7 OF 11
JULY, 2014



MATCH LINE SHEET 9 OF 11

LEGEND

WETLAND BOUNDARY	● ● ● ● ● ●	WATERS OF THE U.S.	WUS
25' WETLAND BUFFER	B	LIMIT OF DISTURBANCE	LOD
100 YR. FLOODPLAIN			

WETLAND IMPACTS

- TEMPORARY WETLAND IMPACTS = 0
- PERMANENT WETLAND IMPACTS = 1,293 SF

25' WETLAND BUFFER IMPACTS

- TEMPORARY 25' WETLAND BUFFER IMPACTS = 0
- PERMANENT 25' WETLAND BUFFER IMPACTS = 3,301 SF

WATERS OF THE US (WUS) IMPACTS

- TEMPORARY WUS IMPACTS = 653 SF / 45 LF
- PERMANENT WUS IMPACTS = 0

IMPACTS TO 100 YR FLOODPLAIN

- FLOODPLAIN IMPACTS = 17,336 SF

0 25 50 100
SCALE 1" = 50'

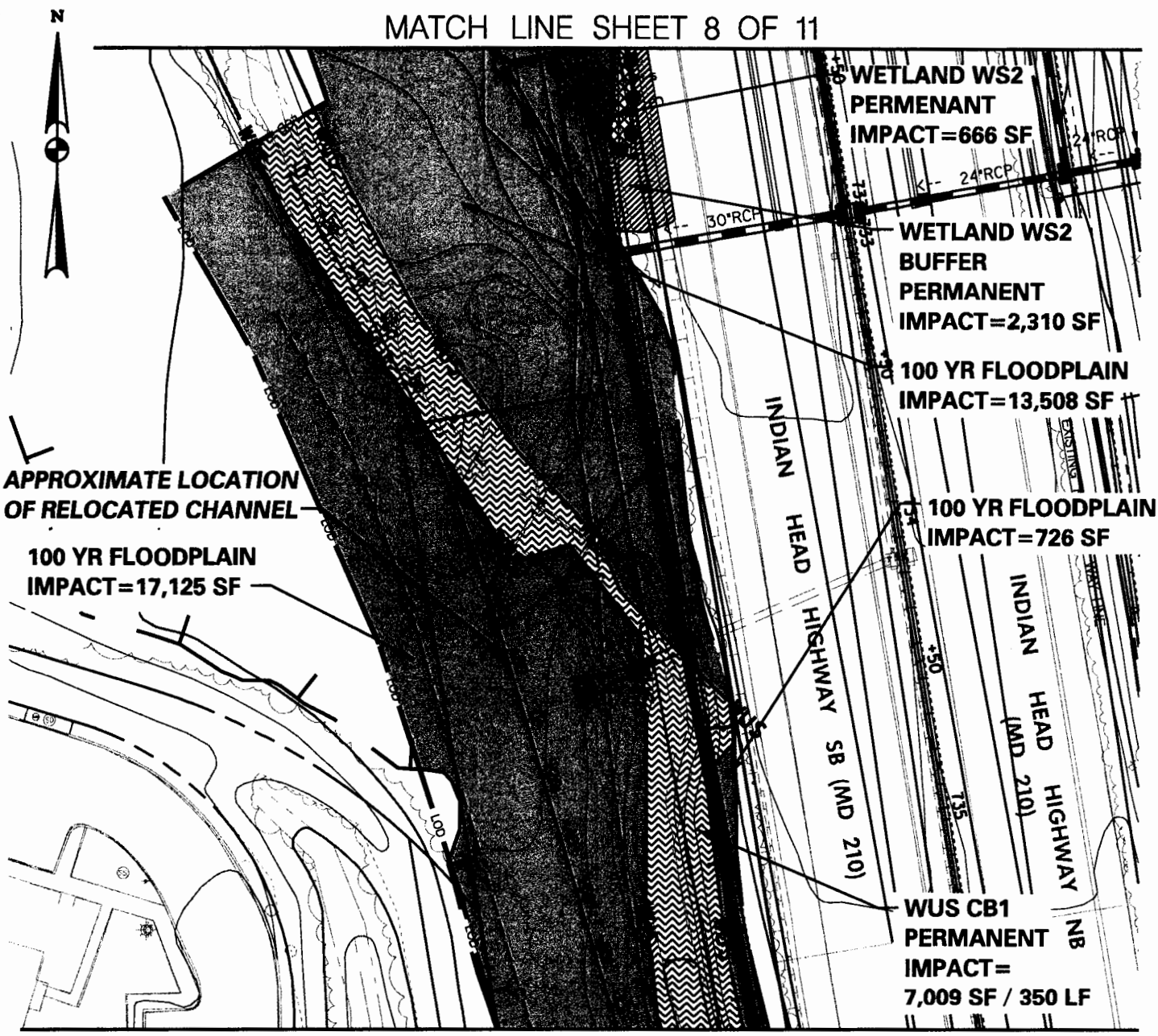
SHA State Highway Administration
Maryland Department of Transportation

MD 210 @ KERBY HILL RD/
LIVINGSTON RD

INTERCHANGE IMPROVEMENTS

CONTRACT NO.:	PG700B21
COUNTY:	PRINCE GEORGE'S
APPLICATION BY:	STATE HIGHWAY ADMINISTRATION

SHEET 8 OF 11
JULY, 2014



LEGEND

WETLAND BOUNDARY	● ● ● ● ● ●	WATERS OF THE U.S.	WUS
25' WETLAND BUFFER	B	LIMIT OF DISTURBANCE	LOD
100 YR. FLOODPLAIN			

WETLAND IMPACTS

- TEMPORARY WETLAND IMPACTS = 0
- PERMANENT WETLAND IMPACTS = 666 SF

25' WETLAND BUFFER IMPACTS

- TEMPORARY 25' WETLAND BUFFER IMPACTS = 0
- PERMANENT 25' WETLAND BUFFER IMPACTS = 2,310 SF

WATERS OF THE US (WUS) IMPACTS

- TEMPORARY WUS IMPACTS = 0
- PERMANENT WUS IMPACTS = 7,009 SF / 350 LF

IMPACTS TO 100 YR FLOODPLAIN

- FLOODPLAIN IMPACTS = 31,359 SF

0 25 50 100
SCALE 1" = 50'

SHA State Highway Administration, Maryland Department of Transportation

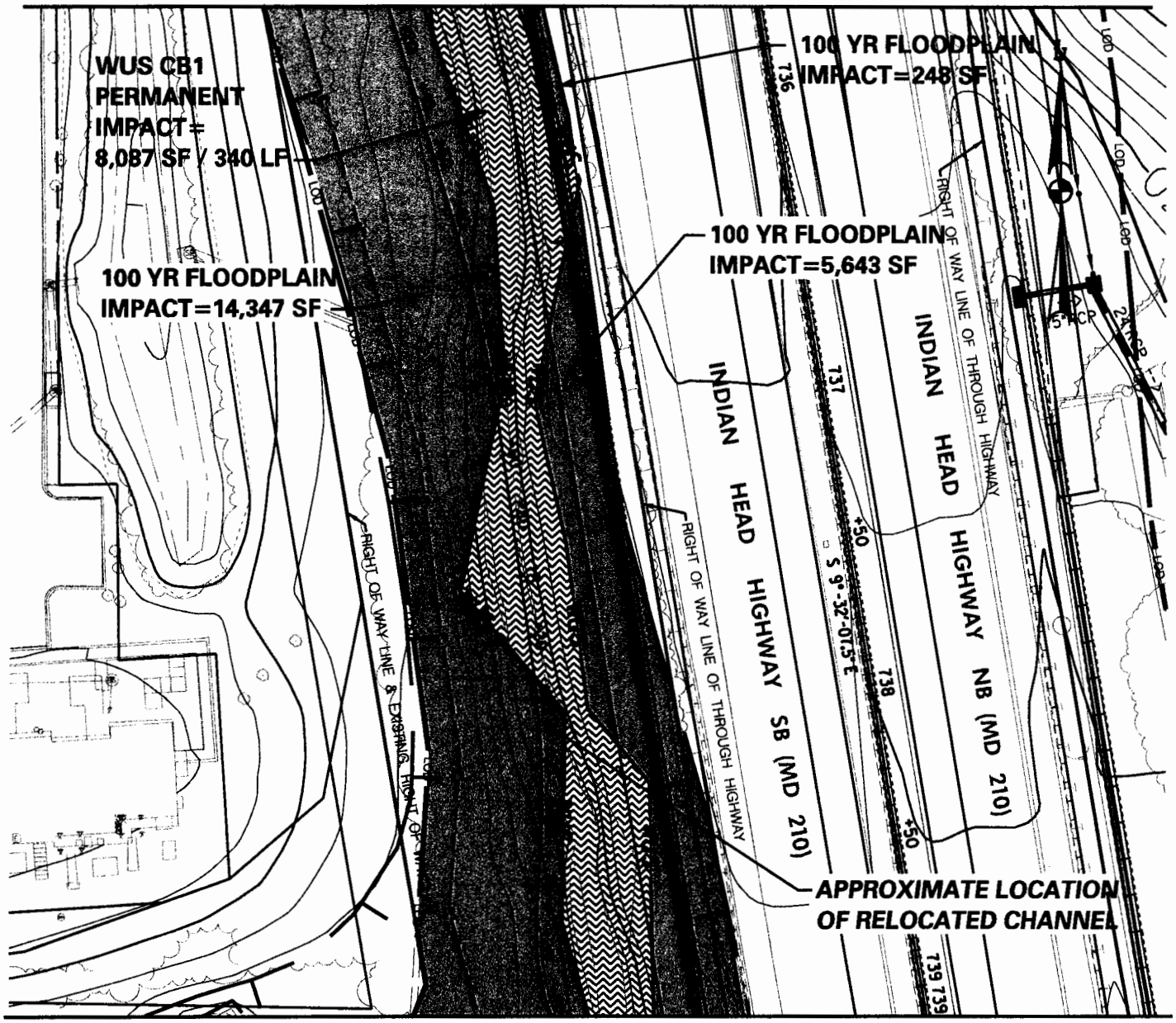
MD 210 @ KERBY HILL RD/
LIVINGSTON RD

INTERCHANGE IMPROVEMENTS

CONTRACT NO.:	PG700B21
COUNTY:	PRINCE GEORGE'S
APPLICATION BY:	STATE HIGHWAY ADMINISTRATION

SHEET 9 OF 11
JULY, 2014

MATCH LINE SHEET 9 OF 11



MATCH LINE SHEET 11 OF 11

LEGEND

WETLAND BOUNDARY	WATERS OF THE U.S. — WUS
25' WETLAND BUFFER — B	LIMIT OF DISTURBANCE — LOD
100 YR. FLOODPLAIN	

WETLAND IMPACTS

- TEMPORARY WETLAND IMPACTS = 0
- PERMANENT WETLAND IMPACTS = 0

25' WETLAND BUFFER IMPACTS

- TEMPORARY 25' WETLAND BUFFER IMPACTS = 0
- PERMANENT 25' WETLAND BUFFER IMPACTS = 0

WATERS OF THE US (WUS) IMPACTS

- TEMPORARY WUS IMPACTS = 0
- PERMANENT WUS IMPACTS = 8,087 SF / 340 LF

IMPACTS TO 100 YR FLOODPLAIN

- FLOODPLAIN IMPACTS = 20,238 SF

0 25 50 100
SCALE 1" = 50'

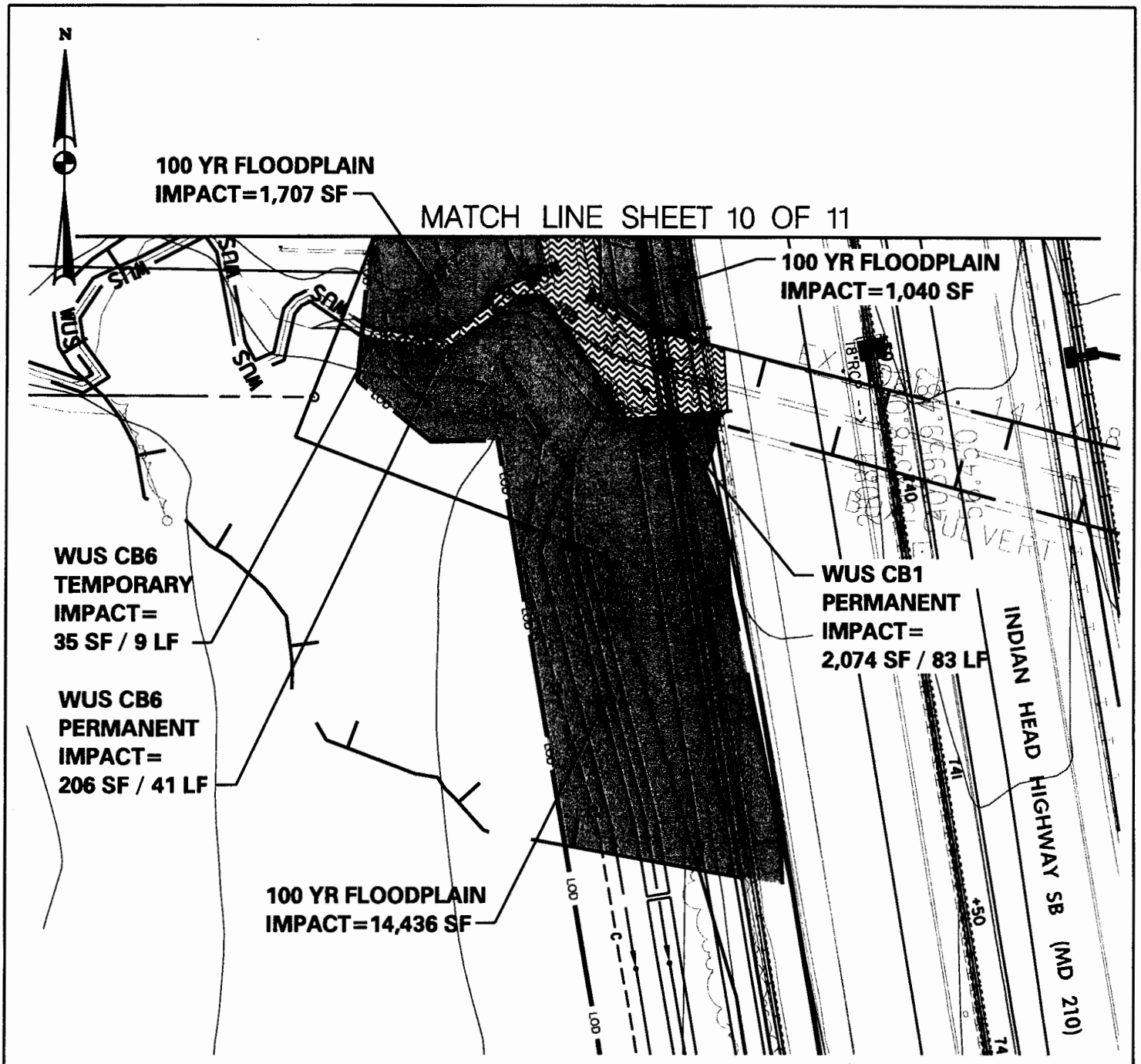
SHA State Highway Administration — Maryland Department of Transportation

MD 210 @ KERBY HILL RD/
LIVINGSTON RD

INTERCHANGE IMPROVEMENTS

CONTRACT NO.:	PG700B21
COUNTY:	PRINCE GEORGE'S
APPLICATION BY:	STATE HIGHWAY ADMINISTRATION

SHEET 10 OF 11
JULY, 2014



LEGEND

WETLAND BOUNDARY	● ● ● ● ● ●	WATERS OF THE U.S.	WUS
25' WETLAND BUFFER	B	LIMIT OF DISTURBANCE	LOD
100 YR. FLOODPLAIN			

WETLAND IMPACTS

- TEMPORARY WETLAND IMPACTS = 0
- PERMANENT WETLAND IMPACTS = 0

25' WETLAND BUFFER IMPACTS

- TEMPORARY 25' WETLAND BUFFER IMPACTS = 0
- PERMANENT 25' WETLAND BUFFER IMPACTS = 0

WATERS OF THE US (WUS) IMPACTS

- TEMPORARY WUS IMPACTS = 35 SF / 9 LF
- PERMANENT WUS IMPACTS = 2,280 SF / 124 LF

IMPACTS TO 100 YR FLOODPLAIN

- FLOODPLAIN IMPACTS = 17,183 SF

0 25 50 100
SCALE 1" = 50'

SHA State Highway Administration, Maryland Department of Transportation

MD 210 @ KERBY HILL RD/
LIVINGSTON RD

INTERCHANGE IMPROVEMENTS

CONTRACT NO.:	PG700B21
COUNTY:	PRINCE GEORGE'S
APPLICATION BY:	STATE HIGHWAY ADMINISTRATION

SHEET 11 OF 11
JULY, 2014

MD 210 AT KERBY HILL ROAD/LIVINGSTON ROAD
CONTRACT NO.: PG700B21

Sheet	System Name	Land Use	Water Type[1]	Waterway or Wetland Classification	Stream Use Designation	DNR 12-digit watershed	Tidal or Non-Tidal	Critical or Non-Critical Area	Wetland Impacts				Stream Impacts					Floodplain Impacts (s.f./acres)	Notes
									Direct		Buffer		Area of Stream Impact		Length of Stream Affected				
									Temporary (s.f./acres)	Permanent (s.f./acres)	Temporary (s.f./acres)	Permanent (s.f./acres)	Temporary (s.f./acres)	Permanent (s.f./acres)	Temporary (l.f.)	Permanent (l.f.)	Length/Av. Width at OHWM (l.f.)[2]		
2	WUS CB2	N/A	RPW	Perennial	I	020700100301	N/T	N/C	0	0	0	0	1,306/ 0.03	2,859/ 0.07	25	225	250/22	0	Unnamed tributary to Carey Branch, which conveys flow to Henson Creek, a TNW.
3	WUS CB3	N/A	NRPW	Ephemeral	I	020700100301	N/T	N/C	0	0	0	0	0	1,712/ 0.04	0	125	125/18	0	Unnamed tributary to Carey Branch, which conveys flow to Henson Creek, a TNW.
4	WUS CB4	N/A	RPW	Perennial	I	020700100301	N/T	N/C	0	0	0	0	0	1,689/ 0.04	0	209	209/8	0	Unnamed tributary to Carey Branch, which conveys flow to Henson Creek, a TNW.
4	WUS CB4A	N/A	NRPW	Ephemeral	I	020700100301	N/T	N/C	0	0	0	0	0	283/ <0.01	0	41	41/8	0	Unnamed tributary to Carey Branch, which conveys flow to Henson Creek, a TNW.
5	WUS CB5	N/A	RPW	Perennial	I	020700100301	N/T	N/C	0	0	0	0	230/ <0.01	3,670/ 0.08	15	182	197/20	0	Unnamed tributary to Carey Branch, which conveys flow to Henson Creek, a TNW.
6	WUS CB5	N/A	RPW	Perennial	I	020700100301	N/T	N/C	0	0	0	0	431/ 0.01	2,340/ 0.05	15	81	96/28	0	Unnamed tributary to Carey Branch, which conveys flow to Henson Creek, a TNW.
7	N/A	Wooded/ Developed	N/A	100 YR FP		020700100301	N/T	N/C	0	0	0	0	0	0	0	0	0	11,832/ 0.27	Carey Branch 100-yr floodplain
7	WUS CB1	N/A	RPW	Perennial	I	020700100301	N/T	N/C	0	0	0	0	0	7,089/ 0.16	0	248	226/30	0	Carey Branch, a tributary to Henson Creek, a TNW.
8	N/A	Wooded/ Developed	N/A	100 YR FP		020700100301	N/T	N/C	0	0	0	0	0	0	0	0	0	17,336/ 0.40	Carey Branch, a tributary to Henson Creek, a TNW.
8	WUS CB1	N/A	RPW	Perennial	I	020700100301	N/T	N/C	0	0	0	0	653/ 0.01	0	45	0	45/18	0	Carey Branch, a tributary to Henson Creek, a TNW.
8	WETLAND WS2	Roadside	RPWWN	PEM2B/ PFO1B		020700100301	N/T	N/C	0	1,293/ 0.03	0	3,301/ 0.08	0	0	0	0	0	0	Nontidal wetland associated with Carey Branch, a tributary to Henson Creek, a TNW.
9	N/A	Wooded/ Developed	N/A	100 YR FP		020700100301	N/T	N/C	0	0	0	0	0	0	0	0	0	31,359/ 0.72	Carey Branch 100-yr floodplain
9	WUS CB1	N/A	RPW	Perennial	I	020700100301	N/T	N/C	0	0	0	0	0	7,009/ 0.16	0	350	350/20	0	Carey Branch, a tributary to Henson Creek, a TNW. This segment to be relocated and restored.
9	WETLAND WS2	Roadside	RPWWN	PEM2B/ PFO1B		020700100301	N/T	N/C	0	666/ 0.02	0	2,310/ 0.05	0	0	0	0	0	0	Nontidal wetland abutting SB MD 210
10	N/A	Wooded/ Developed	N/A	100 YR FP	I	020700100301	N/T	N/C	0	0	0	0	0	0	0	0	0	20,238/ 0.46	Carey Branch 100-yr floodplain
10	WUS CB1	N/A	RPW	Perennial	I	020700100301	N/T	N/C	0	0	0	0	0	8,087/ 0.19	0	340	340/25	0	Carey Branch, a tributary to Henson Creek, a TNW. This segment to be relocated and restored.
11	N/A	Wooded/ Developed	N/A	100 YR FP	I	020700100301	N/T	N/C	0	0	0	0	0	0	0	0	0	17,183/ 0.39	Carey Branch 100-yr floodplain
11	WUS CB1	N/A	RPW	Perennial	I	020700100301	N/T	N/C	0	0	0	0	0	2,074/ 0.05	0	83	40/20	0	Carey Branch, a tributary to Henson Creek, a TNW. This segment to be relocated and restored.
11	WUS CB6	N/A	RPW	Intermittent	I	020700100301	N/T	N/C	0	0	0	0	35/ <0.01	206/ <0.01	9	41	32/6	0	Unnamed tributary to Carey Branch, which conveys flow to Henson Creek, a TNW.
Total Impacts to Wetlands and Waterways									0	1,956/ 0.05	0	5,611/ 0.13	2,655/ 0.06	37,018/ 0.84	109	1,925		97,948/ 2.24	

[1] TNW = Traditional Navigable Waters, including territorial seas; TNWW = Wetlands adjacent to TNWs; RPW = Relatively Permanent Waters (RPWs) that flow directly or indirectly into TNWs; NRPW = Non-RPWs that flow directly or indirectly into TNWs; RPWWD = Wetlands directly abutting RPWs that flow directly or indirectly into TNWs; RPWWN = Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs; NRPWW = Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs; ISOLATE = Isolated (interstate or intrastate) waters, including isolated wetlands; UPLAND = Uplands; TNWRPW = Tributary consisting of both RPWs & non-RPWs.

[2] Length and average width at the approximate ordinary high water mark of each stream being impacted.

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.

NOTICE TO CONTRACTOR
FEDERAL AVIATION ADMINISTRATION REQUIREMENTS

MARKINGS REQUIRED. The Design-Builder is informed that the current project is in the vicinity of Potomac Airfield and Ronald Reagan Washington National Airport. The Design-Builder shall ensure all equipment (including cranes) exceeding 50 feet in height above ground level is marked and/or lighted in accordance with Federal Aviation Administration (FAA) Advisory Circular AC 70/7460-1K Change 2, titled *Obstruction Marking and Lighting* – Chapters 1, 3 (Marked), 4, 5 (Red), and 12, Appendices 1 and 2 – enclosed in the Contract Documents as Appendix E.

PRECONSTRUCTION NOTICE REQUIRED. As per Title 14 Part 77 of Code of Federal Regulations, any construction or alteration of a structure that may affect the National Airspace System (NAS) mandates a notification to FAA by completing the Notice of Proposed Construction or Alternation form (FAA Form 7460-1) as outlined in FAA Advisory Circular AC 70/7460-1K. This notice must be submitted by the Design-Builder at least 30 days prior to the date of proposed construction or alteration. If required by FAA, Form 7460-2 Part 1, Notice of Actual Construction or Alteration, is to be completed and sent to FAA at least 48 hours prior to starting the actual construction or alteration of the structure. Additionally, Part 2 of this form shall be submitted no later than 5 days after the structure has reached its greatest height. Details are outlined in the Advisory Circular AC 70/7460-1K.

MULTIPLE NOTICES REQUIRED. During the project duration, each phase may require a separate notice/s depending upon the work involved. The Design-Builder will be responsible for obtaining and coordinating the obstruction evaluation (OE) during each phase of the project.

APPLICABILITY. The FAA requirements apply to all temporary and permanent equipment / construction that will be used and/or installed as part of this Contract. The crane(s) on the project site must be retracted and / or lowered to the ground when not in use, if required. The fixed infrastructure components of this project that include and may not be limited to the bridges, retaining walls, guardrails, and highway lighting, will need a similar OE as will be completed for the cranes. The items requiring approvals include, but are not limited to, type and location of cranes, lighting (permanent and temporary) types and structures, bridge and roadway profiles, temporary and permanent construction appurtenances, guardrails, shields, shoring, pile driving equipment, etc.

RESPONSIBILITY. The Design-Builder shall have to seek determinations and approvals for bridges and roadway profiles, roadway lighting, and all construction activity that may interfere with the NAS. All determinations and approvals must be received prior to the construction activity. It is the responsibility of the Design-Builder to provide adequate notice, in proper form, in accordance with the Advisory Circular AC 70/7460-1K Change 2. The cost and effort of preparing and providing notices, preparing supporting documentation, submitting documents, responding to comments, compliance with the FAA requirements including, but not limited to, labor, flags, lights, etc, as well as coordination will be incidental to the Contract lump sum. No additional payment will be made to comply with these requirements. Delays and costs due to, but not limited to, FAA review time, FAA comments, design changes, penalties for violations, shutdowns, work hour restrictions and modification to method of construction

resulting out of FAA requirements will be the responsibility of the Design-Builder. The Administration will not be responsible for any costs or delays arising out of these requirements.

The Administration has obtained prior determinations for the bridge as well as for temporary crane locations and has posted them on ProjectWise. The Design-Builder has the option of either utilizing these determinations and abiding by the conditions listed therein, or preparing new requests for OE. These determinations are an interim and partial submittal; and they do not cover the entire scope of the project nor do they relieve the Design-Builder of responsibility for any future or additional for submittals to FAA.

FILING INFORMATION. The Obstruction Evaluation / Airport Airspace Analysis Portal may be found at: https://oeaaa.faa.gov/oeaaa/external/portal.jsp for completion of the proper forms, tracking of the status of analysis, and confirmation of project approval.

Correspondence to FAA shall be sent through:

William E. Brauer, III
Office of Traffic & Safety, TDSD
Maryland State Highway Administration
7491 Connelley Drive, Hanover MD 21076
Phone: 410-787-5888 Fax: 410-582-9469

With copies to:

Project Engineer, PG7005170
Maryland State Highway Administration
District 3 Construction
9300 Kenilworth Avenue, Greenbelt, MD 20770

The anticipated duration of the turnaround from the time of original filing to the receipt of approval is over sixty (60) days and this may be necessary for each phase of the project. The Administration will not be responsible for any delays, contract extensions, additional costs or claims as a result of the OE.

Notice is required by 14 Code of Federal Regulations, part 77 pursuant to 49 U.S.C., Section 44718. Persons who knowingly and willingly violate the notice requirements of Title 14, part 77 of CFR are subject to a civil penalty of $1,000 per day until the notice is received, pursuant to 49 U.S.C., section 46301 (a).

GENERAL PROVISIONS

GP SECTION 2
BIDDING REQUIREMENTS AND CONDITIONS FOR DESIGN-BUILD – COMPETETIVE SEALED PROPOSALS

16 **DELETE: GP-2.19 (a) General.** in its entirety.

INSERT: The following:

GP-2.19 (a) General. The Contract is to be awarded as outlined in TC 2 of the Request for Proposals.

DELETE: GP-2.19 (b) Determination of Lowest Bidder.

INSERT: The following:

GP-2.19 (b) Determination of Successful Proposer.

DELETE: The first sentence in GP-2.19 (b) "Bids shall be…Invitation for Bids."

INSERT: The following:

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

17 **DELETE: GP-2.19 (c) Award.** in its entirety.

INSERT: The following:

GP-2.19 (c) Award. Award of the Contract will be based on the criteria as outlined in TC 2 of the Request for Proposals.

TERMS AND CONDITIONS

TC SECTION 2
BIDDING REQUIREMENTS AND CONDITIONS FOR COMPETITIVE SEALED PROPOSALS (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 the MD210 at Livingston Road/Kerby Hill Road Interchange. This project is located in Prince George's County, Maryland. The basis of payment for this work will be "lump sum" which price shall include all costs associated with design and construction of the project in accordance with the requirements of this RFP.

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

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

2.07.01.1 Restrictions on Participation in Design-Build Contracts:

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

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

A. Whitney, Bailey, Cox & Magnani, LLC

B. STV, Incorporated

C. AECOM

D. Wallace, Montgomery & Associates, LLP (WMA)

E. KCW Engineering Technologies

F. McCormick Taylor

G. Applied Research Associates, Inc. (ARA)

H. RJM Engineering, Inc.

I. Mercado Consultants, Inc.

J. KCI

K. Infrastructure Technologies, LLC

L. Sabra Wang and Associates, Inc.

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

No official or employee of the State of Maryland, as defined under State Government Article, §15-202, Annotated Code of Maryland, whose duties as such official or employee include matters relating to or affecting the subject matter of this contract, shall during the pendency and term of this contract and while serving as an official or employee of the State become or be an employee of the Consultant or an entity that is a subcontractor on this contract.

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

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

2.07.02 Project Overview

2.07.02.01 Description of Work

The project consists of the design and construction of a grade separated interchange at the intersection of MD 210 with Livingston Road/Kerby Hill Road. The project limits begin north of Wilson Bridge Drive and continue to the southern end of MD 210 Service Road B. The project also includes design and construction of a new service road to maintain access to residential and commercial properties. Roadway improvements include realignment of Livingston Road and Kerby Hill Road approaching the interchange; new bridge structures, retaining walls, and noise barriers; new pavement construction and pavement rehabilitation of existing roadways and shoulders; reforestation; closed/open drainage systems; stormwater management quality and quantity

facilities; erosion and sediment control; stream stabilization and relocation; culvert extensions; signing, pavement markings, lighting and signalization; maintenance of traffic; utility relocation and coordination; and structure demolition.

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

Starting in 1997, SHA conducted a multi-modal study of MD 210 from I-95/I-495 (the Capital Beltway) to MD 228 to relieve traffic congestion along MD 210 and improve intersections (PG2211116). On June 21, 2004 Federal Highway Administration (FHWA) approved the Final Environmental Impact Statement (FEIS), prepared for the MD 210 Multi-Modal Study. The Record of Decision was approved and Location Approval was granted on September 22, 2004. The study resulted in endorsement of Selected Alternative 5A Modified. The selected alternative proposed overpasses at each main signalized intersection location along MD 210, with the exception of Wilson Bridge Drive, Farmington Road and MD 373.

The MD 210 - Livingston Road/Kerby Hill Road Interchange project received funding for design in 2006. Due to revised traffic numbers, a Value Engineering (VE) Study was conducted in April 2011. As a result, the revised scope included construction of a median ramp interchange in lieu of the original loop ramp design.

SHA has completed an Environmental Reevaluation for the MD 210 - Livingston Road/Kerby Hill Road Interchange break-out project. This Environmental Reevaluation was approved by FHWA in September 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 a facility that is able to be adequately maintained.
4. To minimize impacts to trees, floodplain elevations, and noise receptors.

2.07.02.04 Project Key Issues

Schedule

- Right-of-Way may 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.

- The construction schedule will need to be closely coordinated with utility companies performing utility relocations within the project limits. Design and construction must 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.

- Stream relocation work is restricted from March 1 through June 15. Construction must be phased to accommodate this restriction and to minimize delay in the overall project schedule.

Maintenance of Traffic

- Access for residents, emergency response, and school buses must be maintained to all private properties within the project limits.

- Pedestrian safety and accessibility must be maintained throughout the project limits, especially within work zones.

- Access must be maintained to the gas station at MD 210 and Kerby Hill Road. Fuel delivery truck access must be accommodated.

- Long term closures and detours of secondary roads must be avoided and minimized if unavoidable. This will require the installation of temporary signals to maintain traffic and complete construction of the project. Extensive coordination with SHA, WMATA, Prince George's County DPW&T, Prince George's County Fire Department/EMS, and Prince George's County Public Schools related to any closures and detours will be required.

- No permanent through lane closures will be allowed on MD 210. Only temporary closures as shown in the Temporary Lane or Shoulder Closure Schedule will be permitted.

On-going Coordination with Stakeholders

- Meet with the local community organizations on a periodic basis to seek feedback on construction details and progress.

- Coordinate with SHA, WMATA, Prince George's County DPW&T, Prince George's County Fire Department/EMS, Prince George's County Public Schools, and local community organizations regarding closures, detours, and changes in traffic patterns.

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 at 1" = 30' was 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 portions of the roadways to refine pavement elevations, ditch inverts, and pipe culverts. The data from these supplemental surveys was incorporated into the plan and the surface. This information is available in electronic format on ProjectWise. All surveys were performed in the Maryland State Plane Grid, NAD 83/91 and NAVD 88.

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

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 purpose only. The Design-Builder must perform field-run cross-sections to complete design and construction activities to address design and/or construction issues and provide clarification where necessary. Cross-sections showing existing and proposed ground must be prepared by the Design-Builder using the appropriate computer software.

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.

The Administration has performed a geotechnical survey and topsoil testing. Results of the survey and laboratory test data are included on ProjectWise.

These studies were performed with reasonable care and recorded in good

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

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 some of the underground utilities which identified the existence of the utility at its horizontal location. Additional utility data was obtained using as-built plans. How the different data was obtained will be noted in the files. 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. Limited utility test hole data was field collected at single point locations. Once uncovered, the utility's horizontal and vertical location was verified using accurate survey techniques. Limited test hole data for this project was obtained and vertical locations may be referenced to existing ground that has been disturbed over time. Therefore, some of the data may not be accurate, especially the vertical references. The Design-Builder is responsible for obtaining all information that will be required to complete the roadway design and construction. The Administration has conferred with the utility companies with facilities in this area concerning the potential impact of this roadway construction. The Design-Builder must coordinate and cooperate with other contractors that are expected to be relocating utilities during the construction of this Project. The Design-Builder is responsible for determining the status of all designs and relocations and for identifying all additional required relocations and for coordinating the design and construction of the utilities with the design and construction of the roadway improvements of this Project.

The limits of the contract were lengthened after the Utility Designation was completed. Some utility data in the areas of the contract north of Sta. 690+00 and south of Sta. 745+00, MD 210, is based on as-built utility information. The Design-Builder will be responsible to obtain any additional utility data it determines necessary for design and construction of the project.

2.07.02.05.6 Right of Way

It is anticipated that the total right-of-way clearing will be April 1, 2015. The Administration will clear right-of-way in a phased approach to

facilitate advanced utility relocations beginning along MD 210 Northbound. The second phase will include property along MD 210 Southbound, near the intersection with Kerby Hill Road.

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 in advance of the right-of-way clear date. The Design-Builder may begin construction activity only on approved plans where the disturbance is entirely contained within right-of-way in SHA's possession and with prior approval from the Administration. The Administration will not approve plans and the Design-Builder may not proceed with construction on any properties not within SHA possession until such time as the Administration issues a Right-of-Way Certification stating that right-of-way is clear for the design plan submittal. 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:

- Stormwater Management Permit (from MDE)
- Erosion and Sediment Control Approval (from MDE)
- National Pollutant Discharge Elimination System Permit (from MDE)
- Nontidal Wetlands & Waterways Permit and Section 404 Individual Permit (from MDE and USACE)
- Reforestation Law Approval (from DNR)
- Federal Aviation Administration (FAA) Obstruction Evaluation

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 is currently under review by MDE. Approval of the concept SWM report and a Letter of Intent is anticipated to be issued prior to the Technical Proposal Due Date. 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.

Erosion and sediment control has been designed for clearing and grubbing for utility relocation work along MD 210 northbound only. Approval for this design is expected to be obtained and permit issued prior to the submission of the Technical Proposal.

The Administration has submitted a Notice of Intent form to MDE for the erosion and sediment control for clearing and grubbing for utility relocations as noted above. Approval for the NOI is expected to be obtained prior to Notice to Proceed. The ultimate responsibility of submitting any amendments thereto shall be on the Design-Builder. Any delays resultant of obtaining NOI amendments will be the sole responsibility of the Design-Builder.

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

A permit was issued in 2008 for the MD 210 Corridor Study. The Administration has applied for a Permit Modification for the impacts based upon the proposed activities in the conceptual plans that are part of this RFP. SHA obtained approval from MDE on August 8, 2014 and from the Corps of Engineers on August 11, 2014 and is included in this RFP. Any impacts that are outside the current LOD or are in excess of the current assessment will have to be permitted by the Design-Builder. In such cases, the Design-Build Team is responsible for the complete process of preparing the documentation for these approvals and submitting this information to SHA- Environmental Programs Division for approval, who will then submit the modification request to the appropriate agency for approval.

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

Status of Reforestation Law Approval:

The Administration received Reforestation Law Approval from DNR on July 21, 2014 for the impacts for this project based upon the proposed activities in the conceptual plans that are part of this RFP (See Reforestation Law Approval contained in this RFP). Any impacts that are outside the current LOD or are in excess of the current assessment will have to be permitted by the Design-Builder. In such cases, the Design-Build Team is responsible for the complete process of preparing the documentation for these approvals and submitting this information to SHA- Landscape Operations Division for

approval, who will then submit the modification request to DNR for approval.

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

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

- Topographic files
- Text files
- Existing Contour files
- Triangle files
- Environmental Features file
- Existing Surface files
- Intergraph Output/Coordinate files

C. Utility Files

- Utility designation files
- Test Hole Information

D. Right-of-Way

- Existing Right-of-way file
- Work Map files
- Proposed Right-of-Way Line file
- Right-of-way Plats

E. Reforestation Impact Plans & Wetland Plates

- Wetland Impact Plates
- Wetland Impact Plates Design Files

- Forest Impact Plans

F. Advanced E&S Clearing & Grubbing

- Advanced E&S Clearing & Grubbing Plan

G. Appendices

- Soil Laboratory Test Results
- Soils Survey Boring Logs
- Topography Tabulation
- Existing and Proposed Traffic Data
- Pavement Details
- Traffic Control 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.

H. Conceptual Plan Sheets

- Compiled Conceptual Plans (.pdf)
- Title Sheet
- Index
- General Notes
- Sheet Layout Plan
- Typical Section Sheets
- Geometry Sheets
- Roadway Plan Sheets
- Roadway Profile Sheets
- Stream Stabilization Plans
- Guide Signing Details
- Structure Plans
- Utility Plans
- MD 210 As-Builts

I. Design Files/Other Pertinent Information

- Roadway Design Files

- Horizontal Baseline
- Vertical Alignment file
- Shading file
- Conceptual Cross Section files
- Border & Layout files
- Geopak Files
- Potential SWM area file
- Conceptual SWM grading file
- Conceptual Drainage file
- Noise Barrier Spread Sheets
- TNM Data File
- Conceptual Project Schedule
- Traffic Analyses

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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 designs.

J. Environmental Documents

- Environmental Reevaluation of the FEIS
- Noise Abatement Report
- Hazardous Material Survey Report

K. Stormwater Management and Surface Drainage Information

- NOI Form (and attachment)
- Concept Stormwater Management Report (.pdf file)
- BMP Checklists and As-Built Certification Formats
- SWM Report Format Guidelines
- SHA BMP Identification Form
- Water Quality Summary Sheet Format and Definitions
- Geotextile Guidelines
- Maryland State Highway Administration Stormwater Management Site Development Criteria, prepared by Highway Hydraulics Division, Revised June 2011.

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L. Office of Structures, Policy and Procedures

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, Noise 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, Signals, and Pavement Marking Design and Construction.
- Roadside Landscape Planting, Stormwater Management Landscape Planting, Reforestation Design and Construction of the aforementioned.
- Utility Coordination for utility modifications regardless of whether designed and/or constructed by the Design-Builder.
- Utility Design and Relocations.
- Geotechnical Engineering.
- 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).
- Remove and Disposal of Existing Buildings
- 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 Proposal 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. All necessary Right of Way may not be acquired prior to Notice to Proceed. **As of the issuance of this RFP, the Administration has not advanced sufficiently in this process to permit Design-Builder's to inspect all of the project site. The Design-Builder is permitted to inspect the portions of the of the project site within the Administration's Existing Right-of-Way.** The Design-Builder 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 including utility test hole data included on ProjectWise. It is the Proposer's responsibility to verify that information as part of its utility and/or geotechnical investigation. The Technical Proposal and Price Proposal submission will be considered conclusive evidence that the Prospective Design-Build Team has determined that it has performed a reasonable site investigation to submit Technical Proposal and Price Proposal, necessary to design and construct the project.

All subsurface investigations performed by the Prospective Proposer, including sampling and laboratory testing, shall be performed by a Geotechnical firm experienced in subsurface investigations and in accordance with the 1988 AASHTO Manual on Subsurface Investigations, AASHTO Standards, the Maryland State Highway Administration Standard Specifications for Subsurface Explorations, MSMT Standards, the Maryland State Highway Administration Book of Standards for Highway and Incidental Structures, and ASTM Standards. The Prospective Proposer shall be responsible for utility clearance and any traffic control required for his investigation. The Prospective Proposer shall submit all Maintenance of Traffic concepts related to site investigation to the SHA District 3 Traffic Division for approval. Any investigative methods that pose a safety threat to the traveling public shall not be used. Any borings taken in roadway or shoulder areas shall be backfilled before the area is re-opened to traffic. The Prospective Proposer shall restore to its current condition, any area of the site disturbed by his site investigation operations. If the Prospective Proposer encounters any abnormal conditions that indicate the presence of hazardous materials or toxic waste during his site investigation, he shall immediately suspend work in the area and notify the Administration. A Geotechnical Engineer who is registered in the State of Maryland shall supervise all subsurface investigations conducted by the Design-Builder.

2.08.01.3 Utility Coordination

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

a. What utility relocation work is planned, what is the status and anticipated schedule impact of this work.

b. What utility facilities actually exist within the project limits.

c. What additional utility relocation work must be included in their design and impact to the schedule that will result from the Design-Builder's activities.

d. What permitting modifications result from additional utility relocations.

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

2.08.01.4 Additional Surveys

The Prospective Proposer 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.

2.08.01.5 Duty to Notify if Errors Discovered

Proposers shall not take advantage of any error, omission, or discrepancy in the RFP or related materials, including all Project information. If a Proposer discovers such an error, omission or discrepancy, he shall immediately notify the Administration in writing; failure to 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 Proposers 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 one month of notification of the RCL.

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

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

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

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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 **February 11, 2015 prior to 12 noon** (EST). The LOI must be delivered to the following email address:

PG7005170_MD_210@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 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 shall be only through a single representative authorized to bind the Proposer.

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

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

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: PG7005170_MD_210@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.

3 Only requests received by 4:00 p.m. EST on **February 4, 2015** 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 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, 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.

2 The Proposer may submit an ATC for review by the Administration on or before **December 2, 2014 at 4:00 p.m.** (prevailing local time). Inquiries received after that date and time will not be accepted. The Proposer may submit up to 3 additional ATCs directly related to the modifications in Addendum No. 3 related to the Adjusted Price Proposal and the No Excuse Bonus. These additional ATCs must be submitted on or before January 14, 2015 at 4:00 p.m. (prevailing local time). Additional ATCs received after that date and time will not be accepted.

3

All ATCs shall be submitted in writing via email only to PG7005170_MD_210@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 PG7005170_MD_210@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. **Any re-submittal of an ATC must be made on or before January 7, 2015 at 4:00 p.m. (prevailing local time).** Re-submittals made after that date and time will not be accepted.

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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 five copies and 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-on 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 and Price Proposal to match the organization specified in this RFP.

a. Separate Proposal Packages

Proposal submissions shall consist of two separate sealed packages, a Technical Proposal as described in 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

MD 210 –Livingston Road/Kerby Hill Road Interchange – PG7005170

Container ___ of ____

c. Location and deadline for submittal of Technical Proposal Submittal

3

Technical Proposals must be delivered no later than **February 18, 2015 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 Proposal

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

Prospective Proposer's Name

Price Proposal

MD 210 –Livingston Road/Kerby Hill Road Interchange – PG7005170

Container ___ of ____

f. Proposal Guaranty

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

Prospective Proposer's Name

Proposal Guaranty

MD 210 –Livingston Road/Kerby Hill Road Interchange – PG7005170

g. Location and deadline for submittal of Price Proposal Submittal

3

Price Proposals must be delivered no later than **March 3, 2015 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.

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

b. The Proposer has given the Administration written notice of all errors, omissions, or discrepancies in the RFP in accordance with Section TC 2.08.01.

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

2.08.03.3 Withdrawals and Resubmittals of Proposals

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

2.08.03.4 No Public Opening

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

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

TC-2.09 TECHNICAL 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 five parts, meet the specified page limitation, and correspond to the outline as follows:

- 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:

Maryland State Highway Administration (SHA)
Attention: 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 Construction firm(s). A Major Participant is defined as the legal entity, firm or company, individually or as a party in a joint venture or limited liability company or some other legal entity, that will be signatory to the

Design–Build Contract with the Administration. Major Participant(s) will be expected to accept joint and several liability for performance of the Design–Build Contract. Major Participants are not design subconsultants, construction subcontractors or any other subcontractors to the legal entity that signs the Design–Build Contract.

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

The cover letter shall include the following:

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

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

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

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

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

f. Include a certification that the Design-Build Team is in compliance with 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:

  - Project Sequencing – How the Design-Builder will design and construct the project. The Design-Builder shall, at a minimum, address how it will coordinate its work with all utility relocations, whether completed by the utility company or by the Design-Builder, within the project constraints and what the Design-Builder will specifically do to facilitate utility relocations to ensure the overall project will be completed on or before the project completion date. – **CRITICAL**
  - Maintenance of Traffic – How the Design-Builder will safely maintain all traffic (motorists, pedestrians, bicyclists, transit, emergency services, etc.), minimize delay within the project area and maintain local access at the Livingston Road/Kerby Hill Road intersection. The Design-Builder shall, at a minimum, address the maintenance of traffic phases it will utilize to design and construct the project and why this approach would beneficial to meeting the project goals, key issues and requirements. – **CRITICAL**
  - 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**
  - Innovation and 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

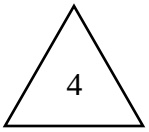
A. Design and Construction Summary Schedule **- IMPORTANT**:

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:

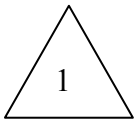
- The schedule for design, and construction will be task oriented, indicating dates by which milestones are to be achieved. The proposer may use a critical path scheduling approach and the schedules be graphically represented.
- The schedule is to be an integrated and networked multi-layered schedule 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 cannot exceed **June 19, 2019**. It also must include 18 months for concurrent, third party utility relocations to be completed after the Design-Builder completes the advanced clearing and grubbing.

B. Project Management – CRITICAL



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

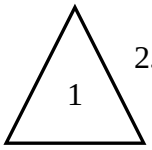
- Project communication plan including how you will document and control communications internally within the Design-Build team, externally with the Administration, and externally with the public including roadway users, impacted stakeholders, community officials and the general public.
- Coordination management plan through design and construction including how you will coordinate with the right-of-way acquisition schedule, concurrent utility relocations, and permit restrictions.
- Risk management plan including risks from a design, construction, and management perspective and how the Design-Builder will manage, avoid and mitigate the risks.
- 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.

2.09.04 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.



2.09.05 Legal & Financial Information (Limit 1 Page 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.

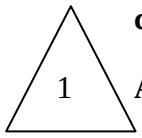
B. Liability: State whether Major Participant firm(s) who will be party to the prime design – build contract with the Administration will have joint and several liability, and how liability is being apportioned between other firms of the design- builder team. Provide documentation that you have met the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

TC-2.10 PRICE PROPOSAL

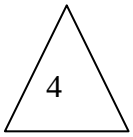
2.10.01 General

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.



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2.10.02 Wetland and/or Waterway Impact Reduction Incentive

See Section 3.20.08.04.03

3

2.10.03 Forest Impact Reduction Incentive

See Section 3.20.08.05.02

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 Price Proposal Irrevocable

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

2.10.06 Proposal Guarantee

The Contractor's proposal guarantee shall represent 5% of the Price Proposal 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.

2.10.08 Contract Time

3

The Proposer shall establish the Contract Time for the project. **The Contract Time shall be a calendar date and entered by the Proposer on page 44 of 45 in the Proposal Form of the Request for Proposals.** This calendar date shall consider that the Notice to Proceed for the contract will be issued by the Administration on or before June 1, 2015 and consider all other contract requirements including concurrent utility relocation timeframes stated in TC 2.09.03. **The calendar date for the Contract Time shall be no later than June 19, 2019.**

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 Proposal will have a higher relative importance than the Price Proposal.

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 – 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 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.

- 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 be 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 an/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.

3

Once the Price Proposal is determined to be accurate, complete, and reasonable, the Administration will determine the Adjusted Price Proposal amount. This Adjusted Price Proposal will take into account not only the Price Proposal submitted by the Proposer, but the Contract Time entered into the Proposal Form. **The Adjusted Price Proposal, as determined in the method described below, shall be utilized in the Determination of the Successful Proposer as described in TC 2.11.08.**

The number of calendar days will be determined by the difference between the calendar date provided by the Proposer on page 44 of 45 in the Proposal Form of the Request for Proposals and the Notice to Proceed Date of June 1, 2015. For example, a calendar date of June 19, 2019 would be 1,479 calendar days.

The calendar days will then be multiplied by the daily loss of public benefit cost of **$11,800** per calendar day and then added to the aggregate amount of the Price Proposal to determine the Adjusted Price Proposal. For example, the Adjusted Price Proposal for a Price Proposal with an aggregate amount of $50,000,000 and a calendar date of June 19, 2019 would be as follows:

Adjusted Price Proposal = $50,000,000+((1,479 calendar days)x($11,800/calendar day))
Adjusted Price Proposal = $50,000,000+$17,452,200
Adjusted Price Proposal = $67,452,200

The preceding formula will only be used to determine the Adjusted Price Proposal. The Contract award amount and final payment to the Design-Build Team will be based upon the aggregate amount in the Price Proposal.

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 or subfactor; and/or

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

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

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 the Adjusted Price Proposal which the Administration determines provides the best opportunity to obtain the right Design-Build Team to ensure a successful project.

3

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

Any Proposal that receives a rating of "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 will require that the successful Proposer start design activities as soon as possible after notification of selection and prior to issuance of Award. The Administration requires this approach as an effort to maximize the available time for construction activities and to facilitate critical relocation activities with utility companies. The Administration also recognizes the benefits to the public by providing an opportunity to accelerate project activities and project completion. It is reasonable that these design activities should not place the Design-Builder at risk should the Administration not award the contract and issue a Notice to Proceed for events outside of the control of the Design-Builder.

The Administration will diligently process contract documents and procedures to Award and issue a Notice to Proceed within the shortest time frame possible. In the event that

the Administration does not issue a Notice to Proceed to the selected Proposer for reasons beyond the control of the Proposer, the Administration will reimburse all actual documentable design costs incurred by the Design-Builder after approval of the Bid Bond. To receive reimbursement, the Design-Builder must submit all related work product including, but not limited to, design calculations, plans, surveys, boring data, updated electronic files, personnel time sheets and other materials to the Administration for its use.

Actual construction work may not begin until the additional requirements specified elsewhere in this RFP have been satisfied, including but not limited to receipt of 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 $140,000.00 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 $140,000.00 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.

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 not be processed for payment.

Invoices shall contain the following information:

Invoice # - created by the Design-Build Team

Federal Tax I.D. number

Remittance Address

FMIS # - PG700B51

Contract Description – MD 210 – Livingston Road/Kerby Hill Road Interchange

Construction # - PG7005170

Payment Amount - $140,000.00

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

STIPEND AGREEMENT

Contract No. PG7005170
Project Description: MD 210 at Livingston/Kerby Hill Road Interchange

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

A. On _____, 201_, the SHA issued a Request for Proposals ("RFP") for design and construction of the MD 210 at Livingston/Kerby Hill Road Interchange Design-Build Project ("Project"), pursuant to procurement authority granted in State Finance and Procurement Article of the Annotated Code of Maryland and the Code of Maryland Regulations ("COMAR"), Title 21. The MD 210 at Livingston/Kerby Hill Road Interchange 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. <u>Work Product.</u>

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

1.5 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.

1.6 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 $140,000.00 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 $140,000.00 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:_____

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:

A) Section V Highway Design - (Phase IV)

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

C) Section VII Surveys and Plats (Phase IV)

D) Section VIII Traffic Engineering (Phase IV)

E) Section IX Landscape Architecture

F) Section XI Critical Path Method

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

3.05.02 Design Personnel Identified in Proposal

The designer and design subcontractors shall utilize the key personnel identified in their Statement of Qualification (SOQ) to manage the project and supervise engineers and technicians in completing the design in a timely manner to permit construction activities. **Changes in key**

staff identified in the SOQ must be approved in writing by the Administration, and replacement personnel must have equal or better qualifications than the key personnel identified in the proposal. The format for replacement staff resumes must be in the same format as required for the SOQ including requirements thereof. The Administration shall be the sole judge as to whether replacement staff members are acceptable.

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, signalization and traffic control. The Design-Build Team shall be knowledgeable in coordinating utility designs, utility connections and working with other agencies and the public. The Design-Build Team shall have experienced personnel qualified in the development of plans, specifications and estimates for the various utility relocations to be designed by the Design-Build Team as outlined in TC 3.15.

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.
- A description of any potential mitigating features.

1

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.

The following design exceptions from the County criteria as reflected on the concept plans have been approved by Prince George's County:

5

Kerby Hill Road design speed of 30 mph and Livingston Road design speed of 35 mph.

Kerby Hill Road/Livingston Road vertical curves (K values)

4

PVC Sta. 14+32.97 – PVT Sta. 19+74.55 K = 37

PVC Sta. 20+96.79 – PVT Sta. 22+95.34 K = 19

PVC Sta. 22+95.68 – PVT Sta. 26+52.70 K = 37

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 3.08.03, shall also be sealed by a Professional Engineer licensed in the State of Maryland and signed by the corporate representative of the Design-Build Team, Designer and checker(s).

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

3.05.07.6 Design Quality Assurance

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

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

work shall not serve as the basis for claims for additional compensation or time by the Design-Build Team.

3.05.08 Highway Engineering

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

3.05.09 Structural Engineering

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

3.05.10 Noise Abatement

The Design-Build Team shall perform any required acoustical analyses associated with the designated noise abatement system. All plans developed shall meet the prescribed CADD Standards established for the overall project. **Noise abatement is required on this project.**

3.05.11 Geotechnical Engineering

The Design-Build Team shall conduct supplemental subsurface explorations, analyses, design and construction for all geotechnical components of the Project in accordance with all applicable criteria and standards cited herein and in accordance with TC 3.14 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.

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

3.05.13 Traffic Engineering

The Design-Build Team shall prepare signing; signal; roadway, pedestrian/bicycle path and sign lighting and final pavement marking plans in addition to plans to relocate an existing DMS to new supports 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 these documents to the SHA-OED-LOD & LAD 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.

3.05.15 Utility Relocations and Permits

The Design-Build Team shall be responsible for coordination of all activities during design and construction with regard to utilities and permits, including utility relocations to be completed by the Design-Builder as specified in this RFP. See Section 3.15-Utility Design and Relocation Criteria.

3.05.16 Stormwater Management (SWM) Design and Approvals

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

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

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

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

A SWM concept design was developed to demonstrate to MDE that all of the SWM needs of the project can be met within the project corridor. It is anticipated that MDE

will approve the methodology in the concept SWM report and provide a Letter of Intent to issue approvals. The Design-Build Team is responsible to finalize the SWM design. The final design shall be acceptable to both MDE and SHA. MDE will issue final SWM Approvals.

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

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

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

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

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

The Concept SWM report proposes certain locations of SWM facilities. The Letter of Intent will be issued based upon the locations. Other types of facilities may be used, but they shall meet all requirements of the 2000 Maryland Stormwater Design Manual and subsequent changes and be approved by the Administration's Highway Hydraulic Division. Once approval is gained from the Administration, the Design-Build Team shall acquire all other approvals and necessary permits.

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

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

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

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

3.05.16.3 Stormwater Management (SWM) As-Built Certifications

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

The As-Built Certification Package shall be prepared according to the special provision, 300 – Stormwater Management Facility As-Built Certification, included in this package. The As-Built Certification signature block, checklists and tabulations are also included on ProjectWise.

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

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

3.05.17 Surface Storm Drainage Design and Approvals

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

Review time for submissions to the Administration shall not be the basis of a claim or time extensions against the Administration.

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

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

3.05.18 Erosion and Sediment Control (ESC) Design and Approvals

The Administration will design erosion and sediment control and obtain plan approval, prior to Technical Proposal submittal, for clearing and grubbing along MD 210 northbound only, to allow the Design-Build team to perform clearing and grubbing for utility relocations as a first order of business. The Design-Build team will be responsible for the remaining design and for obtaining additional approvals for the erosion and sediment control plans from all appropriate agencies such as MDE. ***The Design-Build Team shall consider the price for the advanced clearing and grubbing as part of their LS Design-Build cost. All cost will be final, regardless of any quantity changes as defined on the approved plans.***

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

A Pre-Permitting meeting shall be scheduled as discussed under SWM Design and Approvals section above. Submittals for ESC approval shall be delivered concurrently to MDE and the Administration according to the review process for SWM approval described above under SWM Design and Approvals. Review time for submissions to MDE shall not be the basis of a claim or

time extensions against the Administration.

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.

The Administration has submitted a NOI form for this project and anticipates approval prior to NTP. The ultimate responsibility of amendments thereto shall be on the Design-Build Team. Any delays resultant of obtaining the NOI modifications will be the sole responsibility of the Design-Build Team.

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

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

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

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

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

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

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

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

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

Plan reviews that result in “conditional approval” means the comments are minor in nature and should not have an adverse effect on construction activities. If “conditional approval” is granted, the Design-Build Team shall post a copy of

their point-by-point responses on Project Wise outlining how the Design-Build Team will address the comments. If the comments are identified to be addressed as part of an "As-Built Drawing", the Design-Build Team shall follow the process outlined in Section 3.05.27.2.2. If the Design-Build Team elects to address all comments prior to proceeding towards construction, then the Design-Build Team shall follow the process for plan "approved" as noted below. In order to proceed towards construction the Design-Build Team shall submit the title sheet that is signed and sealed by the Design-Build Team's Engineer to the SHA Design Project Manager. The title sheet shall be returned to the Design-Build Team with signatures from the appropriate officials of the Administration. The Design-Build Team shall then submit 20 sets of plans, specifications and post a copy of their point-by-point responses on Project Wise for SHA internal distribution. One set of Reproducibles 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 Reproducibles 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:

- All Final Plans and Specifications comments have been addressed to the satisfaction of the Administration for that portion.
- All required permits for that portion of work have been received.
- Final Plans and Specifications approval is received in writing from the Administration for that portion.
- 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 coordinate the changes with the Administration who will coordinate the permit modifications with the agencies. 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 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 Law Approval (from DNR)

    3) Erosion and Sediment Control Approval for Advanced Clearing and Grubbing (from MDE)

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) Federal Aviation Administration (FAA) Obstruction Evaluation

    5) 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 -Specifications for Consulting Engineers' Services,".

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

3.05.25 Conformance with Contract and Proposal

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

3.05.26 Check Shop Drawings

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

All shop drawings relating to the structures shall be reviewed in accordance with *SHA OBD PPM No. OP-82-34 (G), Checking of Working Drawings, Form Plans and/or Erection Plans*. The primary review shall be undertaken by the Design-Build Team. A secondary review shall be

undertaken by SHA. Once reviewed and approved by SHA, the structural shop drawings shall be stamped as approved and returned to the Design-Build teams with the stamped plans being designated as the documented approval. No construction activities are permitted in conjunction with any structural shop drawings that have not been approved by SHA.

The Design-Build Team shall correct any errors or omissions found by the Administration during QA-QC of such approved shop drawings at no additional cost to the Administration.

The Design-Build Team shall challenge all the work of the detailer, approving that, which is correct, or most appropriate and red lining and commenting on incorrect or less appropriate details or design. The importance of this approach is emphasized since inferior detailed design could negate the benefits of quality general design. Each shop drawing shall bear the official stamp of the Design-Build Engineer, attesting to their review and approval by the Design-Build Engineer. This work is to be done under the supervision of and shall be the responsibility of a Maryland Registered Professional Engineer.

3.05.27 Conformance with Approved Plans and Specifications

3.05.27.1 Construction Plans and Project Specifications

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

3.05.27.2 Plan Revisions after Approval of Final Plans and Specifications

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

3.05.27.2.1 Revisions

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

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

and approved by SHA prior to implementing any changes to the contract documents.

3.05.27.2.2 As-Built Drawings

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

The Design-Build Team shall submit one comprehensive set of As-Built plans at the completion of the project that are signed and sealed by the Engineer. The comprehensive set of As-builts will include an index sheet and a key plan which graphically represents and annotates each phase of the plan submittal if there are multiple submittals. The comprehensive set of as-builts will be assembled and numbered consecutively, beginning with sheet one of the first submittal and ending with the last sheet of the final submittal. The index and key plan will allow for more easily understood and 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 Black and White images, at 200 DPI-TIF and PDF files, of the As-Built Plans on CD ROM. The As-Built plans shall be scanned starting with the Title Sheet. The file names will be the Construction Contract Number, followed by a dot (.), followed by a sequential number beginning with 1001. The sequential number must correspond with the plan sheet numbering. This number is followed by another (.) and then the TIF and PDF extension. Example: PG7005170.1001.tif. All scanned TIF and PDF images will be scanned in such a way that they do not appear upside down upon opening. The cover of the CD ROM shall be labeled with the SHA contract number, date, route number, and project description.

3.05.27.2.4 Traffic Control Plans

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

3.05.27.2.5 Permits

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

3.05.28 Coordination with Other Contractors

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

It is anticipated that 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 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

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

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

C. Schedule and coordinate all milestone meetings for this project.

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

E. Provide review of all redesign and revisions.

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

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

H. Review and approve design concepts, plans, contract drawings, documents and estimates.

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

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

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

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

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

E. Functional operation and requirements for the traffic signals.

F. 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.

G. Handwritten Structure Design Sheets.

H. 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.

I. 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) A review of all plans, reports, calculations, shop drawings etc. related to the structures on this project.

B) Respond to all Requests for Information on the structures during the design and/or construction.

C) Copies of existing standard sheets; however, these may require some revisions by the Design-Build Team and/or SHA.

D) 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;
- The FHWA Representative;
- 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
- District Utility Engineer
- Prince George’s County Representative

3.06.05.2 Pre-Construction Conference Topics

The Design-Build Team should be prepared to discuss the following issues at the

conference (at a minimum):

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

- Material submittals and approvals;
- Processing of field decisions and change orders;
- Close-out procedures;
- Review of miscellaneous procedures;
- Safety;
- Utility relocations, and
- Utility connections to all existing and proposed TCD's.

3.06.06 Conduct Progress Meetings

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

3.06.06.1 Progress Meeting Attendees

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

3.06.06.2 Progress Meeting Topics

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

3.06.07 Permits

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

have been obtained by the Administration.

TC 3.07 DELIVERABLES

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

3.07.01 Plans

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

- Title Sheet
- Index of Drawings
- Typical Sections
- Superelevation Charts
- Paving Details
- Geometry and Coordinates
- Roadway Plans
- Roadway Profiles
- Traffic Control Plans
- Traffic Signalization Plans
- Interconnect Plans
- Structure Plans and Details
- Noise Wall Plans, Elevation and Details
- Retaining Wall Plans, Elevation and Details
- Culvert Extension Plans, Elevation and Details
- Stream Relocation Plans and Details
- Stream Diversion 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
- Signing and Pavement Marking Plans
- Stormwater Management Plans and Details
- Cross Sections
- Landscape/Reforestation/SWM Planting Plans
- Lighting Plans
- Water and Sewer Relocation Plans
- Gas Relocation Plans

3.07.01.1 General Requirements

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

3.07.01.2 Refinements to Contract Documents

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

3.07.01.3 Contract Plans and Specifications

The Design-Build Team shall provide contract plans and any required specifications, in accordance with "Volume II Specifications for Consulting Engineers " and this RFP. The Design-Build Team will develop specifications for construction that identify the details of the proposed work. The intent is that the work will be done in accordance with the

Standard Specifications, project specific Special Provisions, the "standard" Special Provisions, and the Special Provisions Inserts which are normally included in an Administration advertised RFP. All of these "standard" Special Provisions Inserts and Special Provisions are included in this RFP even though the work items to which they apply might not be included in this project. The intent is that if the item is included in the construction, then these "standard" Special Provisions and Special Provisions Inserts will apply.

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

Throughout the design phase, the Design-Build Team shall prepare and update 50 scale reproducible maps of the design to be used for meetings, briefings, etc. Where needed for added clarification, 20 scale reproducible maps shall be provided for use by the Administration. The scale of the roadway plans should be 30 scale unless more detail is needed.

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

3.07.01.4 Drafting and CADD Standards

The Design-Build Team shall utilize SHA supplied Microstation files, including data collector survey and photogrammetry in their design and drafting. The Design-Build Team shall utilize the Microstation drafting software packages Version V8 or later, and/or Inroads/Geopak. All of the design and drafting will utilize all Administration CADD Standards including but not limited to feature tables, file-naming standards, parameter files, font libraries, cell libraries and color tables.

3.07.01.5 Stormwater Management (SWM) and Surface Drainage Plans

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

- Pipe profiles and structure schedules for all storm drain systems and culverts.
- Profiles shall be at a scale of 1 in. = 30 ft. horizontal and 1 in. = 3 ft. vertical. The 25-year hydraulic gradient and existing and proposed ground, proposed pipe, existing and proposed utilities, proposed outlet protection, and existing structures shall be shown on all storm drain profiles.
- Details for all non-standard drainage structures.

- SWM Systems including details, profiles, grading and layout plans, planting plans and BMP ID numbers.

- Side, median and outfall ditch elevations, offsets, section geometry, and surface treatments.

- A BMP As-Built Certification sheet shall be developed for each SWM facility (see 3.05.16.3). Examples of the checklists and tabulations are included in this package and checklists for other types of facilities may be available from the Administration, Highway Hydraulics Division, upon request. The Design-Build Team may expand the checklist as necessary.

- Hazardous material spill containment plans as necessary.

- Underdrain connections, locations (including linear filter cleanouts), and outlets.

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

- Spring box and outlet locations and configurations.

3.07.01.6 Erosion and Sediment Control (ESC) Plans

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

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

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

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

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

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

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

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

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

3.07.01.7 Traffic Control Plans

The Design-Build Team shall prepare detailed Traffic Control Plans (TCPs) as required for various stages of construction showing traffic patterns, signs, barricades, etc. These plans will be developed at a scale of 1 in. = 20 ft. or 1 in. = 50 ft. and shall layout in detail each phase of construction as coordinated with the erosion and sediment control and landscape plans. Final TCPs shall be submitted for final review, and may include cross-sections, temporary signals and/or signal phasing modification plans and interim drainage. All existing highway lighting systems, sign lighting and traffic signals are to be kept fully operational throughout the construction period. In the event some or all of the existing lighting must be taken out of service, consideration should be given to temporary lighting systems and maximizing usage of new lighting systems. All lane closures shall be as outlined elsewhere in this RFP, and shall be approved by and coordinated with the District 3 Traffic Office of the State Highway Administration.

3.07.01.8 Structure Plans

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

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

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

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

3.07.01.9 Utility Map

The Design-Build Team shall develop a utility map graphically showing all existing utilities within proposed Right-of-Way. This map shall be at the scale of the roadway plans. Existing utilities are to be clearly indicated and labeled. Connections between

valve boxes, manholes, poles, etc., are to be shown and labeled with the type of existing service, e.g. 8 in. Sanitary, 4 in. H.P. Gas, 200 K.V. Transmission, etc. This map is to be kept current with all proposed utility relocations shown and made available for review and use by Administration and Utility Company staff. Existing utilities are to be shown and clearly labeled on plans, profile and cross-sections.

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"=30'. Plans shall include schedules of all materials proposed for use, and shall be submitted to the Administration, Landscape Architecture Division and Landscape Operations Division, for review and approval. Roadside Landscape and Reforestation plans should include the following information:

- Vicinity map of site location for both on-site and off-site reforestation areas
- Density and quantity of plantings area provided for mitigation
- Limit of Disturbance
- Tree preservation fence line
- Plans should include environmental/surface features, extending at least 100' beyond Property Line or Right-of-Way of adjacent parcels. Ownership and parcel numbers should be identified for each adjacent parcel
- A schedule of materials, indication plant quantities for each type and size of plant material, proper nomenclature for plant species, root of materials; B&B or Container Grown (CG), and proposed spacing
- Defined limits of mowing and limits of mulching where applicable
- Critical Root Zones for individual significant or specimen trees, as defined by the Maryland Department of Natural Resources: Measured from the center of the tree's trunk; 1 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 walls, and all utilities. Cross-sections shall have the P.G.E.(s) and all proposed ditches and swale inverts labeled with offsets and elevations. Cross-sections shall have all existing and proposed (including relocated) utilities and storm drains drawn to scale at the correct offset and elevation, and have type, size, and invert elevation (if known) labeled. Cross-sections shall be placed on sheets measuring 22 in. x 34 in. with grid lines spaced at .1 in. horizontal and .1 in. vertical. Each section shall be identified by the baseline name, station and a datum elevation. Elevations shall be shown in the Maryland Grid System Datum, 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 the 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 (3.07.03.1.1).

The ESC Report shall contain the following:

- Drainage area maps to control devices for each phase.
- Computations for sizing control devices.
- Plans and procedures for converting sediment control devices into stormwater management facilities.
- Identification of and placement of controls in sensitive areas.

3.07.03.4 Final Geotechnical Reports

The Design-Builder shall prepare Final Geotechnical Reports for individual Project elements or groups of Project elements consistent with the Geotechnical Planning Reports and the Interim Design Memoranda prior to releasing constructed elements for subsequent work. The Final Geotechnical Reports shall include the following, at a minimum:

A) The corresponding Geotechnical Planning Report;

B) The corresponding Interim Design Memorandum;

C) Locations and results of borings, rock coring, geophysical testing and other in-situ testing;

D) A detailed description of geological and subsurface conditions for each Project element (including a description of site stratigraphy);

E) Field investigation procedures;

F) A description of groundwater conditions;

G) Results of laboratory tests;

H) Values assigned to all applicable soil parameters for design;

I) All pertinent data and complete discussions of all geotechnical analyses and design;

J) All relevant design calculations and computer program results checked and initialed by a Professional Engineer licensed in the State of Maryland;

K) Conclusions and recommendations for foundation types for structures, embankments, cut slopes, retaining walls, ground improvement, requirements for backfill materials;

L) Groundwater problems encountered, means of dewatering and/or other solutions;

M) Designs for support of excavation;

N) Results of instrumentation and monitoring and post-construction monitoring summaries;

O) Potential settlement problems; and

P) Potential stability problems and analysis results;

Q) A set of full size plans and cross sections of the area covered by the report.

R) Copies of any reports or references referred in the report.

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

Foundations

1) Individual pile and pile group design calculations including axial and lateral capacity for the pile type, size, and length to achieve the required capacities (including any effects of liquefaction and downdrag); estimated pile and pile group settlement;

2) Shallow foundations calculations including allowable bearing capacity, estimated differential and total settlements, and rotations; and

3) Calculations of embankment settlement (magnitude and time rate) and downdrag forces on the piles, depths to zero or negligible settlement, and the proposed means to mitigate the downdrag.

Retaining Walls

1) Wall design calculations including the results of the global and internal

stability analyses; analyses of total, differential, and secondary settlements; and, calculations for analyses of sliding, overturning, and bearing pressure for live and seismic loadings;

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 of 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.

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.

Subgrades for Pavements

1) The results of all subgrade improvement testing including Falling Weight Deflectometer (FWD) test results.

Instrumentation

1) All items included in TC 3.14.04.04.03 “Geotechnical Instrumentation”.

Stormwater Management

1) Results of Bioretention Soil Mix (BSM) testing.
2) Results of Field Percolation Tests, Infiltration Tests, SPT tests and test pit including depth to bedrock, soil description, textures, locations of infiltration test pits and soil borings. Include recommendations for SWM facility type, embankment settlement rate and infiltration rates.

3) Filter Diaphram design recommendations.

4) Cut-off trench and clay core recommendations.

3.07.03.5 Pavement Report(s)

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

3.07.03.6 Tree Impact Minimization and Avoidance Report

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

3.07.04 Removal of Existing Structures

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This work consists of the demolition of structures on six (6) properties in Prince George's County, located at:

7801 Indian Head Highway, Oxon Hill
7805 Indian Head Highway, Oxon Hill
508 Kerby Hill Road, Fort Washington
512 Kerby Hill Road, Fort Washington
516 Kerby Hill Road, Fort Washington
520 Kerby Hill Road, Fort Washington

A Hazardous Materials Survey (HMS) was performed by to determine the presence of hazardous materials in or around six the (6) properties noted above.
The HMS reported the following:

	PACM	LBP	PCB's	Mercury	USTs/ASTs	Other
7801 Indian Head Hwy	Y*	Y	N	N	N	Y
7805 Indian Head Hwy	Y*	Y	Y	Y	N	Y
508 Kerby Hill Rd	Y*	Y	N	N	N	Y

512 Kerby Hill Rd	Y*	Y	N	Y	Y	Y
516 Kerby Hill Rd	Y*	Y	N	N	Y	Y
520 Kerby Hill Rd	Y*	Y	Y	Y	N	Y

Y = materials were observed
N = materials were not observed
Y*= materials were observed but not submitted to laboratory for testing

A copy of the HMS report is included in on ProjectWise.

Remove hazardous materials from the structures and dispose of in accordance with Federal, State, and local regulations. Provide a Health and Safety plan prepared by a Certified Industrial Hygienist that addresses how contaminated zones will be monitored during demolition and removal. Cost of worker safety issues shall be incidental to the appropriate Contract items.

Demolish the structures and remove and dispose of all debris as directed. Also remove any basements or foundations found under the structures and dispose of all debris and as directed. Backfill with approved materials.

3.07.05 Engineers Office

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

One phone in the conference room of the Engineer's Office shall have conference call and speakerphone capabilities.

4

The Design-Build Team shall provide the Administration with one (1) digital cameras, and two (2) 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.

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 specifically cited in the body of this specification establish requirements that shall have precedence over all others. Should the requirements in any Guideline conflict with those in another or any other requirement in the Contract Documents, the strictest requirement as determined by the Administration shall govern. It is the Design-Builder's responsibility to obtain clarification for any unresolved or perceived ambiguity prior to proceeding with design or construction. Unless noted below, the most recent version as of the date of issuance of this RFP for each Guideline shall apply.

Table 1
Guidelines for Roadway

Author or Agency	Title
SHA	Accessibility Policy & Guidelines for Pedestrian Facilities along State Highways - 2010
AASHTO	A Policy on Geometric Design of Highways and Streets, 2001
AASHTO	Roadside Design Guide, 2011
SHA	Maryland Manual on Uniform Traffic Control Devices (MD MUTCD) – 2011 Edition
FHWA	Manual on Uniform Traffic Control Devices, 2009 (MUTCD)
AASHTO	Guide for the Development of Bicycle Facilities, 2012
SHA	Bicycle Policy and Design Guidelines - 2013
SHA	Highway Design Policy and Procedure Manual
ADA	Americans with Disabilities Act Accessibility Guideleines

Table 1
Guidelines for Roadway

Author or Agency	Title
SHA	Standard Specifications for Construction Materials
SHA	Book of Standards Highway and Incidental Structures
Prince George's County	Prince George's County DPW&T Specifications and Standards for Roadways and Bridges
SHA	Guidelines for Traffic Barrier Placement and End Treatment Design, dated 2006
WMATA	Guidelines for Design and Placement of Transit Stops, dated December 2009
TRB	TCRP Report 19 – Guidelines for the Location and Design of Bus Stops

3.09.03 Performance Requirements

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

A. Meet or exceed all Maryland Department of Transportation State Highway Administration, AASHTO and other roadway design and safety guidelines as referenced above, outlined in these specifications, and in accordance with sound engineering principles.
B. 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.

A conceptual design for the Project and supporting electronic files are included to illustrate the general scope of the improvements and may contain some elements that require modification to meet the requirements of this Performance Specification. The Design-Builder shall verify all information prior to use to ensure compliance with the requirements of this Performance Specification.

3.09.04.01 Design Criteria

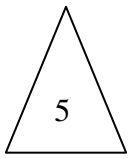
MD 210 Mainline Criteria	
Design Speed	55 mph
Posted Speed	45 mph
Functional Classification	Urban Freeway Expressway
Terrain	Rolling
Minimum length of Horizontal Curve	Per AASHTO
Maximum Superelevation	6%
Maximum Grade	4%
Minimum Grade	0.5%
Superelevation Transition Design	Per AASHTO (Method 5)

MD 210 Median Ramp Southbound - North of Livingston Rd. Criteria	
Design Speed	50 mph
Posted Speed	Per MDMUTCD
Functional Classification	N/A
Terrain	Rolling
Minimum length of Horizontal Curve	Per AASHTO
Maximum Superelevation	6%
Maximum Grade	6%
Minimum Grade	0.5%
Superelevation Transition Design	Per AASHTO (Method 5)

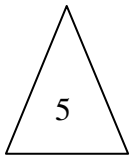
MD 210 Median Ramp Southbound - South of Livingston Rd. Criteria	
Design Speed	50 mph
Posted Speed	Per MDMUTCD
Functional Classification	N/A
Terrain	Rolling
Minimum length of Horizontal Curve	Per AASHTO
Maximum Superelevation	6%
Maximum Grade	6%
Minimum Grade	0.5%
Superelevation Transition Design	Per AASHTO (Method 5)

MD 210 Median Ramp Northbound - North of Livingston Rd. Criteria	
Design Speed	50 mph
Posted Speed	Per MDMUTCD
Functional Classification	N/A
Terrain	Rolling
Minimum length of Horizontal Curve	Per AASHTO
Maximum Superelevation	6%
Maximum Grade	6%
Minimum Grade	0.5%
Superelevation Transition Design	Per AASHTO (Method 5)

MD 210 Median Ramp Northbound - South of Livingston Rd. Criteria	
Design Speed	50 mph
Posted Speed	Per MDMUTCD
Functional Classification	N/A
Terrain	Rolling
Minimum length of Horizontal Curve	Per AASHTO
Maximum Superelevation	6%
Maximum Grade	6%
Minimum Grade	0.5%
Superelevation Transition Design	Per AASHTO (Method 5)



Kerby Hill Road (West of MD 210)	
Design Speed	30 mph
Posted Speed	25 mph
Minimum Radius	300 feet
Terrain	Rolling
Maximum Superelevation	4%
Maximum Grade	10%
Minimum Grade	1%
Superelevation Transition Design	Per Prince George's County Std's.



Livingston Road (East of MD 210)	
Design Speed	35 mph
Posted Speed	30 mph
Minimum Radius	500 feet
Terrain	Rolling
Maximum Superelevation	4%
Maximum Grade	10%
Minimum Grade	1%
Superelevation Transition Design	Per Prince George's County Std's.

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Murray Hill Drive	
Design Speed	30 mph
Posted Speed	25 mph
Functional Classification	Urban Secondary Residential
Terrain	Rolling
Maximum Superelevation	4%
Maximum Grade	10%
Minimum Grade	1%
Superelevation Transition Design	Per Prince George's County Std's

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Service Road	
Design Speed	30 mph
Posted Speed	25 mph
Functional Classification	Local Road
Terrain	Rolling
Maximum Superelevation	N/A
Maximum Grade	8%
Minimum Grade	0.5%
Superelevation Transition Design	N/A

Loop Road	
Design Speed	20 mph
Posted Speed	15 mph
Functional Classification	Local Road
Terrain	Rolling
Maximum Superelevation	N/A
Maximum Grade	6%
Minimum Grade	0.5%
Superelevation Transition Design	N/A

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

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For Kerby Hill Road, Livingston Road and Murry Hill Drive, the Prince George's County DPW&T Specifications and Standards for Roadways and Bridges shall govern over other Guidelines listed in TC 3.09.02.

3.09.05 Typical Section

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

Typical Section Vehicular Lanes								
MD 210								
Station			Northbound			Southbound		
Begin	End		Decel Lanes	Thru Lanes	Accel/Decel Lanes	Accel/Decel Lanes	Thru Lanes	Decel Lanes
672+42	690+00	No. of Lanes	-	-	-	-	**4**	-
		Width of Each Lane	-	-	-	-	**12’**	-
690+00	696+56	No. of Lanes	-	-	-	-	**3**	**1**
		Width of Each Lane	-	-	-	-	**12’**	**12’**
696+56	708+50	No. of Lanes	-	-	-	-	**3**	-
		Width of Each Lane	-	-	-	-	**12’**	-
708+50	716+50	No. of Lanes	-	-	-	**1**	**3**	-
		Width of Each Lane	-	-	-	**12’**	**12’**	-
680+72	689+19	No. of Lanes	**1**	**3**	-	-	-	-
		Width of Each Lane	**12’**	**12’**	-	-	-	-
689+19	704+50	No. of Lanes	-	**3**	-	-	-	-
		Width of Each Lane	-	**12’**	-	-	-	-

MD 210								
Station			Northbound			Southbound		
Begin	End		Decel Lanes	Thru Lanes	Accel/Decel Lanes	Accel/Decel Lanes	Thru Lanes	Decel Lanes
704+50	716+50	No. of Lanes	-	**3**	**1**	-	-	-
		Width of Each Lane	-	**12'**	**12'**	-	-	-
716+50	733+00	No. of Lanes	-	**3**	-	-	**3**	-
		Width of Each Lane	-	**12'**	-	-	**12'**	-
733+00	748+00	No. of Lanes	-	**3**	**1**	**1**	**3**	-
		Width of Each Lane	-	**12'**	**12'**	**12'**	**12'**	-
748+00	759+50	No. of Lanes	-	**3**	-	-	**3**	-
		Width of Each Lane	-	**12'**	-	-	**12'**	-
759+50	765+50	No. of Lanes	-	**3**	-	**1**	**3**	-
		Width of Each Lane	-	**12'**	-	**12'**	**12'**	-
765+50	767+12	No. of Lanes	**1**	**3**	-	**1**	**3**	-
		Width of Each Lane	**12'**	**12'**	-	**12'**	**12'**	-
MD 210 Median Ramp North of Livingston								
716+50	721+00	No. of Lanes	-	**1**	-	-	**1**	-
		Width of Each Lane	-	**12'**	-	-	**12'**	-
721+00	723+50	No. of Lanes	-	**1**	-	**1**	-	**1**
		Width of Each Lane	-	**12'**	-	**12'**	-	**12'**

MD 210 Median Ramp South of Livingston								
Station			Northbound			Southbound		
Begin	End		Decel Lanes	Thru Lanes	Accel/Decel Lanes	Accel/Decel Lanes	Thru Lanes	Decel Lanes
724+75	726+50	No. of Lanes	**1**	**-**	**1**	**-**	**1**	**-**
		Width of Each Lane	**12'**	**-**	**12'**	**-**	**12'**	**-**
726+50	733+00	No. of Lanes	**-**	**1**	**-**	**-**	**1**	**-**
		Width of Each Lane	**-**	**12'**	**-**	**-**	**12'**	**-**

MD 210 – Minimum outside shoulder widths on MD 210 shall be 10' in an open section and 12' in a closed section. Median shoulders widths shall be a minimum of 10', including along the acceleration & deceleration lanes unless adjacent to the proposed retaining walls for the median ramps, where they may be a minimum of 4'. Sidewalks are not allowed on MD 210.
Bike access by the way of a 10 foot wide path shall be provided to SB MD 210 at the following approximate locations:

- Sta. 711+25, Rt.
- Sta. 725+50, Rt.

Livingston/Kerby Hill Roads –The typical section shall be a closed section, 43 feet minimum in width from face of curb to face of curb. Provide an 11' center turn lane, a through lane in each direction and a 4' shoulder with a 1' offset to the face of curb in each direction. Both sides of Livingston/Kerby Hill Road shall have a 5' sidewalk. The sidewalk shall be offset 7 feet from the face of curb to provide green space. The 43 foot typical section, 5 foot sidewalk, and 7 foot offset shall continue up to the limits of the bridge structure. The 7 foot sidewalk offset may be reduced in areas where a 7 foot offset impacts the proposed LOD.

Murray Hill Drive – The typical section shall be a closed section, 26 feet minimum in width from face of curb to face of curb. Both sides of Murray Hill Road shall have a 5' sidewalk. The sidewalk shall be offset 6' from the face of curb to provide green space. This 6' offset may only be reduced in the area where tying into the Limit of Work and is subject to approval by the Administration and PG County.

Service Road – The typical section shall be a closed section, 28 feet minimum in width from face of curb to face of curb to allow for Shared Lanes with bicycles. A 10' wide path for bike access from the MD 210 shoulder to the Service Road shall be provided at approximately Sta. 711+10. A 10' Bike Path shall run along the SB/West side of the Service Road from the northern limits of the Service Road at the existing parking lot to the Proposed Bus Stop on the Service Road. A 5' sidewalk shall be provided from the Proposed Bus Stops to the southern limits and

tie-in to Kerby Hill Drive. A 5' sidewalk access shall be provided from the proposed parking lot expansion at Wilson Bridge Towers near Sta. 52+65, Rt.

Loop Road – The Loop Road will be a one-way, closed section road with a minimum width of 22' from face of curb to face of curb, designed to accommodate the turning movements for articulated buses.

Wilson Bridge Drive – The typical section shall be a closed section, 23' minimum in width from face of curb to face of barrier.

Bike Path – The Bike Path connecting MD 210 northbound to Livingston Road will be a two-way path and shall be a minimum of 10' in width. There shall be a graded area 4' wide minimum with a 6:1 slope in fill sections. There shall be a graded area 6' wide minimum with a 6:1 slope in cut sections. A galvanized chain link fence 42 inches minimum in height shall be provided on both sides of the Bike Path.

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 meet AASHTO Standards and will also be subject to approval by the Administration and may require approval by additionally affected agencies, including Prince Georges 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

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.

The island design at Livingston Road & Murray Hill Drive shall accommodate Emergency vehicles. The Design-Builder shall design the island as to allow Emergency vehicles only in the West bound direction to make a left turn across the island onto Murray Hill Drive. Also the design is to allow emergency vehicles only in the northbound direction on Murray Hill Drive to make a left turn onto Livingston Road. The turning movements for the intersection at Livingston Road/Murray Hill Drive shall use the design vehicle as per section 3.09.07.

3.09.07 Design Vehicle

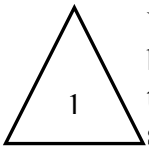
The design vehicle for turning movements on MD 210, MD 210 Ramps, Kerby Hill Road & Livingston Road shall accommodate the WB-67 vehicle. Murray Hill Drive shall accommodate an SU vehicle. The Service Road and Loop Road shall accommodate an articulated Bus (A-BUS). The local Access Road south of the interchange on the East side of MD210 (Service Road B) shall accommodate an SU vehicle. The existing gas station area shall accommodate a vehicle

the size of a WB-50 for re-fueling of the gas station.

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 where feasible. 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 the proposed design.

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

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

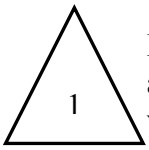
3.09.08.02 Median Traffic Barrier

Where median barrier is warranted by AASHTO or other Guidelines, galvanized steel traffic barrier W-beam median barrier or 42" F-shape concrete median traffic barrier shall be used. At a minimum, concrete median traffic barrier shall be installed in the median along MD 210 from Sta. 692+00 to Sta. 760+00.

All 42" Concrete median barrier shall include two 3" diameter PVC conduits. Existing median barrier and end-treatments within the project limits shall be replaced if not compliant with current standards or if warranted based on the proposed design.

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

3.09.08.03 Single Face Concrete Traffic Barrier



Proposed use of single face concrete barrier will be subject to Administration approval and is generally to be avoided unless it is determined that the installation of traffic barrier w-beam is not feasible. 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, except in the immediate area when matching existing conditions. Asphalt curb will

not be allowed.

3.09.09 Pedestrian and Bicycle Facilities

For this Project, these facilities include sidewalks, bike lanes and shared use paths, also referred to as a bike path.

Sidewalks shall be constructed as 5" thick concrete, unless existing adjacent sidewalk has been constructed using asphalt in which case asphalt shall be acceptable. Sidewalks that do not connect to existing sidewalk shall be truncated at the limits of the required improvements on the cross streets. Sidewalks that connect to existing sidewalks shall be connected at the proposed typical section location to the limits of the required roadway work, after which the sidewalk shall be tapered to meet the existing sidewalk. The width of all curb ramps shall be the full width of the sidewalk approaching and curb ramps should not be placed within the pedestrian travel way where feasible. Where ramps must be placed within the pedestrian travel way, the minimum possible rise shall be within the travel way. When any one leg of an intersection is impacted by the project, all legs of the intersection shall be upgraded to ADA compliance.

Continuous bicycle lanes shall be signed and marked along MD 210. When approaching the entrances and exits in the noise walls on the SB side of MD 210, bicycle symbols/signs shall be utilized to guide the user to access the local roads or to return to the mainline. When approaching the bike path on the NB side of MD 210, symbols/signs shall be utilized to guide the user to access the local roads or to return to the mainline. No marking or signing will be installed on the ramps of the interchange.

Bike paths shall be constructed of asphalt and shall be a minimum of 10' wide. Switchback style ramps on the path shall not be used. Shared use path profile grades shall be designed such that the landings or level rest areas are not required. At the locations where the trail ties into existing of proposed roadway curbline, the ramped areas shall be constructed of concrete.

The shared use path shall be located outside the clear zone of the mainline roadway, except at crossings of and approaches to the mainline shoulder. The shared use path shall be protected and separated from the mainline roadway using traffic barrier W-Beam and chain link fencing.

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The shared use path curb ramps shall be the full width of the path approaching.

3.09.10 Noise Walls

Noise walls shall be located as indicated in TC 3.18. Noise walls shall be on the roadway side of the shared use path, including on structures.

3.09.11 Access to SWM facilities

Maintenance vehicle access shall be provided to SWM and other facilities in accordance with TC 3.13 and TC 3.17.

ADDENDUM NO. 6
02/06/15

3.09.12 Planned Projects

N/A

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. Removal, relocation, or replacement of an existing fence shall be coordinated with the owner of the fence and adjacent property owners who may be affected by the fence construction. Every effort should be made to accommodate the scheduling needs of the property owners during fence construction, including those who have animals on the property.

3.09.15 Brookside Park Condominiums

The Design-Build Team is to provide a 24’ wide access road from Wilson Bridge Drive to the New Service Drive at the south end of the Brookside site, using the existing parking lot pavement, by restriping and eliminating any parking spaces that encroach on the proposed access road. The Design-Build Team shall design and construct additional parking, to mitigate for the spaces that may be eliminated, on a minimum of a 1:1 basis so that an equal or greater number of parking spaces is provided once the project is complete. The mitigation of the parking shall be done in the same relative area as the removal of spaces. The following locations may be used for parking space mitigation:

- Wilson Bridge Drive – Sta. 202+29 to Sta. 202+90, Lt. – The Design-Build Team may design and construct parking spaces to mitigate for any eliminated visitor parking spaces located nearby along the curb line. The new parking spaces shall include ADA compatible spaces, as required.
- Along the Access Drive – Sta. 707+60 to Sta. 708+45, 330’ Rt., MD 210 – The Design-Build Team shall design and construct parking spaces to mitigate for any eliminated parking spaces located nearby, at a minimum 1:1 basis. The new parking spaces shall include ADA compatible spaces, as required. The Design-Build Team has the option of striping the excess pavement from the eliminated spaces, which is outside of the 24’ access road path, as a no parking zone or removing the excess pavement and installing

green space.

- South end of Brookside Park Condo site at last building – Sta. 709+90, 110' Rt., MD 210 – The Design-Build Team shall design and construct an additional parking lot with a minimum of 25 spaces. The new parking spaces shall include ADA compatible spaces, as required.

The Design-Build Team shall design and construct sidewalks and accessible ramps for access to any new parking areas and new dumpster pads near any existing dumpster pads that may be impacted by the proposed access road or parking. The dumpster pads shall be located to allow access by a dump truck.

3.09.16 Wilson Towers Apartment Complex Parking

Due to the widening of MD 210 and the addition of a Service Road, existing parking spaces in the Wilson Towers Apartment Complex may be impacted or eliminated. The Design-Build Team shall design and construct additional parking or restripe existing parking, to mitigate for the spaces that may be impacted or eliminated, on a minimum of a 1:1 basis so that an equal or greater number of parking spaces is provided once the project is complete. The mitigation of the parking shall be done in the same relative area as the removal of spaces. Restriping of the existing parking spaces to a minimum space width of 8.5 feet may be allowed if the Design-Build Team demonstrates that 1:1 mitigation of the parking spaces cannot be obtained within same relative area or within the LOD. The following locations may be used for parking space mitigation:

- North end of the Wilson Towers Apartment Complex - Sta. 52+50 to Sta. 53+75, Rt., Service Road - The Design-Build Team shall design and construct parking spaces to mitigate for any eliminated parking spaces located nearby, at a minimum 1:1 basis. The new parking spaces shall include ADA compatible spaces, as required. ADA access shall be provided from this new parking lot area to the sidewalk along the Service Road. No steps in the access to the Service Road will be allowed.
- Middle building area of Wilson Towers Apartments – Sta. 56+85 to Sta. 59+10, Rt., Service Road – The Design-Build Team may re-strip the existing parking lot to adjust the location of the parking spaces that may be impacted by the roadway widening. A 22' minimum isle width must be provided between opposing rows of parking spaces.
- South end of Wilson Towers Apartment Complex – Sta. 61+80 to Sta. 62+85, Rt., Service Road - The Design-Build Team may design and construct an additional parking area in the green space adjacent to the existing parking lot to provide additional parking spaces, as needed. The new parking spaces shall include ADA compatible spaces, as required. . .

The Design-Build Team shall design and construct sidewalks and accessible ramps for access to any new parking areas and new dumpster pads near any existing dumpster pads that may be impacted by the proposed roadways or parking. The dumpster pads shall be located to allow access by a dump truck.

3.09.17 Transit Stops

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

A. Wilson Bridge Drive at MD 210
B. MD 210 (Southbound) approximately 1,500' south of Wilson Bridge Drive or 1,000 north of Livingston Road Intersection
C. MD 210 (Southbound) approximately 350' south of Livingston Road Intersection
D. MD 210 (Northbound) approximately 350' north of Livingston Road Intersection
E. Livingston Road (Westbound) approximately 525' east of Murray Hill Drive
F. Livingston Road (Eastbound) approximately 50' west of Carey Branch Dr. (For reference only-past LOW)

3.09.17.01 Relocation of Transit Stops

Proposed bus stops shall be designed and constructed in accordance with the WMATA Guidelines for the Design and Placement of Transit Stops and the TCRP Report 19 – Guidelines for the Location and Design of Bus Stops. The Design-Builder is responsible for providing all the necessary infrastructure including paved pads for shelters, seating, conduit, lighting, accessible ramps, shelters and sidewalks for the proposed bus stops according to the type of stop specified below. The Design-Builder shall not relocate bus stop poles, signs, or flags. The Design-Builder shall contact the responsible transit agency to coordinate the relocation by the transit agency of bus stop poles, signs, and flags, where necessary. The existing bus stops shall be relocated per the criteria below:

Existing bus stops A-D will be removed. New relocated bus stops will be placed at the following locations:

Service Road – Approx. Sta. 54+75, Rt. – Enhanced Service Bus Stop
Service Road – Approx. Sta. 69+65, Lt. – Basic Stop
Livingston Road – Approx. Sta. 28+69, Lt. – Basic Stop (Bus Stop E - Same location as existing behind new curb)

Existing bus stop F will remain at its current location. Bus stop F is just past the eastern most limit of work on Livingston Road but may be in the work zone once the DBT designs its MOT operations.

Existing bus stops A-D shall remain in operation until the time the above proposed Relocated Bus Stops are in full operation. At that time Prince George's County DPW&T will discontinue service to existing bus stops A-D.

Existing Bus Stops E-F shall remain in operation for the length of the contract.

3.09.17.02 Coordination with Transit Agencies

The Design-Builder shall coordinate with WMATA regarding the relocation of existing bus stops during the design and construction of this project. Access to WMATA bus stops shall be maintained during construction per the requirements in TC 3.16 – Maintenance of Traffic Performance Specification. The final location of all WMATA bus stops shall be coordinated with and approved by WMATA prior to the relocation of bus stops. The WMATA Metrobus contact for this project is listed below:

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

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

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

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. When the Design-Builder utilizes only the Pavement Sections provided by the Administration, any patching completed over the quantity provided by the Administration and as directed by the Engineer during construction will be the cost responsibility of the Administration.

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

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

TABLE 2
REFERENCES FOR ROADWAY

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

3.10.02 Use of Pavement Sections Provided by SHA

3.10.02.01 General

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

3.10.02.02 Submittals

If the Design-Builder uses only the pavement sections provided in Section 3.10.06, the Design-Builder is required to submit the following:

(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. In the SHA Pavement Design Guide, refer to chapters with "AASHTO 1993". The July 2008 AASHTO Mechanistic-Empirical Pavement Design Guide (MEPDG) shall not be used.

The Design-Builder may elect to use either flexible or rigid pavement sections, unless otherwise restricted in 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 6.10 of the "SHA Pavement Design Guide" may be used for the specific roadway facilities that are identified in Section 6.10;

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B) The minimum, maximum and preferred lift thickness for all pavement layers are specified in the "SHA Pavement Design Guide" in Section 4.07;

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 4.07; 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, Mr = 10,500 psi;
2) Cement Modified Subgrade, Mr = 10,500 psi;
3) Graded aggregate base, Mr = 15,000 psi;
4) Soil Cement Base Course, Mr = 400,000 psi;
5) Any bound pavement layer, Mr = 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 $^{1}/_{8}$" wide saw cut one quarter the depth of the PCC layer shall be made to form the location for the transverse joint. No joint reservoir shall be formed, use MD 572.92 as a reference.

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

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

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

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

The Design-Builder shall specify the design subgrade strength, planned subgrade improvements, and as-needed subgrade improvements in the Interim Pavement Report. The same design subgrade strength value shall be used throughout the entire area of each roadway element. In the case that a subgrade improvement is used throughout a significant portion of a roadway element, it shall be shown in the pavement details.

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

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

3.10.03.02.05.04.02 Acceptable Subgrade Improvement Strategies

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

A) Material design specification;

B) Material strength and engineering properties;

C) Construction and placement specification;

D) Material quality control plan specification;

E) Long term performance history; and

F) Material Safety Data Sheets for any recycled material.

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

Subgrade improvement techniques proposed by the Design-Builder shall have a proven history of performance in similar applications. Subgrade improvements shall not utilize materials or construction practices that could endanger the safety of the public or be detrimental to the environment in either the short or long term. Any subgrade improvement technique contained in the SHA Standard Specifications for Construction and Materials is considered acceptable without additional supporting documentation.

3.10.03.03 Submittals

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

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

Multiple Roadway Elements may be combined for each of these reports. For Roadway Elements provided by the Administration that the Design-Builder uses, refer to TC Section 3.10.02.

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. The Interim Pavement Report shall come with a full size set of plans of the area covered by the report, a copy of any reports referred to in the pavement report, and contain the Design-Builder's plans for addressing the pavement design sections for the following:

A) New roadways for mainline, shoulders and ramps;

B) Pavement rehabilitation treatments;

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

D) Roadway and pavement base/subbase drainage;

E) Other pavement related matters on the Project; and

F) Pavement Material selection.

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

The Design-Builder shall obtain all information necessary to properly complete the Interim Pavement Report. The Interim Pavement Report shall include the design inputs and calculations used to develop the pavement sections.

The results of all soil borings and pavement cores, both the Administration's and the Design-Builder's, shall be shown on the roadway plan sheets. Boring log information shall be shown on the roadway profile sheets. Laboratory and in-situ test data may be shown on separate plan sheets. The recommendations contained in the Interim Pavement Report shall be incorporated into the plans and specifications developed for the Project.

The Interim Pavement Report shall contain pavement design items deemed important by the Design-Builder. The Interim Pavement Report shall contain, but is not limited to the following items:

1) Testing results from the Complete Pavement Investigation:

   a) Summary of records review of as-builts, existing construction and performance records;
   b) Pavement condition index (PCI) and distress summaries on all existing roadways following D 6433;
   c) Location and result of pavement and soil borings;
   d) Location and result of mainline and shoulder pavement cores of existing roadways;
   e) In-situ test results;
   f) Laboratory test results of field samples;
   g) Location and result of non-destructive structural deflection testing;
   h) Findings and summary of data analysis of any and all field data collection; and
   i) Estimate of pavement patching needs.

2) Summary of critical design values and elements from the Complete Pavement Investigation:

   a) Records review analysis of each existing and new pavement section;
   b) Analysis and pavement design of all roadways;
   c) All design input requirements for AASHTO and SHA Pavement Design criteria;
   d) Traffic data, analysis and calculation of the equivalent single axle load (ESAL) for each roadway element;
   e) Structural capacity values (required, effective and original) for each roadway element;
   f) Structural pavement layer calculations used to develop pavement sections needed for the required structural capacity; and
   g) Design subgrade resilient modulus (Mr) or modulus of subgrade reaction (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. 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	$Mr = \frac{1.5pa}{\Delta_z}$	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 yd^2 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 of 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 final roadway surfaces.

3.10.04.03 Repair of Damaged Pavement

The Design-Builder shall perform pavement repairs of all distressed areas related to the operations of the Project. Distressed areas shall be defined as any medium and high severity distress in existing pavement and any low, medium or high severity level for new construction or reconstruction pavement section. All distress and severity levels shall be as identified in D 6433-Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys. Any damage to the pavement in the Project or adjacent pavements caused by operations of the Design-Builder shall be repaired to the satisfaction of the Administration at the Design-Builder's expense. The depth and materials of all permanent patches shall match the depth and materials of the existing pavement and in accordance with the SHA Pavement Design Guide.

In addition, the Design-Builder shall perform patching and other necessary repairs to maintain traffic during all construction operations at no additional expense to the Administration.

3.10.05 Performance Criteria

The parameters that will be used to evaluate performance of all constructed pavements are:

A) Structural capacity;

B) Skid resistance;

C) Visual Appearance; and

D) Ride quality.

These parameters will be evaluated by the Design-Builder in coordination with the Administration, during construction and at Final Administration Acceptance. If corrective action needs to be taken, the Design-Builder shall coordinate all such activities to minimize disruption to the traffic at no additional cost to Administration.

3.10.05.01 Structural Capacity

The structural capacity (thickness and strength) of 100% of all pavement sections shall be evaluated during the design and construction phase through the Design-Builder's Quality Plan. The parameters that will be evaluated include thickness, strength, and quality of materials. The thickness, strength, quality, and proper placement of materials shall be evaluated to ensure compliance with the Design-Builder's Design and Construction Quality Plans. Final Acceptance will require meeting or exceeding the design criteria as well as meeting proper construction requirements. The Design-Builder shall provide documented field evidence and/or data that confirms the design thickness for each pavement layer, and tack/bond between each layer was achieved after final construction. If the structural capacity is determined to be deficient by the Design-Builder or the Administration, the Design-Builder shall take corrective action at no expense to the Administration.

3.10.05.02 Skid Resistance

The Design-Builder shall construct a pavement surface that shall meet or exceed an average friction number of 45 for each travel lane to provide adequate skid resistance for each roadway element. The friction number of the roadway shall be collected and determined in accordance with "Standard Test Method for Skid Resistance of Paved Surfaces Using a Full-Scale Tire" (E 274) and "Specification for Standard Rib Tire for Pavement Skid-Resistance Tests" (E 501). The Design-Builder shall be responsible for the friction number data collection. The Design-Builder may elect to request the Administration to collect friction data. If the Design-Builder disputes the friction number collected by the Administration, the Design-Builder must collect the data through other means in accordance with this specification for justification of friction number dispute.

A friction number data test point shall be collected every two-tenths of a lane-mile for each travel lane, at a minimum testing frequency. The average of all test points collected for each roadway element shall meet or exceed a friction number of 45 with no single data point falling below 35. Roadway elements with pavements exhibiting values less than an average friction number of 45 or a single data point less than 35 shall require corrective action from the Design-Builder to provide average friction number values that exceeds 45 and is projected to provide that value for at least 5 years into the future. Data collection 5 years into the future shall not be required. The Design-Builder shall provide justification and evidence that the corrective action will provide the friction number of 45 for 5 years into the future. A flexible pavement constructed with a surface layer meeting the requirements of this specification with an approved high polish value aggregate source shall be considered as satisfying the skid resistance performance criteria.

3.10.05.03 Visual Appearance

The Design-Builder shall provide a pavement for each roadway element that is visually appealing and free of distress. The pavement surface shall have a consistent color and texture. The Design-Builder shall minimize the number of construction joints. The construction joints that do exist shall be visibly straight and performing as intended. The Design-Builder shall be required to provide a pavement surface that is free of any severity distress. All distress and severity levels shall be as identified in D 6433-Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys. A visual survey shall be done on a representative sample of the pavement per D 6433. The Design-Builder shall take corrective action to ensure the visual appearance is in accordance with this specification.

3.10.05.04 Ride Quality

Ride quality shall be evaluated in all travel lanes for each roadway element based on the SP 535 Pavement Surface Profile specification provided in the contract documents.

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3.10.06 Project-Specific Data and Criteria

3.10.06.01 General

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

3.10.06.02 Scope of Work

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

- Construction of a new elevated interchange at the intersection of MD 210 and Kerby Hill. Road / Livingston Road.
- Base widening and rehabilitation of MD 210.
- Reconstruction of Livingston Road, Kerby Hill Road, Murray Hill Road and Service Road.
- Construction of hiker / biker trail, parking lots and bus loop.
- Grinding and resurfacing of existing roads.
- Full-depth and partial-depth patching.
- Utility patching.
- Curb and gutter placement.
- Sidewalks.

3.10.06.03 Roadway Elements

The following Roadway Elements have been identified:

- Roadway Element 1 – MD 210 Outer Base Widening and rehabilitation.
- Roadway Element 2 – MD 210 Inner Base Widening and Interchange Ramps.
- Roadway Element 3 – Livingston Road and Kerby Hill Road
- Roadway Element 4 – Murray Hill Drive, Service Road and Parking Lots
- Roadway Element 5 – Hiker / Biker Trail and Driveways
- Roadway Element 6 – Bus Loop

3.10.06.04 Pavement Sections

Superpave Asphalt Mix and Portland Cement Concrete (PCC) pavement sections are provided for each Roadway Element except for the following Roadway Elements:

- Roadway Element 1, 2 – No PCC pavement section provided.
- Roadway Element 6 – No Superpave Asphalt Mix pavement section provided.

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The Design-Builder shall select either a Superpave Asphalt Mix or PCC pavement section for each roadway element. All new asphalt construction/reconstruction/base widening shall be a minimum of four feet wide. Note that for all provided sections, details from corresponding standards in the Book of Standards that are missing from the provided sections still apply.

Alternatively, The Design-Builder may choose to design a different pavement section 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.

When a PCC section is selected for any of the Roadway Elements, a joint spacing slab layout including the location of contraction and expansion joints shall be prepared and submitted by the Design-Builder to The Office of Materials Technology – Pavement and Geotechnical Division for review and approval.

3.10.06.04.01 Roadway Element 1

3.10.06.04.01.01 Outside Base Widening and Outside Shoulder Reconstruction MD 210:
The outside shoulder is not traffic bearing for travel-lane traffic and shall be reconstructed. Alternatively, the outside shoulder can be overlaid to become structurally adequate and support travel-lane traffic.

The following minimum Superpave Asphalt Mix pavement section shall be placed along MD 210 where shoulder reconstruction and base widening is performed:

2” Gap-Graded Asphalt Mix 12.5 mm for Surface, PG 64E-22, Level 4
10” Superpave Asphalt Mix 25.0 mm for Base, PG 64S-22, Level 2
(Two – 5” Lifts)
12” Graded Aggregate Base Course (Two – 6” Lifts)

3.10.06.04.01.02 Existing Shoulders for Maintenance of Traffic:
The existing shoulders are adequate for maintenance of traffic (MOT) for no more than 18 months except at the following locations:

1. Northbound outside shoulder from Livingston Road to End of Project Limit (STA 767+10 B/L MD 210). Shoulder is not adequate at all for MOT.

2. Southbound outside shoulder from Beginning of Project Limit (STA 688+50 B/L MD 210) to Kerby Hill Road. Shoulder is adequate for only 5 months of MOT.

If MOT exceeds the above referenced timeframes, the shoulders shall be reconstructed or reinforced to make it traffic bearing for the duration of the MOT.

3.10.06.04.02 Roadway Element 2

3.10.06.04.02.01 MD 210 Inside Base Widening and Interchange Ramps.
The following minimum Superpave Asphalt Mix pavement section shall be placed for the inside base widening of MD 210 and for the construction of the interchange ramps.

2" Gap-Graded Asphalt Mix 12.5 mm for Surface, PG 64E-22, Level 4
6" Superpave Asphalt Mix 25.0 mm for Base, PG 64S-22, Level 2 (Two – 3" Lifts)
6" Graded Aggregate Base Course (One – 6" Lift)

3.10.06.04.03 Roadway Element 3

3.10.06.04.03.01 Livingston Road and Kerby Hill Road:
The following minimum Superpave Asphalt Mix pavement section shall be placed for the reconstruction of Livingston Road and Kerby Hill Road.

2" Superpave Asphalt Mix 12.5 mm for Surface, PG 64S-22, Level 2
5" Superpave Asphalt Mix 25.0 mm for Base, PG 64S-22, Level 2 (One – 5" Lift)
6" Graded Aggregate Base Course (One – 6" Lift)

Alternatively, the following minimum PCC pavement section may also be used for the reconstruction of Livingston Road and Kerby Hill Road.

8" Jointed Plain Portland Cement Concrete Pavement, Mix No. 7
6" Graded Aggregate Base Course (One – 6" Lift)

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

1. Maximum transverse joint spacing 15'. No mid-slab reinforcement.
2. Load transfer devices:
    a. # 8 smooth/plain dowel bar, 18" long, epoxy coated, placed 12" center to center.

3. Longitudinal tie bars at longitudinal slab/curb joint:
    a. # 4 smooth/plain bars, 14" long, epoxy coated, spaced 36" center to center.
4. Joints saw cut:
    a. Single 1/8" saw-cut to a depth of 2" as per Section 520 of the Specifications.
    b. Not sealed.

3.10.06.04.04 Roadway Element 4

3.10.06.04.04.01 Murray Hill Road, Service Road and Parking Lot:
The following minimum Superpave Asphalt Mix pavement section shall be placed for the reconstruction of Murray Hill Road and Service Road and the construction of new parking lots.

2" Superpave Asphalt Mix 12.5 mm for Surface, PG 64S-22, Level 2
3" Superpave Asphalt Mix 25.0 mm for Base, PG 64S-22, Level 2 (One – 3" Lift)
6" Graded Aggregate Base Course (One – 6" Lift)

Alternatively, the following minimum PCC pavement section may also be used in lieu of the Superpave Asphalt Mix section.

6" Jointed Plain Portland Cement Concrete Pavement, Mix No. 7
6" Graded Aggregate Base Course

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

1. Maximum transverse joint spacing 12 feet without mid-slab reinforcement.
2. No dowel bars for transverse joints:
3. No longitudinal tie bars at longitudinal slab/curb joint:
4. Joints saw cut:
    a. Single 1/8" saw-cut to a depth of 2" as per Section 520 of the Specifications.
    b. No joint sealant shall be used.

3.10.06.04.05 Roadway Element 5

3.10.06.04.05.01 Driveways and Bike Paths:
The following minimum flexible pavement section shall be placed for the construction of driveways and bike paths.

1.5" Superpave Asphalt Mix 9.5 mm for Surface, PG 64S-22, Level 1
2.5" Superpave Asphalt Mix 12.5 mm for Base, PG 64S-22, Level 1
4" Graded Aggregate Base Course (One 4" Lift)

Alternatively, the following minimum PCC pavement section may also be used.

6" Jointed Plain Portland Cement Concrete Pavement, Mix No. 7
6" Graded Aggregate Base Course

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

1. Maximum transverse joint spacing 12 feet without mid-slab reinforcement.
2. No dowel bars for transverse joints:
3. No longitudinal tie bars at longitudinal slab/curb joint:
4. Joints saw cut:
    a. Single 1/8" saw-cut to a depth of 2" as per Section 520 of the Specifications.
    b. No joint sealant shall be used.

3.10.06.04.06 Roadway Element 6

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

9" Jointed Plain Portland Cement Concrete Pavement, Mix No. 7
6" Graded Aggregate Base Course

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

1. Maximum transverse joint spacing 15 feet without mid-slab reinforcement.
2. Dowel bars for transverse joints:
    a. # 8 smooth/plain dowel bars, 18" long, epoxy coated and 12" spaced center to center.
3. Longitudinal tie bars at longitudinal slab/curb joint:
    a. # 4 smooth/plain bars, 14" long, epoxy coated and spaced 36" center to center.
4. Joints saw cut:
    a. Single 1/8" saw-cut to a depth of 2" as per Section 520 of the Specifications.
    b. No joint sealant shall be used.

3.10.06.04.07 Common Pavement Sections
Pavement sections contained in this section are applicable to different Roadway Elements and shall be used at the Roadway Elements shown in section 3.10.06.04.07.06 - Summary Table.

3.10.06.04.07.01 Patching:
Patching identification shall be in accordance of the SHA Pavement Design Guide.

3.10.06.04.07.01.01 Full-Depth Patching:
The depth and materials of all full-depth patches shall match the depth and materials of the existing pavement surrounding the patch.

The following shall be placed if the patching area consists of Hot Mix Asphalt on top of concrete:

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

It is estimated that 135 SY of Plain Portland Cement Concrete Pavement Type I Repair and 120 tons of Superpave Asphalt Mix 25.0 mm may be required for full-depth patches of composite pavements.

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

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

It is estimated that 380 tons of Superpave Asphalt Mix 25.0 mm may be required for full-depth patches of flexible pavements.

If the underlying granular base layer is deteriorated at the time of pavement removal, it shall be removed and replaced with minimum 6" Graded Aggregate Base. It is estimated that 10 CY of Graded Aggregate Base may be required for removal and replacement of unsuitable material.

3.10.06.04.07.01.02 Partial-Depth Patching:
Partial-depth patches shall be minimum 5" thick or to the top of the concrete, whichever occurs first. The following shall be placed for partial-depth patches:

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

It is estimated that a total of 715 tons of Hot Mix Asphalt Superpave 25.0 mm may be required for partial-depth patches.

3.10.06.04.07.01.03 Utility Patching:
The depth and materials of all utility patches shall match the depth and materials of the existing pavement surrounding the patch.

The following shall be placed if the utility patch consists of Hot Mix Asphalt on top of concrete:

Variable Depth Superpave Asphalt Mix 25.0 mm for Partial-Depth Patching, PG 64S-22, Level 2
Variable Depth Plain Portland Cement Concrete Pavement Type I Repair, Mix No. 9
6" Graded Aggregate Base Course

The following shall be placed if the utility patch consists of Hot Mix Asphalt on top of granular base:

Variable Depth Superpave Asphalt Mix 25.0 mm for Full-Depth Patching, PG 64S-22, Level 2
6" Graded Aggregate Base Course

3.10.06.04.07.02 Curb and Gutter Placement:

3.10.06.04.07.02.01 Option I:
This work is to be done at the contractor's option. An additional 1 feet width maximum excavation may be used for curb and gutter form placement. The additional excavation width is to be filled with a minimum of 4" GAB and Jointed Plain Portland Cement Concrete Mix No. 3 from the bottom of the standard curb and gutter to 2 inches below the final Superpave Asphalt Mix surface elevation. Transverse joints shall match those of the curb and gutter. Dowel bars are not necessary.

3.10.06.04.07.02.02 Option II:
Saw-cut the existing pavement and place the new curb and gutter directly against the sawed edge.

3.10.06.04.07.03 Grinding:
The pavement surface shall be ground minimum to a depth of 2". The following shall be used for grinding:

0" – 2" Grinding Hot Mix Asphalt Pavement with Carbide Cutting Bits

3.10.06.04.07.04 Wedge/Level:
If wedge/level is needed to make grade or cross slope corrections, use the following material:

For Wedge/Level less than 2" thick, use the following:
Superpave Asphalt Mix 9.5 mm for Wedge/Level, PG 64S-22, Level 2

For Wedge/Level more than 2" thick, use the following:
Superpave Asphalt Mix 19.0 mm for Wedge/Level, PG 64S-22, Level 2

3.10.06.04.07.05 Resurfacing:
The following surface layer shall be placed for the resurfacing of MD 210.

2" Gap – Graded Asphalt Mix 12.5 mm for Surface, PG 64E-22, Level 4

The following surface layer shall be placed for the resurfacing of Livingston Road / Kerby Hill Road.

2" Superpave Asphalt Mix 12.5 mm for Surface, PG 64S-22, Level 2

3.10.06.04.07.06 - Summary Table
Pavement sections contained in 3.10.06.04.07 shall be used as shown in the following table.

Pavement Section	Roadway Element 1	Roadway Element 2	Roadway Element 3	Roadway Element 4	Roadway Element 5	Roadway Element 6
Patching	X	N/A	X[(1)]	N/A	N/A	N/A
Curb and Gutter Replacement	N/A	N/A	X	N/A	N/A	N/A
Grinding	X	N/A	X	X	N/A	N/A
Wedge and Level	X	N/A	X	X	N/A	N/A
Resurfacing	X	N/A	X	X	N/A	N/A

(1) All patches full-depth.

3.10.06.05 Traffic Data

The Design-Builder shall use the following traffic data if developing alternate pavement designs for the Roadway Elements.

	Roadway Element 1		Roadway Element 2		Roadway Element 3		Roadway Element 4	
Year	2014	2035	2014	2035	2014	2035	2014	2035
Average Daily Traffic (ADT)	82,700	102,850	4,145	5,110	8,050	9,925	50	1,925
Percent Trucks	7%	7%	7%	7%	6%	6%	2%	2%
Truck Factor – PCC	N/A	N/A	N/A	N/A	0.8	0.8	0.6	0.6
Truck Factor – HMA	0.94	0.94	0.83	0.83	0.60	0.6	0.4	0.4
Directional Distribution	50%	50%	100%	100%	50%	50%	50%	50%
Lane Distribution – Rehabilitation Existing Pavement	80%	80%	100%	100%	100%	100%	100%	100%
Lane Distribution – Left-Side Base-Widening and Shoulder Reconstruction	40%	40%	N/A	N/A	N/A	N/A	N/A	N/A

Note: This traffic data shall only be used for pavement design purposes and shall not be used for any other traffic needs in the Project.

Roadway Elements 5 and 6 correspond to standard pavement sections and traffic data are not provided. Refer to the MDSHA Pavement and Geotechnical Design Guide.

3.10.06.06 Pavement Design Criteria

The Design-Builder shall use the following requirements as the general pavement design criteria if developing alternate pavement designs:

Pavement Type	**Flexible**	**Flexible**	**Rigid**
Roadway Element	1	2, 3, 4	2, 3, 4
New Construction Design Life	25 years	25 years	25 years
Rehabilitation Design Life	15 years	15 years	15 years
Initial Serviceability	4.2	4.2	4.5
Terminal Serviceability	2.9	2.4	2.4
Reliability	90%	80%	80%
Overall Standard Deviation	0.49	0.49	0.39
Load Transfer Coefficient	N/A	N/A	3.2
PCC Modulus of Rupture	N/A	N/A	685 psi
PCC Elastic Modulus	N/A	N/A	4,371,000 psi
Overall Drainage Coefficient	1	1	1
Minimum Modulus of Subgrade Reaction (static) *	N/A	N/A	228 psi/in
Minimum Resilient Modulus of Subgrade *	4,500 psi	4,500 psi	N/A
Maximum Modulus of Subgrade Reaction (static) *	N/A	N/A	533 psi/in
Maximum Resilient Modulus of Subgrade *	10,500 psi	10,500 psi	N/A

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* The Design-Builder has the option of designing with a higher design subgrade modulus than the minimum requirement and less than the maximum requirement, providing field verification is submitted by the Design-Builder as per Section 3.10.03.03.05.04 of the Pavement Performance Specification and is approved by the Office of Materials Technology.

Roadway Elements 5 and 6 are standard pavement sections. Refer to the MDSHA Pavement and Geotechnical Design Guide.

3.10.06.07 Geotechnical Design Criteria

Refer to the Geotechnical Performance Specification (TC 3.14) for Geotechnical Design Criteria.

3.10.06.08 Minimum Pavement Thickness for Frost Depth

All pavement sections shall be of a sufficient depth to protect against pavement heaving due to frost. The thickness of the pavements for frost protection purposes shall be a minimum of 14 inches. The frost protection pavement depth includes the hot mix asphalt surface or portland cement concrete layer, the granular and bound pavement base layers, and the granular and bound subgrade improvement layers.

3.10.06.09 Soils Laboratory Test Results and Soil Samples Availability

Soils jar samples were recovered from each SPT boring. Jar samples are available for visual inspection and lab testing upon request.

Soil samples from auger borings were discarded after testing and they are not available for visual inspection.

The following soil laboratory testing was performed on selected soil samples recovered from auger cuttings:

- Soil Classification
- Natural moisture content
- Gradation
- Atterberg Limits
- Soil PH
- Modified Proctor

All lab results are in ProjectWise.

3.10.06.09.01 SWM-Borings
Five (5) Storm Water Management (SWM) borings were drilled. Bulk samples were collected from auger cuttings for soil classification and Proctor testing. Field infiltration testing was performed at some SWM boring locations but, it failed due to high water table at the time of testing. Geotechnical information obtained from borings is summarized in the SWM boring logs.

3.10.06.09.02 SPT-Borings
One Hundred Thirty (130) Standard Penetration Test (SPT) borings were drilled to a depth varying from 45 feet to 120 feet. Jar samples were recovered from each SPT run. Soil classification was performed on select jar samples for soil class verification. Laboratory soil classification results of selected jar samples are available in ProjectWise.

3.10.06.09.03 Soil/Pavement Auger Borings
Thirty Three (33) soil borings were drilled on mainlines, shoulders and base widening areas. Bulk samples were not recovered for lab testing.

3.10.06.08.04 Top Soil Samples
Top soil samples for lab testing were taken for development of the Nutrient Management Plan. Top soil lab results are available in ProjectWise.

3.10.06.10 Boring Logs

Geotechnical information obtained from all soil borings, SWM, SPT and Pavement, is summarized in the boring logs located on ProjectWise.

3.10.06.10.01 Top Soil
The topography tabulation showing the locations of top soil is available in ProjectWise.

TC 3.11 STRUCTURAL DESIGN AND HYDROLOGY/HYDRAULICS PERFORMANCE SPECIFICATION

3.11.01 General

The Design-Build Team (DBT) shall 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 minimum design life shall not apply to the existing portions of culverts or slab bridges that will remain and are being extended but shall apply to the new extensions.

The requirements in this specification apply to the design and construction of temporary and permanent structures, including but not limited to: bridges, retaining walls, noise barriers, pipe culverts; box culverts; wing walls and drainage structures.

3.11.02 Guidelines and References

3.11.02.01 Guidelines

Structural and structure hydraulic analysis, 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.

TABLE 1

GUIDELINES FOR STRUCTURES

Priority	Author or Agency	Title
1	SHA	Office of Structures, Policy and Procedure Manual
2	SHA	Office of Structures, Structural Standards Manual, Volumes I and II
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 LRFD Bridge Design Specifications
8	ACI	Building Code Requirements for Structural Concrete, ACI 318
9	AASHTO/ AWS	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 with errata
12	AASHTO	A Policy on Geometric Design of Highways and Streets, 2001
13	FHWA	FHWA Memorandum, Bridge Rails, Dated August 1986 and updated May 1997
14	AASHTO	Manual on Subsurface Investigations
15	AASHTO	Manual for Condition Evaluation of Bridges
16	SHA	State Highway Administration, Office of Structures Guide for Completing Structure Inventory and Appraisal Input Forms, June 2003.
18	MDE	Code of Maryland Regulations Title 26.08.02 Water Quality
19	MDE	Code of Maryland Regulations Title 26.17.4 Water Management
20	ACOE	HEC-RAS Software, Version 4.0
21	MDE	Maryland's Waterway Construction Guidelines
22	FEMA	Conditional Letter of Map Revision (CLOMR)
23	SHA	SHA/MDE Application of Hydrologic Methods in Maryland, September 2010
24	AASHTO	Standard Bridge Design Specifications

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3.11.02.02 References

Use the references listed in Table 2 as supplementary materials for the design and construction of the structures. These references have no established order of precedence and are not intended to be all-inclusive.

TABLE 2

REFERENCES FOR STRUCTURES

Author or Agency	Title
FHWA	Design and Construction of Driven Pile Foundations, Volumes 1 and 2
FHWA	Geotechnical Engineering Circular No. 5: Evaluation of Soil and Rock Properties
FHWA	The Osterberg Load Cell for Load Testing Drilled Shafts and Driven Piles
FHWA	Publication No. FHWA-SA-98-074, Driven 1.0 User's Manual
FHWA	Publication No. FHWA-SA-91-048, Laterally Loaded Pile Program
FHWA	Publication No. FHWA-SA-96-038, Geotechnical Engineering Circular No. 2: Earth Retaining Structures
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 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 Structure Hydrology and Hydraulics

The DBT shall study, analyze, design, obtain permit modifications and approvals and construct the relocated stream in accordance with requirements of this specification, including performance requirements, standards and references, design and construction criteria, maintenance during construction, and required submittals.

The DBT shall analyze the hydrologic and hydraulic conditions of Carey Branch for use in the overall design and to secure regulatory agency approvals for the project.

Carey Branch is located in Maryland watershed 02-14-02 and drains to the Potomac River, Upper Tidal. Carey Branch is classified as a Use I stream according to the Code of Maryland Regulations (COMAR) and in stream construction may not occur during the period of March 1 through June 15, inclusive of any year.

3.11.03.01.01 Structure Classification and Design Storm

The State Functional Classification for MD 210 is an Urban Freeway Expressway. This classification will remain the same after the highway dualization. This means that the highway should be designed to prevent inundation by a 100-year flood.

3.11.03.01.02 Existing and Ultimate Conditions Hydrology

MDE-approved peak discharges will be needed for, at a minimum, the 2-, 10-, and 100-year flows to obtain a waterway construction permit. These discharges must be determined in accordance with the MDE/SHA Hydrology Panel recommendations. The DBT will need to build a divided WinTR-20 model to verify discharges throughout the reach and the timing of the peak flows. The DBT may determine that additional discharges are helpful in determining a design.

3.11.03.01.03 Hydraulic Analysis

The Design-Builder is responsible for the following:

A. Hydrology and Hydraulics Analysis Procedures

The DBT is to perform all hydrologic and hydraulic studies to secure MDE permit modifications and approvals for the proposed work. At minimum, the studies shall include the following items:

1. The Hydrologic Analysis Report for the existing and ultimate land use conditions.
2. A geomorphic assessment of the reach through the project limits.
3. The Hydraulic Analysis Study and Report for the existing and proposed conditions, as well as the surveys needed to complete the hydraulic studies.
4. Surveys needs to complete the hydraulic study.

The Office of Structures (OOS) Manual for Hydrologic and Hydraulic Design has been provided in electronic format on ProjectWise with the Design-Build (DB) contract package.

B. Communication

The DBT is encouraged to work in close cooperation with the OOS to establish and maintain good communication to result in productive work. At a minimum the DBT shall submit the following items for correspondence, communication to SHA:

1. Project schedule complete with design, MDE approval and permitting timeframes.
2. Identification of submission and completion milestones.
3. Plans / protocol for mitigative action for project changes, schedule upsets.
4. Monthly progress reports.

C. Requirements for DBT Hydrologic and Hydraulic Reports

The Hydrologic and Hydraulic Analysis Reports shall contain the completed text, exhibits, summary tables, computer output data, and other technical information. The format and content of report shall be prepared in conformance with the instructions in the OOS Manual for Hydrologic and Hydraulic Design and any other instructions from the SHA's Project Team. The DBT shall determine the impacts the proposed project would have on the hydraulic characteristics such as water surface elevations, flow velocities, Froude numbers and shear stress in the channel.

All DBT study reports shall be self-contained documents to the extent practicable. When necessary, reference may be made to outside sources of information used by the DBT in their preparation of data or exhibits for the reports. All references shall be clearly stated, listed and described as related to the Hydraulic Analysis Report. All the pages within the report shall be numbered, dated and shall be placed in an 8 ½-inch by 11-inch, three-hole binder.

Upon completion of the Hydrologic and Hydraulic Analysis Reports, the DBT shall submit the report to SHA's Structure Hydrology and Hydraulics Unit and the Environmental Programs Division for review and concurrence prior to submittal to MDE. The DBT shall submit the Hydraulic Analysis Report to MDE for review and approval and copy SHA. Upon approval from MDE, the DBT shall provide two copies of the final, approved report, files on CD, and the notification of the MDE approval to the OOS Structure Hydrology and Hydraulics Unit.

D. Current guidance to perform the required studies

1. Office of Structures Manual for Hydrologic and Hydraulic Design, (September, 2007)
2. US Army Corps of Engineers Hydrologic Engineering Center River Analysis System (HEC-RAS) Software, Version 3.1.3 (May 2005) *, Davis California
3. MDE Regulations COMAR 26.17.04, "Construction on Nontidal Wetlands and Floodplains.

3.11.03.01.04 MDE Hydraulics

Major drainage structures 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". Major drainage structures shall generally be considered to be all bridges and any pipe or culvert greater than 84" in diameter or with an equivalent hydraulic opening. The exact structures covered by this section shall be determined jointly by the DBT and the SHA.

3.11.03.01.05 FEMA Hydraulics and CLOMR Requirements

FEMA Floodplain Map Change Requirements: The proposed design may impact the FEMA-regulated 1-percent annual chance floodplain limits and water surface. If so, the project may require a FEMA National Flood Insurance Program NFIP permit to address the project's impact on the FEMA SFHA, such as a FEMA Floodplain Conditional Letter of Map Revision (CLOMR). The DBT, if necessary, shall prepare the FEMA permit, or CLOMR, in conformance with all applicable regulations and codes, including Federal Emergency Management Agency, Code of Federal Regulations Title 44 (Emergency Management Assistance), Parts 9, 10 and Part 72—Procedures and Fees for Processing Map Changes. The DBT shall coordinate with SHA throughout the duration of submitting and securing and meeting all subsequent requirements of the required FEMA permit. The DBT shall provide SHA with copies of the permit submission, approval and all related documents.

3.11.03.02 Channel Design and Stability Assessment

3.11.03.02.01 Channel Stabilization Design and Sediment Transport

The DBT shall complete the design of the stream channel in accordance with the Code of Maryland Regulations 26.17.04. The DBT shall develop stream stabilization designs and demonstrate that either the tractive forces in the channel do not increase by more than 10 percent during the passage of the 2-year and 10-year frequency flood events, or the channel will remain stable with the proposed design.

Determine impairments of physical stability and the ecological function and values of the stream system, including the stream channel, floodplain and riparian areas. Determine a geomorphically significant design discharge(s) based on a combination of hydrologic modeling, regional hydrologic relationships, geomorphic principles and field indicators. The following document may provide guidance: Office of Structures Manual for Hydrologic and Hydraulic Design for Stream Morphology, Maryland Guidelines for Waterway Construction and Rosgen "Applied River Morphology."

Develop a proposed channel and floodplain geometry in plan form, profile and cross-section that remains stable across the range of flow events expected to produce maximum erosive forces and velocities at the site including up to the 100-YR storm event. The

proposed channel and floodplain geometry and stability measures must prevent continued erosion of the system and be resistant to changes induced by proposed conditions.

100-YR storm event. The proposed channel and floodplain geometry and stability measures must prevent continued erosion of the system and be resistant to changes induced by proposed conditions.

The Stream Stabilization Assessment and Design Report shall define the assessment methodologies, results and supporting documentation and calculations on the topics described above. The report must be provided to the Administration in draft form prior to acceptance of the proposed design.

3.11.03.02.02 In-Stream Structure Design

Design in-stream structures to stabilize the channel bed or bank within the character of the proposed design strategy. Any in-stream structures proposed and constructed by the DBT may not create a barrier for any aquatic species that may be reasonably expected to be present at the site presently or anticipated following construction. Materials for the structures must be designed to resist the range of forces and velocities in the channel in proximity to the structure(s) at discharges up to the 100 YR storm event. Design computations must be provided to the Administration indicating the resistance and/or design life of any stone, wood, or other materials integral to the structural stability of all in-stream structures, prior to final approval of the design plans. A design narrative and the computations described above must be included in the Stream Stabilization Assessment and Design Report. Details and specifications depicting the materials, methods, and means of construction must be provided to the Administration in each plan submittal.

3.11.03.02.03 Deliverables

The DBT must provide a Stream Stabilization Assessment and Design Report and plans to the Administration. At minimum the report must include all the elements described in 3.11.03.02. The Administration must approve all design methods, computations and reporting prior to design acceptance which must occur prior to the DBT applying for permit modifications and approvals. The DBT is responsible for rectifying any deficiencies perceived by the regulatory agencies even if the Administration has approved the report prior to issuance of the required permit modifications.

The Stream Stabilization Assessment and Design Report may be combined with the Hydrologic and Hydraulic Assessment Reports.

Design plans and specifications must include details to describe the structure in layout, materials, methods and means. These details and specifications must be approved by the Administration prior to plan acceptance. The specifications must be in the format of the SHA Specification Guide dated 1/26/2012.

3.11.03.03 Structure Design Methodology

The following references are for AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications, dated 2014, including all interims.

A. Concrete

All reinforced concrete members shall be designed in conformance with AASHTO LRFD specifications, including all applicable provisions for service, fatigue, strength, and extreme event limit states.

B. Prestressed Concrete

The use of prestressed concrete beam superstructures or substructures will not be permitted for this project.

C. Structural Steel

All structural steel members shall be designed in conformance with AASHTO LRFD specifications, including all applicable provisions for service, fatigue, strength, and extreme event limit states.

D. Composite Members

Composite members shall be designed to include effects resulting from differential creep and shrinkage of the concrete deck.

E. Load Ratings

All vehicular superstructures shall be rated using the load factor and resistance factor (LRFR) method of analysis using the latest edition of the AASHTO Manual for Bridge Evaluation (MBE). The rating factors shall be shown in a table on the General Plan and Elevation in the General Notes. Load Ratings shall be in accordance with Policy and Procedure Manual D-97-47(4) and shall include the existing portions of structures if as-built plans are available.

3.11.03.04 Loads and Forces

All loads and forces applied to structures shall be in accordance with AASHTO LRFD Bridge Design Specifications except as modified below.

3.11.03.04.01 Dead Loads (DL)

Design loads shall be in conformance with the Administration's Office of Structures Policy and Procedure Memorandum D-89-40(4) and AASHTO LRFD Bridge Design Specifications. All bridges shall be designed to accommodate a loading of 25 psf for a 2 inch future wearing surface and a loading of 15 psf for forms that remain in place.

3.11.03.04.02 Highway Loads (LL)

Live loading for bridges, designated HL-93, shall be in accordance with AASHTO LRFD Bridge Design Specifications. Retaining walls including wingwalls and headwalls shall be designed to accommodate horizontal surcharge in accordance with AASHTO LRFD.

3.11.03.04.03 Wind Loads

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Wind Loads for bridges and retaining walls shall be in accordance with AASHTO LRFD Design Specifications.

3.11.03.04.03 Thermal Forces

Moderate temperature climate changes shall be used per AASHTO LRFD. Normal temperature shall be 60 degrees Fahrenheit.

3.11.03.04.04 Seismic Forces

All structures are located within Seismic Zone 1. No detailed seismic analysis is required.

3.11.03.04.05 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 in 3.11.03.04.02.

3.11.03.05 Materials

3.11.03.05.01 Foundations

A. Piling

1) Steel H piles shall conform to conform to A 36, Grade 36 or A 709, Grade 50 Steel.

2) Steel pipe piles shall conform to A252, Grade 3 steel (Fy = 45,000 psi.).

3) 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.

4) Reinforcement for steel pipe piles shall conform to Section 908.01 of the Administration's Standard Specifications for Construction and Materials.

B. Drilled shaft materials shall conform to Section 412 of the Administrations Standard Specifications for Construction and Materials.

3.11.03.05.02 Structural Steel

A. Structural steel shall conform to A 709, Grade 50 and Section 909.01 of the Administration's Standard Specifications for Construction and Materials. All structural steel shall be fully painted in accordance with Section 435 of the Administration's Standard Specifications for Construction and Materials and the Special Provisions.
B. Fracture Critical Members are prohibited.
C. All bridges utilizing steel beams or girders shall be designed without the use of cover plates.
D. The use of longitudinal and transverse stiffeners is prohibited except for required bearing stiffeners.
E. Minimum sizes for steel members and welds shall conform to the Administration's Policy and Procedure Memorandum D-87-34(4).
F. Electro-slag welding is prohibited.
G. Steel sheet piling shall conform to A328.
H. All bolts shall conform to A 325
I. All bolted connections shall be designed a Class A slip critical connections.

3.11.03.05.03 Concrete

A. Mix No. 6 (4500 psi) normal weight concrete shall be used at the following locations:
   1) Bridge deck slabs
   2) Parapets on bridges and retaining walls
   3) Entire portion of abutment backwalls
   4) Copings for MSE Walls
   5) Precast noise barrier elements
   6) Box culvert top slab when minimum depth of fill at the headwall is less than 18 inches.

B. Mix No. 3 (3500 psi) normal weight concrete shall be used at the following locations:
   1) Footings and substructure units except abutment backwalls
   2) Retaining Walls
   3) Box culvert top slab when minimum depth of fill at the headwall is greater than 18 inches or greater and box culvert walls, wing walls, bottom slabs and cutoff walls.

C. Subfoundation concrete shall be normal weight Mix No. 4 (3500 psi) concrete.

D. The use of lightweight concrete for structures is prohibited on this Project.

3.11.03.05.04 Reinforcement Steel

A. All reinforcement steel bars shall conform to 908.01.

B. All Welded Wire Fabric (WWF) reinforcing shall conform to 908.05.

C. All Epoxy coated reinforcement steel bars and WWF shall conform to Section 917.02 of the Administration's Standard Specification for Construction and Materials and shall be used at the following locations:

1) Deck slabs
2) Barriers and parapets
3) All concrete superstructure/roadway elements
4) Abutment backwalls
5) Abutment bearing seat areas
6) Parapet portion of wingwalls including retaining walls and headwalls
7) 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 1'-6" of cover.
8) Portions of retaining walls and noise barriers located within 10 ft of the outside edge of shoulder measured vertically and/or horizontally.

D. Unless noted otherwise minimum clear cover to reinforcement steel shall be as follows:

LOCATION	CLEAR COVER
Top of Bridge Deck Slabs	2-1/2 in.
Bottom of Bridge Deck Slabs	1 in.
Top of Box Culvert Slabs Built to Grade	2-1/2 in.
Box Culvert Slab Not Built to Grade	2 in.
Toewall – Top, Bottom and Sides	3 in.
Culvert Bottom Slab – Bottom	3 in.
Footings – Bottom and Sides	3 in.
All Other Locations – Main Reinforcement	2 in.
All Other Locations – Stirrups	2 in.
Precast Concrete Elements	1-1/2 in.

E. Welding of reinforcement steel is prohibited.

F. Box culvert shall be designed to allow the reinforcing steel in the top mat to be laid out parallel to the headwalls or perpendicular with the culvert sidewalls when using a headwall edge beam.

G. Mechanical rebar couplers may be used.

3.11.03.05.05 Pipes

A. Reinforced concrete pipes, corrugated steel pipe, and corrugated metal pipes shall conform to section 905.01 of the Administrations Standard Specifications for Construction and Materials.

B. The corrugated steel and corrugated metal pipes shall have a minimum gage of 8.

3.11.03.06 Foundations

The DBT 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:

3.11.03.06.01 Foundation Boring Requirements.

Foundation borings for each structure were obtained for the preliminary engineering of this project and are included elsewhere in the Contract Documents. The Administration guarantees the accuracy of the borings provided but not the sufficiency of the data for the foundation design. Samples from the borings are available for review by contacting the Field Explorations Division Chief, 7450 Traffic Drive, Hanover, MD 21076, 1-866-9268501. The Administration has evaluated the borings and recommendations and/or restrictions have been established for each structure as indicated in the Special Provisions.

The DBT 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 DBT 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 DBT, 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 DBT 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 DBT'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.

3.11.03.06.02 Foundation Design Requirements.
Structures foundations shall be designed in accordance with AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications and as required below.

A. Spread Footings.
The bottom of a spread footing, including leveling pads for a proprietary retaining wall, shall be placed so that the top of the footing is a minimum of 1 ft below the proposed ground line and the bottom of the footing is a minimum of 3 ft below the proposed ground line. If the footing is to be placed on rock as determined by the Engineer, it shall be keyed into the sound rock at least 1 ft. The Plans developed by the DBT shall specify the maximum allowable bearing pressure for each substructure element and its footing.

Setting spread footings or leveling pads for proprietary retaining walls in embankment or fill material is prohibited. Any spread footing, including leveling pads for a proprietary retaining wall, shall be set into existing in-situ soil or sound rock.

The allowable bearing capacity for spread footings shall be established by the DBT 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 DBT shall have the exposed subgrade of any spread foundation inspected by their geotechnical engineer with a written recommendations of their findings forwarded to the Administration.

B. Driven Piles.
Steel H-piles, 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 bridge abutments 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 augured a minimum of 10 feet into competent rock or 5 feet into sound rock. The piles shall be embedded into the augured hole and the void area around the piles shall be filled with Mix No. 4 concrete.

The proposed pile spacing for design shall conform to the following:

1. Spacing in the front row of a pile group shall not exceed 8 ft.
2. Spacing for all other rows shall not exceed twice the spacing of the front row.
3. The DBT 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-9335(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 augured holes with voids filled with concrete, are acceptable for use on this project. Any augered or drilled pile foundation that encounters rock shall have its final tip elevation a minimum of 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 augured 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.

3.11.03.06.03 Subsurface Condition Requirements.

The following chart represents the minimum subsurface requirements that must be present for the various structure and foundation types. This information does not supersede any other foundation design criteria. For retaining walls supporting noise walls, this chart does not apply.

Structure / Foundation Type	Spread Footing	Deep Foundation
Subsurface Conditions	N > 30 for 10 feet of sampling	N > 50 blows per inch for tests over 10 feet of sampling* or REC > 50

N = Blow counts representing penetration resistance as defined in AASHTO T-206
* - In accordance with SHA's Standard Specifications for Subsurface Exploration

3.11.03.06.04 Rock Definition.

The definition of sound rock shall be material with a minimum Rock Quality Designation (RQD) of 50% and a minimum Rock Core Recovery (REC) of 85%. 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.

3.11.04 Structure Specific Design Requirements

3.11.04.01 Bridges

Two new bridges are required as part of this project at the Kerby Hill Road and Livingston Road Interchange. Bridge Nos. 16030700 (Kerby Hill Road over MD 210 SBR) and 16030600 (Livingston Road over MD 210 NBR) shall be in accordance with these Special Provisions.

Bridge No. 16030700 shall be designed to carry Kerby Hill Road over MD 210 SB (including provisions for future HOV), the Service Road, and Carey Branch, and provide access to median ramps for entrance to MD 210 SB and NB. In order to span Carey Brach and MD 210 SB, provide for future HOV, and allow for a flared structure that will accommodate turning movements at the ramp intersection, a four span structure is recommended and preferred. The geometric requirements shall conform to Section 3.11.04.01.01.

Bridge No. 16030600 shall be designed to carry Livingston Road over MD 210 NB (including provisions for future HOV) and provide access to median ramps for entrance to MD 210 SB and NB. The geometric requirements shall conform to Section 3.11.04.01.01.

If the DBT proposes to change any elements of these bridges, the proposed changes shall be submitted in writing to the Administration for review. The Administration may then develop additional site specific requirements as a result of changes proposed by the DBT.

3.11.04.01.01 Geometric Design Criteria for Bridges

The geometric criteria presented within represent a minimum; structures on horizontal roadway curves or other roadway alignment features may require a wider structure. The DBT shall obtain approval from the Administration in writing prior to changing any of these dimensions. The DBT shall be responsible for determination of the final structure size, clearances, geometry, etc. to meet or exceed the design criteria.

A. The minimum vertical underclearance for all bridges over highways and roads shall be 16’-9” as defined in conformance with latest AASHTO criteria.

B. At a minimum the bridge typical section shall accommodate three 11'-0" wide lanes, a 5'-0" shoulder/bike lane and 5'-8" sidewalk on each side of the bridge, and parapets in accordance with 3.11.04.01.02.E; the structure width will vary to accommodate turning movements for a WB-67 design vehicle at the median ramps.

C. Whenever possible bridges shall be located on tangent alignments. If this is not possible, the layout of bridges on non-tangent alignments shall be in conformance with the Administration's Policy and Procedures Memoranda D-85-31(G) and P-85-25(G).

D. Every effort shall be made to provide a roadway profile grade across bridges so that the bridge surface drains without the need for scuppers. The minimum grade allowed on any structure shall be 0.5 percent. Any flow spread shall be limited to the shoulder area during the 10 year storm event.

E. All bridges shall be designed to allow for future deck replacement in conformance with the Administration's Policy and Procedures Memorandum D-79-19(4).

F. The maximum superelevation rate allowed on any structure built to grade shall be 6 percent.

G. All portions of the structures shall remain outside of the 100 year floodplain of Carey Branch.

H. Traffic Signal Poles shall not be supported by any part of the bridge superstructure; however, they may be supported by the substructure, if required.

3.11.04.01.02 Structural Details for Bridges

Standard Details as developed in the Administration's Structural Standards Manual, and/or contained in the plans, shall be utilized for bearings, bridge decks, deck joints, F shape barrier, and any other details whenever possible. Additional or Supplemental Standards developed for use in this project are contained elsewhere in the Contract Documents. Any proposed deviation from the established standards shall be approved in writing by the Administration.

A. Abutments

1) The maximum slope provided in front of abutments shall not be steeper than two horizontal to one vertical (2:1).

2) For MSE walls used as abutment front walls, stub abutments behind the MSE wall shall be supported on piles placed through the reinforced earth zone. Horizontal forces on the abutment shall be accommodated by battered piles, ties to a deadman or other system.

3) For wingwalls and abutments not placed behind MSE Walls, the exposed portions shall have an architectural formliner in accordance with 3.11.05. A 2 foot horizontal coping along the top of the abutment and wingwalls and a 2 foot vertical coping along the sides of the abutments and wingwalls shall be provided.
4) Drainage behind abutments and retaining walls shall conform to Structural Standard Nos. BR-SB(0.01)-80-101.

B. Piers

1) All piers shall be solid stem. The exposed portions shall have an architectural formliner in accordance with 3.11.05. A 2 foot pier cap and a 2 foot vertical coping along the sides of the pier shall be provided.

C. Superstructure

1) Precast, prestressed concrete and/or post-tensioned concrete superstructure members are prohibited.

2) Curved girders are not permitted. Straight, flared beams or girders are permitted and are expected to be required.

3) Primary superstructure members shall not tie into other primary superstructure members. All primary members shall end at, and have bearing at a substructure unit.

4) In order to accommodate the turning movement at the intersection with the ramps, kicker beams may be required in addition to flared beams or girders. Kick beams shall be kept to an absolute minimum and in no case more than 3 will be permitted. The loads to the kicker beams shall be minimized to every extent possible.

5) For bridges supported by beams or girders, the maximum beam or girder spacing between center lines of the beams or girders shall be no more than 10’-6”.

6) All girders within a single bridge structure shall utilize a single type of girder.

7) The location and design of field splices shall be in conformance with the Administration’s Policy and Procedure Memorandum D-83-26(4).

8) Simple span steel girder bridges made continuous for live load are prohibited.

9) Partial depth cross frames are prohibited.

10) The development of Camber Diagrams shall be in conformance with the Administration’s Policy and Procedure Memorandum P-74-1(4).

11) Girders shall be painted to match Color #25177 (Blue) in the Federal Color Standard Specifier System and in accordance with the Standard Specifications.

D. Decks

1) For bridges supported by stringers, all bridge deck slabs shall match Structural Standard Nos. BR-SS(6.61) through BR-SS(6.65).

2) Steel deck forms which remain in place shall be used for all bridges.

3) The ratio of deck overhang length to adjacent deck span shall not exceed 36% without Administration approval.

4) Deck pouring sequence shall be developed in conformance with the Administration's Policy and Procedure Memorandum P-74-1(4).

5) The development of Finished Roadway Elevation Plan Sheets shall be in conformance with the Administration's Policy and Procedure Memorandum P-75-8(4).

E. Parapets

1) All parapets shall match Structural Standard Nos. BR-SS(6.48)-03-350, with the following modifications. The parapets shall provide architectural formliners on both faces of the parapet, with the outside face in accordance with BR-SS(6.48)-03-350 and the inside face detailed to match the same top coping and treatment details as the outside face. The parapet located on the west side of Bridge No. 1630700 shall be made wide enough to accommodate the bridge mounted noise barrier. Refer to 3.11.05 for aesthetic requirements for the parapet coping and formliner.

2) All parapets on the bridges shall have two 3 in. diameter pvc conduits cast into the barrier in conformance with Structural Standards.

3) Precast concrete traffic barriers are prohibited.

4) Slip-Forming of Parapets is prohibited.

F. Deck Joints

1) The selection of the appropriate roadway joint and fixed bearing location shall be in conformance with the Administration's Policy and Procedure Memorandum D-87-38(4). Intermediate and longitudinal joints are prohibited.

G. Bearings

1) Fixed and expansion bearings for straight steel stringer bridges shall be in conformance with Structural Standard Nos. BR-SS(9.05) to BR-SS(9.06).

2) Plain or Steel Reinforced elastomeric bearings shall not be used on this project and will not be allowed as an alternate.

3) Spherical bearings shall be considered for girders whose centerline is greater than 45' from the bridge centerline.

4) Pot Bearings or disc type bearings are prohibited and will not be allowed for any reason within this contract.

H. Utilities

1) Utilities shall not be mounted on the bridge with the exception of PVC in the parapets.

2) The DBT shall make all necessary provisions to avoid conflict between proposed underground utilities and driven piles.

I. Fencing

1) All fencing shall match Structural Standard Nos. BR-SS(3.02)-75-22, Type I chain link fence.

J. Bridge Mounted Noise Barriers

1) A Bridge mounted noise barrier will be required along the north side of Bridge No. 1630700. The barrier shall extend from the location of the noise barrier located between MD 210 SB and the Service Road to the west end of the bridge.

2) The noise barrier shall be mounted to the top of the bridge parapet.

3) Steel posts are required for the bridge mounted noise wall.

4) Only steel noise barrier wall panels are permitted for bridge mounted walls.

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5) The top of the bridge mounted noise barrier shall be at the same elevation as the height of the noise barrier between MD 210 SB and the Service Road at the location where the two walls intersect. The bridge mounted noise barrier may be decreased in height over 1 foot increments with each adjacent panel until the height of the barrier is 13'-0" above the parapet.

K. Foundations

1) Only deep foundations are permitted for abutment, pier, and wingwalls

foundations. Shallow foundations are not permitted, with the exception of proprietary MSE walls placed in front of abutments.

2) Foundations shall be in accordance with Section 3.11.03.06 of this Special Provision.

3) Steel casing shall be provided for all piles driven behind MSE walls, and shall extend, at a minimum, to the bottom of excavation.

L. Slope Protection

1) Slope protection shall be required at all embankment slopes at abutments.

2) Slope protection shall be developed in accordance with the Standard Details

M. Future widening for HOV

1) The location of all substructure units must allow for the future 24'-0" widening of MD 210 HOV lanes. It will be permissible for substructure units to separate MD 210 and future HOV lanes.

3.11.04.02 Box Culvert Extensions

3.11.04.02.01 Description

C01 - Culvert No. 1603500 Extension of 12'-0"+/- X 8'-0"+/- Two Span Slab Bridge/Double Cell Box Culvert on MD 210 over Carey Branch

C02 - Culvert No. P-0394 Extension of 13'-0"+/- X 7'-10" Double Cell Box Culvert on Service Road over Carey Branch

Only cast-in-place concrete box culverts can be used for these extensions. 3'-6" is the minimum allowable depth for the cutoff wall at the inlet end of the culvert.

3.11.04.02.02 Geometry

C01 shall be extended sufficient distance to support the proposed widening of SB MD 210 and any highway barriers. The proposed noise wall shall not be supported on the culvert. At the east end of C01 the geometrics are impacted by the proposed noise wall and stream stabilization. The geometry of the wing walls may be impacted by changes to the stream stabilization. Box culvert shall contain a bottom slab that shall be aligned with the existing grout bags. #9 dowel bars shall be drilled and grouted at 1'–0" intervals around the top slab, side walls, and center wall of the existing structure to tie it to the new extension.

CO2 shall be extended sufficient distance to support the proposed realignment of the service road and the proposed 5'-0" sidewalk. The curb and sidewalk shall be constructed on the curved alignment of the service road. A 42" high combined concrete

traffic and pedestrian barrier shall be placed on the fascia of the culvert extension. The fascia of the culvert extension may be straight rather than following the curve of the service roadway. #9 dowel bars shall be drilled and grouted at 1'–0" intervals around the top and bottom slabs and side and center walls of the existing box culvert to tie it to the new extension.

The Design-Builder may propose alternate wing wall orientations and length; however, the changes shall comply with the hydraulic requirements in 3.11.03.01 and other commitments contained within the IFB. As-built plans will be made available to the DBT however the available plans are not complete and all dimensions, elevations, features, etc. shall be field verified by the DBT prior to use. Existing and proposed walls and existing and proposed slabs shall line up without offsets or deflection angles. All wing walls shall have Type III Chain Link Fence on top of them. The culvert extension shall tie into the existing concrete channel, retaining wall, and fence located along Carey Branch. Any portion of the existing structures that interferes with the proposed work, or would extend above proposed ground, shall be removed to a minimum of 1' below finished grade or so as not to interfere with the proposed work. During removal care shall be taken to not damage any portion of the existing structure that is to remain. If such damage does occur the DBT will propose a remediation design and upon its approval shall make repairs to the satisfaction of the OOS.

3.11.04.02.03 Foundations

A. Box culvert extension shall be founded on a shallow foundation.

B. Refer to 3.11.03.07 for specific foundation requirements.

C. Anticipated scour depth and scour protection information shall be developed by the Design-Builder and incorporated into the foundation design, when applicable.

D. Structures shall be designed and detailed for all forces that result from maximum calculated vertical, horizontal and rotational movement of foundation elements. The limiting values in AASHTO 4.4.7.2.5 shall not be exceeded.

E. Existing Grout Bags that are damaged or removed during construction of the extensions shall be repaired or replaced to the satisfaction of the Administration.

F. At C02 the extension shall have concrete channel liner extensions that smoothly tie the extension into the existing concrete channel lining.

3.11.04.02.04 Hydraulics

Box culverts shall be constructed in two stages so at least one cell is available for stream flow at all times. The DBT operations shall not result in flooding beyond the limits of ROW or existing stream channel.

3.11.04.02.05 Support of Excavation

Temporary support of excavation may be required in order to maintain the roadway embankment during the construction of the box culvert extension.

3.11.04.03 Retaining Walls

3.11.04.03.01 Description.

Six new retaining walls are required as part of this project.

- Retaining Wall No. 16464R0 on MD 210 NBR Left of Station 724+50 to Station 733+00.
- Retaining Wall No. 16465R0 on MD 210 NBR Left of Station 716+50 to Station 723+50.
- Retaining Wall No. 16466R0 on MD 210 SBR Left of Station 716+50 to Station 723+50.
- Retaining Wall No. 16468R0 on MD 210 SBR Left of Station 724+50 to Station 733+00.
- Retaining Wall No. 16467R0 on MD 210 South of Wilson Bridge Drive Right of Station 711+50 to Right of Station 726+50.
- Retaining Wall No. 16463R0 on MD 210 South of Kerby Hill Road Left of Station 724+50 to Station 737+00.

Retaining Wall Nos. 16464R0, 16465R0, 16466R0, 16468R0 comprise the proposed median ramps at the Kerby Hill Road/Livingston Road and MD 210 Interchange. For aesthetic requirements, refer to 3.11.05

Retaining Wall No. 16463R0 is located along the outside shoulder of MD 210 NBR immediately south of the Kerby Hill Road/Livingston Road Interchange. A noise barrier will be mounted on top of this retaining wall. For aesthetic requirements, refer to 3.11.05.

Retaining Wall No. 16467R0 is located between MD 210 SBR and the Service Road south of Wilson Bridge Drive and north of the Kerby Hill Road/Livingston Road Interchange. The retaining wall provides the required grade separation between MD 201 SBR and the Service Road. A noise barrier will be mounted on top of this retaining wall. The top of the retaining wall will extend above the proposed grade as a concrete wall and serve as the bottom portion of the noise barrier. The top coping of the extended concrete wall shall be at the same elevation as the coping on the ramp MSE Wall on the opposite side of MD 210 SBR. There shall be a minimum of 2” clearance between Retaining Wall No. 16467R0 (and supported noise barrier) and any portion of Bridge No. 1630700. A joint shall be provided between the bridge and retaining wall in accordance with the Standard Specifications. Any gap between the retaining wall/ noise barrier shall be minimized so as not to interrupt the acoustic profile of the noise barrier system. For

aesthetic requirements, refer to 3.11.05.

If the Design-Builder proposes to eliminate or introduce new retaining walls to the project, the proposed changes shall be submitted in writing to the Administration for review. The Administration may then develop any site-specific requirements beyond those provided by the Design-Builder, to be used in the design of the structures. All design elements of this project shall be the responsibility of the Design-Builder.

3.11.04.03.02 Geometric Design Criteria

A. Retaining walls on curved horizontal alignments may be constructed on chords provided the angle of deflection between segments does not exceed 5 degrees.

B. The horizontal offset of the wall from the baseline shall not change abruptly. All changes in offset shall be accomplished using curves or chorded construction as described above.

C. The top of retaining walls shall not be stepped to accomplish a change in elevation. The top shall be level or shall vary using a smooth linear transition.

D. The completed retaining wall shall be located entirely within the Administration's Right-of-Way. Construction easements shall only be used to facilitate construction efforts.

E. The ground line behind the retaining wall shall be placed a minimum of 9" below the top of the wall, unless a barrier is required on top of the wall.

3.11.04.03.03 Structural Details and Standard Details

Standard Details, as developed in the Administration's Structural Standards Manual shall be utilized whenever possible. Any proposed deviation from the established standards shall be approved in writing by the Office of Structures.

The following structural details shall be used where appropriate:

A. For retaining walls supporting roadways and adjacent to the shoulder, an F-Shape Barrier shall be placed on top of the proposed retaining wall. The height of the proposed barrier shall be 42" in accordance with the roadway design requirements. The barrier for Retaining Wall No. 16464R0 on MD 210 NBR Left of Station 724+50 shall be 5'-0" high.

B. For retaining walls adjacent to and supporting sidewalks, a 2'-3" barrier with a two strand railing in conformance with Standard BR-SS(5.01)-76-35 shall be utilized. For retaining walls adjacent to and supporting hiker/biker facilities, a 2'-3" vertical face barrier with a two strand rail resulting in a combined barrier height of 4'-6" shall be utilized. All railing elements shall meet the horizontal clear spacing requirements outlined in Section 13.8 of AASHTO. These spacing requirements may not be exceeded.

C. For retaining walls supporting private property or other facilities that are accessible to pedestrians, fencing shall be provided on top of the wall. The minimum height of the fence shall be 3'-0" and detailed in accordance with Standard No. BR-SS(3.11)-96-317 and BR-SS(3.12)-96-318.

D. For barriers placed on top of MSE walls, a moment slab shall be utilized to resist the horizontal loads applied to the barrier. The moment slab and barrier shall be cast-in-place. The barrier for Retaining Wall No. 16464R0 on MD 210 NBR Left of Station 724+50 shall be 5'-0" high.

E. All retaining walls shall contain the appropriate details for drainage. The drainage system for cast-in-place cantilever walls shall be in accordance with Standard No. RW(0.01)-80-101.

F. For retaining walls supporting noise barriers, the following shall be applied:

1) The retaining wall shall be designed to resist all loads imposed by the noise wall.

2) The geometry of the wall shall be sized to allow for proper anchorage of the noise barrier posts. Anchor bolts with a base plate or embedded posts can be considered.

G. For MSE walls, slip joints are required at expansion joints, and every attempt shall be made to provide equal spacing of the slip joints throughout the corridor. Expansion and contraction joint spacing shall not exceed the distances specified in the Structural Standards Manual.

H. For cast in place retaining walls, vertical concrete coping shall be provided to mimic the concrete slip joints used for MSE Walls throughout the corridor. The same spacing used for the MSE slip joints shall be applied to the vertical concrete coping. For retaining walls supporting noise barriers, the vertical copings shall fall in line with noise barrier post locations. For coping aesthetic requirements, refer to 3.11.05.

1 I. The DB Team shall determine if noise absorptive treatments are required on the retaining walls in order to satisfy the noise abatement requirements of this project. If absorptive treatments are required, the DB Team shall meet all aesthetic requirements outlined in Section 3.11.05 – Structure Aesthetics.

3.11.04.03.04 Design Alternates for Retaining Walls

A. All concrete cantilever retaining walls shall be in accordance with Structural Standards No. RW(6.02)-83-133 through RW(6.14)-89-201 and AASHTO.

B. Foundation alternates for the retaining walls are permitted provided the design is in conformance with Section 3.11.03.06 of this Special Provision.

C. Proprietary MSE Walls are permitted. The DBT shall design and detail proposed proprietary retaining walls in accordance with the manufacturer's approved details. The list of proprietary retaining walls that have been approved by the

Administration are located on the Administration's website at www.roads.maryland.gov.

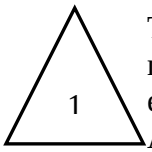
1) Mechanically Stabilized Earth (MSE) retaining walls that are to be placed adjacent to streams, floodplains, SWM ponds, or other water features shall be placed so that no stream flows up to the 100 yr flood elevation or standing water comes in contact with the face of the wall. A solid concrete barrier may be designed to protect the base of the wall and shall contain the appropriate scour countermeasures.

2) The leveling pads for proprietary retaining walls shall be cast-in-place concrete. They are considered spread footings and shall follow the design requirements for spread footings.

3) The reinforced zone backfill for Mechanically Stabilized Earth (MSE) walls shall be comprised of No. 57 stone. A phi angle of 34 degrees shall be used for No. 57 stone in the design calculations.

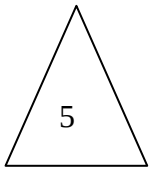
3.11.04.04 Noise Barriers

3.11.04.04.01 Description.



The noise barriers are based on an alignment developed during preliminary studies and may vary according to the final documents developed by the Design-Builder. All design elements of this project shall be the responsibility of the Design-Builder. For the Noise Abatement Performance Specification, refer to TC 3.18.

3.11.04.04.02 Design



Design of noise barrier elements shall be in accordance with AASHTO Standard Bridge Design Specifications. Foundations shall be designed in accordance with this performance specification.

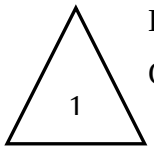
3.11.04.04.03 Noise Barrier Types

A. Noise barriers shall be designed and detailed utilizing a pre-approved proprietary noise barrier system.

B. A list of pre-approved noise barrier system manufacturers is provided on the Administration's website at www.roads.maryland.gov.

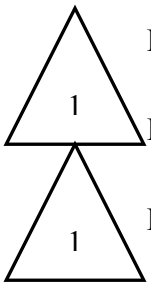
3.11.04.04.04 Geometric Design Criteria

A. The horizontal alignment shall be smooth and shall roughly follow the Project alignment within the Project right-of way.



B. Consistent post spacing shall be used across the entire noise barrier.

C. The vertical profile of the top of noise barrier shall be equal to or above the acoustic profile.



D. The minimum height for a proposed noise barrier shall be 7 ft. above the finished ground line.

E. The top surface of individual noise barrier panels shall be level. Exceptions will be made for the panels at the beginning and end of the proposed wall.

F. Vertical steps between the adjacent top panels shall be a minimum of 2 in. and a maximum of 12 in.

G. At the top of barrier elevation transitions, the elevation difference between the tops of panels shall be established so that the increment is constant for the entire transition. A small step at every panel shall be used in lieu of a larger step at every other panel. Where transitions are so flat that providing a step at every panel cannot be accommodated, the transition shall be accomplished by stepping up or down a constant increment (such as 6 inches) after a constant number of panels (minimum of 5 panels). The pattern shall repeat for several series.

H. The top of wall at the bottom of a sump curve in the acoustic profile shall be raised to provide a long level section at the top of the wall.

I. A minimum distance of four (4) feet shall be provided from the face of a noise barrier and the hinge point of a cut or fill slope steeper than 2.5 (H): 1 (V). The area between the barrier and the hinge point shall be sloped at a maximum of 4% for positive drainage.

3.11.04.04.05 Structural Details and Standard Details

SHA Standard Details shall be utilized whenever possible. Any proposed deviation from the established standards shall be approved in writing by the Office of Structures.

The following structural details shall be used where appropriate:

A. Concrete or steel posts will be permitted for noise barriers. A single type of post shall be used for an entire length of noise barrier. Posts on bridges shall not be connected to the vertical faces of parapets.

B. Only concrete panels shall be used for noise barriers, except on bridges. Noise barriers on bridges shall conform to the requirements of Section 3.11.04.01.02.I of this performance specification and shall be connected to the top of the bridge parapet. To accommodate these connections, parapets will need to be modified and widened. The Design-Builder shall appropriately locate the bridge-mounted noise barrier to avoid vehicular impacts. Connections to the back of parapets shall not be allowed. The top of bridge-mounted noise barriers shall not be more than 18 feet above the deck.

C. Only drilled shaft foundations shall be permitted for ground-mounted noise barriers unless otherwise required for previously approved noise barrier systems. Drilled shafts shall extend a minimum of three diameters into the native ground

surface below any existing or proposed fills.

D. Location of access doors and fire department connections shall be coordinated with the jurisdictional fire department and the Administration.

3.11.04.05 Miscellaneous Structures

3.11.04.05.01 Description.

Miscellaneous structures anticipated include custom traffic signal poles and foundations. All design elements of this project shall be the responsibility of the Design-Builder. Traffic Signal Poles shall not be supported by any part of the bridge superstructure; however, they may be supported by the substructure, if required.

3.11.04.05.02 Design

Design of traffic signal poles shall be in accordance with AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 5th Edition.

3.11.05 Structure Aesthetics

Specific aesthetic details are intended for the various structures on this project as described in this specification. The following aesthetics shall be applied to bridges, retaining walls, and noise barriers. Sample Panels shall be submitted for each of the following finishes in accordance with Section 456 – Architectural Treatment.

3.11.05.01 Formliner for Bridge Parapets and Concrete Barriers

The inside and outside faces of bridge parapets and concrete barriers, shall be a random cut ashlar stone in a linear pattern. The stone reveal shall be a maximum of 2½" and an average of 1¾". The stones shall taper to the grout line resulting in a varying reveal. The grout width shall be ½" minimum and 1" maximum. The liner thickness shall be approximately 3¾". The simulated stone finish shall match as closely as possible the stone pattern of the original fortress walls of Historic Fort Washington at Fort Washington Park, 13551 Fort Washington Road, Fort Washington, MD 20744. The concrete stain color shall be an approved light grey to match the cast in place retaining walls south of the I-495/I-95 and MD 210 ramps, adjacent to where Bald Eagle Road meets MD 210 Southbound. Concrete shall be stained with a range of cool gray colors, roughly equivalent to the Federal Standard 595C, as follows: Colors shall include gray for the base color and shades of gray for the surface and the highlight colors, and shall achieve a finished look which simulates natural stone. The surface color shall be a medium gray which matches Federal Standard 595C, Color 26630. Highlights shall match Federal Standard 595C, Color 26493 and Federal Standard 595C, Color 36300, and shall incorporate, sparingly, highlights using Federal Standard 595C, Color 36076.

3.11.05.02 Finish for Noise Barriers

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The highway side of all noise barrier panels shall be a simulated tree bark finish. The stain color shall be an approved light tan to match as closely as possible to the existing noise barrier at westbound I-495/I-95 and MD 210 ramp on the north side of the interchange. All concrete stain colors shall meet Federal Standard 595.

The residential side of all noise barrier panels shall be a fuzzy rake/double rake finish. The stain color shall be an approved light tan to match as closely as possible the residential side of the existing noise barriers at westbound I-495/I-95 and MD 210 ramp on the north side of the interchange. All concrete stain colors shall meet Federal Standard 595.

Formliner joint seams shall not be visible in the noise barrier system and applies to both full height and stacked panel designs. Patterns for formliners shall be oriented level and plumb and shall not follow the profile of the noise barrier. Post type and design shall be compatible with the panel design in terms of texture, color, and scale. Incidental items such as access doors, etc. shall be incorporated in a manner consistent with the aesthetics aspects of the noise barrier system.

3.11.05.03 MSE Retaining Wall Panels

The exposed faces of concrete retaining walls and bridge substructures shall be Random Cut Stone, having a pattern and texture which replicates natural stone. The treatment shall incorporate stone sizes varying between 2 feet and 6 feet. The height of the stone coursing shall be 16 inches. The maximum relief shall be 1-5/8 inch. The pattern and color shall match the MSE Walls at US 29 and Randolph Road. Concrete shall be stained with a range of cool gray colors, roughly equivalent to the Federal Standard 595C, as follows: Colors shall include white for the base color and shades of gray for the surface and the highlight colors, and shall achieve a finished look which simulates natural stone. The surface color shall be a light gray which matches Federal Standard 595C, Color 36650. Highlights shall match Federal Standard 595C, Color 36495.

3.11.05.04 Formliner for Retaining Walls and Bridge Substructure

The exposed faces of concrete retaining walls and bridge substructures shall be Random Cut Stone, having a pattern and texture which replicates natural stone. The treatment shall incorporate stone sizes varying between 2 feet and 6 feet. The height of the stone coursing shall be 16 inches. The maximum relief shall be 1-5/8 inch. The pattern and color shall match the MSE Walls at US 29 and Randolph Road. Concrete shall be stained with a range of cool gray colors, roughly equivalent to the Federal Standard 595C, as follows: Colors shall include white for the base color and shades of gray for the surface and the highlight colors, and shall achieve a finished look which simulates natural stone. The surface color shall be a light gray

which matches Federal Standard 595C, Color 36650. Highlights shall match Federal Standard 595C, Color 36495.

3.11.05.05 Use of Concrete Copings

Horizontal and vertical copings for the concrete retaining walls, MSE Walls, and bridge parapets shall be closely coordinated. A 2 foot vertical coping shall be provided at all MSE Wall slip joints the spacing of the vertical coping shall be consistent throughout the corridor. A similar 2 foot wide vertical coping shall be provided along all concrete retaining walls with the same spacing provided for the MSE wall vertical coping. The vertical coping spacing shall be coordinated with the noise barrier posts spacing so that all vertical coping for retaining walls supporting noise barriers line up with a noise barrier post.

The horizontal coping along the top of the ramp MSE Walls adjacent to the bridges shall be oriented such that the parapet formliner on the bridge follows a linear pattern with the formliner on the retaining wall parapets. The bottom coping on the bridge parapet shall follow the same thickness along the length of the MSE walls. If a wider coping is required along the MSE Wall, the coping shall be stepped such that the top portion of the stepped coping is the same thickness as the bottom coping of the parapet.

The top of the concrete wall between MD 210 SBR and the Access Road shall have the same appearance as the horizontal coping and parapet formliner on the ramp MSE Wall on the opposite side of MD 210 SBR. The top of the concrete retaining wall shall also appear to tie in to the horizontal coping and parapet fomliner on Bridge No. 1630700, similar to the appearance of the parapet formliner and coping on Retaining Wall No. 16466R0 on the opposite side of MD 210 SBR. The concrete coping shall not infringe upon the proposed traffic lanes. The noise barrier shall be provided above the horizontal top coping.

A 1 foot horizontal coping shall be provided along the top of the noise barriers.

3.11.06 Structure Plan Development

The DBT shall prepare structure plans as part of the Contract using the latest SHA MicroStation CADD Standards and Plan Development Checklists. All structure plans 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 various types of structures (Steel Girder Bridges, Retaining Walls, etc.) and indicate the minimum amount of information that is required on the Structure Contract Plans. If a checklist is not provided for the type of structure that is proposed by the DBT, 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).

3.11.07 Submittals

All bridges and any and all retaining walls, noise walls, culverts classified as small structures, and any other structure specifically designed for this project shall follow an independent review process. This process will be coordinated with the review and approval of the other articles (roadway, drainage, etc.) as appropriate or as required in the specifications.

The structure submission schedule shall be presented in the Design-Build's original project schedule and updated as the project progresses. Submissions for the subject structures shall be made one at a time with a minimum of 7 calendar days between submissions. This schedule shall be presented in the Design-Build's original submission schedule. As noted the DBT must notify the SHA 7 calendar days in advance of all submissions.

3.11.07.01 Type, Size & Location Submission

The first submission required for the structures in this Contract shall be the Type, Size and Location (T.S.&L.) Plans. The materials developed for this submission shall represent approximately 30% complete construction documents. Prior to this submission, the roadway alignment and profile need to have been finalized and approved by the SHA Highway Design Division. Any other pertinent information such as grading plans or drainage features that impact the proposed structures must also be reviewed and approved by the appropriate SHA Design Division prior to submitting the structure plans for review. All plans shall be developed in conformance with TC-3.11.05 Structure Plan Development.

The DBT shall submit a minimum of six (6) sets of the T.S.&L. Plans to the Administration for review. Official review comments shall be conveyed back to the DBT via correspondence and plans with comments noted. The DBT shall provide a point-by-point response to all official comments received and receive concurrence from SHA prior to proceeding forward with design and/or plan development activities. Telephone, email and discussion meeting comments and questions may also be presented to the DBT. No official response is necessary for these inquiries however, proper documentation (telephone memos, notes to file, etc.) is highly recommended. The T.S.&L. submissions will be reviewed and comments provided within 40 calendar days of receipt of the submission. Any incomplete submission shall not be reviewed and returned to the DBT.

3.11.07.02 Foundation Report

The Foundation Report and Plan submission shall be made in accordance with the Maryland Department of Transportation Policy and Procedure Memorandum D-79-17(4), the Structure Descriptions, and other requirements specified in this Special Provision. The submission of the foundation report can be made concurrently with the T.S.&L. submission; however, it shall be noted that the foundation design may be impacted by comments received on the T.S.&L. Plans. If the T.S.&L. submission is provided separately, the Foundation Reports

shall not be submitted until comments on the T.S.&L. have been provided back to DBT and the DBT's responses are accepted by the Administration. All plans shall be developed in conformance with TC-3.11.05 Structure Plan Development. Boring Sheets, including all logs and a location plan, are required as part of the plan submittal for Foundation Review and in the Final Contract Documents.

The DBT shall submit a minimum of six (6) sets of the Foundation Report to the Administration for review. Official review comments shall be conveyed back to the DBT via correspondence and plans with comments noted. Comments will be provided back to the DBT 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 T.S.&L. submission, comments will be provided within 40 calendar days of the receipt of the submission. The DBT shall provide a point-by-point response to all official comments received and receive concurrence from SHA prior to proceeding forward with design and/or plan development activities. Telephone, email and discussion meeting comments and questions may also be presented to the DBT. No official response is necessary for these inquiries however, proper documentation (telephone memos, notes to file, etc.) is highly recommended. If combined with the T.S.&L. submission, the Foundation Report and Plan submission will be reviewed concurrently. If a separate Foundation Report and Plan submission is made, it shall be reviewed and comments provided within 21 calendar days of receipt of the submission. Any incomplete submission shall not be reviewed and returned to the DBT.

3.11.07.03 Structural Detail Submissions

Following approval of the T.S.&L. Plans and Foundation Report, the DBT may submit detailed plans for various structural elements. All plans shall be developed in conformance with TC-3.11.05 Structure Plan Development. The DBT shall submit a structure submission schedule that outlines the anticipated structural detail submissions.

The DBT shall submit a minimum of six (6) sets of the Structural Detail Plans to the Administration for review. The Structural Detail submissions shall be reviewed and comments provided back to the DBT within 21 calendar days of receipt of the submission. The DBT shall provide a point-by-point response to all official comments received. Upon incorporating the comments into Structural Detail Plans, the DBT shall provide four (4) sets of revised Plans to the Administration as a record set of the proposed construction plans. Any incomplete submission shall not be reviewed and returned to the DBT.

3.11.07.04 Revisions to Structure Plans

Any revisions to the structural drawings must be submitted in writing to the Administration 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 Maryland Department of Transportation Policy and Procedures Memorandum P-75-6(4). The DBT is responsible for preparation of all Red Line Revisions.

3.11.07.05 Shop Drawing Review Process

All shop drawings relating to the structures shall be reviewed in accordance with Maryland Department of Transportation Policy and Procedures Memorandum OP-82-34 (G). The DBT shall undertake the primary review and shall be stamped by the DBT 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 DBT 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.

3.11.07.06 Final Plans and Computations

The DBT shall submit a complete set of structure plans once all structural details have been approved. A full set of plans (details, standards etc.) shall be developed for each of the structures. The complete set shall consist of one set of mylar originals, four (4) full size paper print sets and four (4) half size paper print sets. The General Plan & Elevation sheet for each of the structures sealed by the Design-Build 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 (mylar) 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 should reflect any field revision made during construction. The DBT shall submit reproducible As-Built plans at the completion of the project that are signed and sealed by the Engineer.

The DBT 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 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 DBT structural key staff member responsible for performing or oversight of the pertinent design work.

The DBT shall submit completed Structural Inventory and Appraisal (SIA) and PONTIS information forms for each structure for use by SHA in entering the structure data into their structural inventory system. The DBT shall submit Final Load Rating Computations in accordance with Policy and Procedure Manual D-97-47(4). SHA's Standard Load Rating Summary Sheet and all electronic software files are required as part of the submittal.

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; roadway, pedestrian and sign lighting; traffic signals; signal systemization and ITS devices. 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, route marker, regulatory, warning and transit-related signs for MD 210, ramps, and cross-streets. The Design-Builder shall be responsible for the design and construction of sign and DMS structures (overhead, cantilever, and ground mounted), including foundations, protection (placement outside clear zone or traffic barrier), and access for maintenance. Sign lighting shall be provided for all overhead and cantilever sign structures that meet the criteria for sign lighting as defined be the SHA Lighting Guidelines.

The Design-Build Team shall prepare Signing and Pavement Marking plans for all phases of construction (including temporary traffic shifts, detours, median cross-overs, etc.). These shall be prepared in accordance with the latest accepted editions of the MUTCD, Maryland MUTCD, SHA standards as provided by OOTS & PG County Standards & Specifications.

The Design-Build Team shall prepare plans for application of the Final Pavement Markings, including Snowplowable Raised Pavement Markers (SRPM), in accordance with the latest edition of the MUTCD, Maryland MUTCD, SHA standards as provided by OOTS & PG County Standards & Specifications. The Design Builder shall be responsible for the design and construction of the Pavement Markings within the project limits along MD 210, cross-streets and access roads.

LED Interchange lighting, LED intersection lighting, underpass lighting, temporary lighting and sign 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. All lighting to be maintained by SHA shall be designed and constructed in accordance with the requirements of the RFP.

The Design-Builder shall provide traffic signals at each intersection as stated in this performance specification, including foundations, traffic signal poles, signal heads, conduit system, circuitry, detection devices, required signal cabinets and controller equipment, intersection lighting, and signal related signing. The work shall include:

- Coordinating utility connections with the proper utility company to obtain power service for all signal equipment;

- Coordinating the signal cable connections with the Administration to complete the traffic signal installation;
- Connecting each proposed signalized intersection to the Administration's interconnect system, as required; and
- Coordinating with the Administration and Prince George's County to maintain, modify during MOT phases and remove existing traffic signal system equipment/cables and fiber optic cable infrastructure, as required.

The Administration has performed and approved traffic analyses based on the conceptual geometric layout included in this RFP. Those traffic analyses were the basis for preparing the Design Requests for 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

		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

TABLE 1
STANDARDS FOR TRAFFIC ANALYSIS

		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)

Title		
1	SHA	List of Qualified Permanent Pavement Markings
2	SHA	MD High Voltage Line Act
3	SHA	List of Qualified Loop Sealants
4	SHA	List of Qualified Detectable Warning Surfaces
5	SHA	Standard Specifications for Construction and Materials
6	SHA	Maryland Manual on Uniform Traffic Control Devices (MD MUTCD)
7	FHWA	Manual on Uniform Traffic Control Devices (MUTCD)
8	SHA	Bicycle Policy and Design Guidelines
9	SHA	Standard Office of Traffic and Safety Shelf Typicals
10	SHA	Book of Standards for Highway and Incidental Structures
11	SHA	Maryland State Highway Standard Sign Book
12	FHWA	Standard Highway Signs Book
13	AASHTO	Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*
14	SHA	Administration, Section VIII, of the "Specifications for Consulting Engineer's Services, Volume II
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

		Title
1	SHA	Standard Specifications for Construction and Materials
2	NFPA	National Electric Code
3	IEEE	National Electric Safety Code
4	NFPA	502-Standard for Road Tunnels, Bridges and Other limited Access Highways
5	FHWA	Manual on Uniform Traffic Control Devices (MUTCD)
6	SHA	Maryland Manual on Uniform Traffic Control Devices (MD 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-22-05, American National Standard for Tunnel Lighting
10	IES	RP-19-01, Roadway Sign Lighting
11	AASHTO	Roadway Lighting Design Guide
12	AASHTO	Roadside Design Guide
13	SHA	Book of Standards for Highway and Incidental Structures
14	AASHTO	Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 4th Edition
15	SHA	Office of Traffic and Safety's Traffic Engineering Design Division's Traffic Control Devices Manual
16	SHA	Lighting Guidelines
17	AASHTO	Highway Safety Design and Operations Guide
18	SHA	Accessibility Policy and Guidelines for Pedestrian Facilities along State Highways
19	ADA	Americans with Disabilities Act Accessibility Guidelines
20	AASHTO	Guide for the Planning, Design and Operation of Pedestrian Facilities
21	AASHTO	Guide for the Development of Bicycle Facilities
22	NCHRP	Report 350. Recommended Procedures for the Safety Performance Evaluation of Highway Features
23	PG Co.	Prince George's County Specifications and Standards for Roadways and Bridges

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

	TITLE
SHA	2035 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)

Aut	Title
SHA	Roundabout Traffic Design – SHA Roundabout Guidelines
FHWA	FHWA Roundabouts: An Informational Guide 2010 FHWA-RD-00-067-NCHRP-Report 672-Second Edition
TRB	Transportation Research Board's Accessible Pedestrian Signals Synthesis and Guide to Best Practices

3.12.03 Coordination with Other Contracts

The Design-Builder shall coordinate the design and construction of all traffic control devices for the Project with those required for other SHA, Prince George's County and local jurisdiction Projects.

3.12.04 Traffic Operational Analysis – Procedures and Application

3.12.04.01 Approved Analysis Techniques and Software

3.12.04.01.01 Highway Capacity Manual and Software – Latest Version

All freeway mainlines, ramp junctions (merge and diverge locations), and weaving sections shall be analyzed using the Highway Capacity Manual and Software (latest version). The weave analyses will include the weaves between the proposed MD 210 interchange and the ramps to and from I-95/I-495. 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, SimTraffic & CLV Analysis – Latest Version

For corridors with multiple intersections, or for individual signalized intersections, the Design-Builder shall use Synchro, SimTraffic and CLV Analysis 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. Also for all roundabouts, the roundabouts shall be coded and analyzed in VISSIM and/or Synchro in order to capture and visualize the effects on the overall road network. The volumes should also be checked against the capacity thresholds outlined in 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 Design-Builder shall also analyze all ramps so that queues do not extend from the ramp terminus to MD 210 mainline or so side road queues do not extend to adjacent intersections. The Design-Builder shall provide calculations that the sight distance will be adequate for vehicles exiting and entering either MD 210 mainline at highway speeds to see the back of the queue and decelerate to a stop condition. The queuing analysis shall be supplemented with simulation analysis for all cases.

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 included in the RFP, the Design-Builder shall use the 2035 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 or Vissim 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 2035 operational and design speed(s) for each segment of roadway and shall provide the operational and design speed differentials between adjacent lanes (i.e. mainline versus merging ramp) in tabular form for review by the Administration.

3.12.04.01.07 Signal Warrant Analysis

Traffic analyses for the general geometric layout included in the RFP has been completed and approved by the Administration. The intersection of Kerby Hill Road/Livingston Road and the ramps from MD 210 will require signalization based information included in the RFP.

The Design-Builder shall be responsible for performing an evaluation to determine if signalization is appropriate, based on the MD MUTCD, if the Design-Builder proposes modifications to the general geometric layout included in this RFP. Study findings shall be presented in a report which outlines the warrants evaluated, consideration given to safety, operations, delay, and available gaps in traffic resulting from adjacent signalized intersection. Recommendations shall also be included in the report and shall be attached to the Administration's Office of Traffic and Safety's Traffic Control Device Design Request Form, as discussed in the "Preparation and Submittal of Administration's Office of Traffic and Safety's Traffic Control Device Design Request Form." All signal warrant evaluations shall be presented and reviewed prior to final design.

3.12.04.02 Preparation and Submittal of Administration's Office of Traffic and Safety's Traffic Control Device Design Request Form

Traffic Control Device Design Request Forms have been prepared by the Administration based on the general geometric layout 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, written comment and approval, 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 conform to the prescriptive signing layouts provided within the drawings and have the following functional requirements:

- Signing at the interchange of MD 210 with Kerby Hill Road/Livingston Road shall be based on the Intermediate interchange classification on the approaches and the Minor interchange classification for the Kerby Hill and Livingston Road MD 210 approaches, as defined in the MD MUTCD, Section 2E.29;
- Advance guide signing shall be provided along both northbound and southbound MD 210 as indicated in the prescriptive sign detail sheet;
- Exit direction guide signs and exit gore signs shall be provided along all approaches to the interchange as indicated in the prescriptive signing layouts ;
- Relocation of existing overhead and/or cantilever mounted signs to new structures and removal of the existing structures to meet sign spacing requirements;
- Route marker assemblies to direct northbound traffic from the proposed interchange to MD 414 to access I-95/I-495 North. Also include necessary route marker assemblies to direct traffic from MD 414 northbound exit from northbound MD 210 to I-95/I-495 North entrance ramp.

Route marker, regulatory, and warning signs including but not limited to advisory speed signing shall be provided based on MUTCD 2009, the latest MD MUTCD requirements and SHA's Traffic Control Devices Design Manual. Proposed signing on existing roadways shall not simply seek to replace existing signs impacted by construction, but should also seek to remedy any existing deficiencies. It is the intent of this Project to provide fully-compliant signing within the Project Limits that meets all applicable standards.

The Design-Builder may reuse or relocate existing signs within the Project limits, provided that the sign meets all applicable standards (including placement, application, size, color, reflectivity, condition, etc.). Existing signs that have been damaged in any way shall be removed and replaced, if necessary. The Design Builder shall be prepared to submit photographs of any signs to remain or be relocated within the Project Limits at the request of the Administration to verify that the sign is suitable for reuse.

3.12.05.02 Design and Construction Requirements

All temporary signing shall be shown on the Traffic Control Plans (TCP). The Design-Builder shall design and install temporary signing to provide motorist guidance throughout and within the Project limits

All proposed signing shall be shown on a definitive design signing roll plan and reviewed by the Administration prior to advancing the design. The Design-Builder shall be responsible for the design and construction of all signing.

3.12.05.02.01 Definitive Design Signing Roll Plan

The Design-Builder shall prepare a Definitive Design Signing Roll Plan (definitive 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 Design-Builder shall not relocate existing overhead or cantilever sign structures. If existing overhead or cantilever structures must be moved, new structures are required. Existing overhead or cantilever sign panels may be relocated to new structures with the approval of the Administration. The roll plan shall display signing for MD 210, Kerby Hill Road and Livingston Road, as well as for the cross-street streets, frontage roads, and any other roadways that contain signing that is affected by the Project. Transit-related signing will also be included. The Design-Builder shall also provide for the modification or removal of any signing outside the limits of the Project that is no longer appropriate or pertinent as a result of changes associated with this Project. The signing shall be removed or 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.
The roll plan shall include the location of all the proposed and existing Dynamic Message Signs (DMS).

3.12.05.02.02 Plan Sheet Requirements

Once the roll plan is reviewed by the Administration, the Design-Builder shall prepare signing plans at a scale of 1”=50’ or equal to the roadway plans. Plans shall show the proposed message, MD MUTCD or MUTCD sign designation (if applicable), size and location of all guide, supplemental, route marker assemblies, regulatory, and warning signing. These plans shall also show the location,

messages and sizes of all existing signs. All existing signs to be removed or relocated shall also be shown along with the proposed locations for the relocated signs. The plans shall also include the location and type of delineation devices (including pavement markings). The owner of each sign/structure shall be clearly noted on the plan sheets. All proposed guide, supplemental and non-standard signs shall be detailed on an SN-3 (Sign Fabrication) detail sheet. The plan set shall include SHA's latest SN-1 sheet (General Notes and Proposals). The Design-Builder shall be responsible for contacting SHA to obtain the latest SN-1 sheet. The SN-4 (Ground Mount Sign Support Details) sheet shall be used for all ground mounted guide or supplemental sign supports. All ground mounted sign supports (steel and wood) shall be detailed on this sheet. The tables on this sheet shall include the Sign Number, Plan Sheet number where the sign is located, the sign size, the post size to be used, if the supports are breakaway or non-breakaway, the support lengths, the lateral clearance code and offset, and the support spacing from left edge of sign. If necessary, the SN-8 (Overhead Structures) and the SN-9 (Cantilever Structures) sheets shall also be included in the plan set. The SN-11 (Signing and Marking Quantities) sheet shall be included which summarizes the quantities and materials in table format being used for this Project, every sign location shall have a separate line.

3.12.05.02.03 Design of Sign Locations

The Design-Builder shall design, fabricate and install all the overhead and ground mounted signs shown on the definitive plan, within 25-feet of the location shown on the definitive plan or as approved otherwise by the Administration. An 800 foot spacing shall be maintained between overhead signs and traffic signals. For signing along MD 210, all guide signs, supplemental guide signs, and any overhead or cantilever structures shall be installed such that 800 foot spacing is maintained, unless approved by the Administration. It is the Administration's intent to have the signs spaced at 800 foot intervals so that future signing can be accommodated and the 800 foot spacing is maintained. Overhead and cantilever sign structures installed upstream of bridges crossing over the traveled roadway shall be constructed with at least 300 feet between the sign structure and the bridge, unless precluded by the MD MUTCD or Administration standards. Overhead and cantilever sign structures installed downstream of bridges crossing over the traveled roadway shall be constructed at least 800 feet from the bridge. To the extent possible, the Design-Builder shall provide minimum 200 foot spacing between ground-mounted signs. The Design-Builder shall coordinate the proposed sign locations with all proposed landscaping, utility, hydraulic, lighting, and all other roadside features to assure proper clearances, lighting levels, and adequate sight distance.

The Design-Builder shall design, fabricate and install all the R3-17, BICYCLE LANE, signs with bicycle lane pavement markings, as appropriate, on both sides of MD 210. These devices shall be installed in accordance with Sections 9B.04

and 9C.04 of the 2011 MD MUTCD and the CHAPTER 2: BIKE LANE DESIGN of the Maryland SHA Bicycle Policy and Design Guidelines (May 2013). The pavement marking shall consist of the bicycle symbol without a rider and an arrow. The Design – Builder shall introduce the bicycle lane symbol and signs along the shoulder as one approaches the intersection in either direction.

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, warning and transit-related signing 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 Design-Builder shall identify and install sign structure identification numbers for all overhead and cantilever sign structures. Structure numbers will be provided by the Administration.

The messages, fonts, font sizes, arrows, shields, colors, borders, and type of supports for the overhead and ground mounted signs shall be designed and constructed according to the MD MUTCD. The Clearview font shall be utilized for all positive contrast guide signs. Positive contrast guide signs are signs that utilize white text/copy on a dark colored background (i.e. green, blue, black, brown, etc.)

All Advisory, Regulatory, and Warning Signs and route marker assemblies installed along MD 210 shall be expressway size. **All Advisory, Regulatory, and Warning Signs and route marker assemblies installed along all other roadways shall be standard size.** The sizes of the signs shall adhere to the latest edition of the Maryland State Highway Standard Sign Book and the FHWA Standard Highway Signs Book. The sizes of any existing signs to remain or be relocated shall also adhere to the latest edition of the Maryland State Highway Standard Sign Book and the FHWA Standard Highway Signs Book.

Guide signs indicating left or exit only movements entering or exiting freeways or expressways shall have the action message (i.e. NEXT LEFT, LEFT LANE, EXIT ONLY, etc.) in black legend on fluorescent yellow background. Fluorescent yellow background sheeting shall be used for all yellow traffic signs. When a sign contains more than one background color, the signs shall have two separate borders corresponding to each background color where the background colors meet. If the background colors utilize the same border color, then only one border is necessary where the background colors meet.

All proprietary logos (e.g. Police, etc.) will be provided by SHA. The Design-Builder shall identify the logos required during the definitive design process. Those logos will be provided and installed by SHA onto signs and/or supports furnished and installed by the Design – Builder. The Design – Builder shall

submit a letter to SHA requesting the logos and the required size between the definitive design review and the plan submittal.

All signs greater than 4' x 8' shall be manufactured using extruded aluminum sign material. All new signs for this Project shall be constructed with non-reflective (black copy and background) or retroflective (all other colors) sheeting background and copy. The retroflective sheeting for sign copy shall comply with Section 950.03.07 of the Administration's Standard Specification for Construction and Materials. All retroflective sheeting for sign backgrounds except for fluorescent yellow and fluorescent yellow-green shall comply with Section 950.03.08 of the Administration's Standard Specification for Construction and Materials. All fluorescent yellow and fluorescent yellow-green sign backgrounds shall comply with Section 950.03.07 of the Administration's Standard Specification for Construction and Materials.

3.12.05.02.05 Sign Support Design and Construction

All overhead and cantilever sign structures installed under this Project shall be located at a minimum of 50 feet from any roadway lighting.

For each overhead or cantilever structure location, the Design-Builder shall draw the sign panel(s) and the sign structure on the corresponding completed cross-section. The proper vertical and horizontal clearances, sign sizes and sign structure offsets, number of lanes, and lane widths shall be labeled on the cross-sections. The Design-Builder shall check the cross-sections and profiles at all overhead sign locations and make adjustments as necessary to provide adequate sight distances and ground clearances to the bottom of the luminaire supports. Using the sign structure cross-section, the Design-Builder shall correctly fill out the Administration's sign structure input sheet for each overhead/cantilever sign structure. The sign structure input sheet and associated cross section shall be submitted during the definitive design for Administration review and written comment. Comments on the input sheets will be provided within 21 calendar days and returned to the Design-Builder for revisions, if needed. Once comments to input sheets have been satisfactorily resolved, the Design-Builder shall develop the standard SN-8 and SN-9 sheets for the sign structures. The Administration will provide current SN-8 and SN-9 sheets upon request.

For signs using Breakaway wood supports, Non-Breakaway wood supports, or Non-Breakaway steel supports, the Design-Builder shall utilize the support selection charts provided in the Administration's Traffic Control Device Design manual. For sign structures (Overhead, Cantilever, and Breakaway Steel Ground Mounted) the Design-Builder shall utilize the 4th edition of AASHTO's Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals. All Overhead and Cantilever sign structures shall be selected from SHA's Book of Standards. If an alternate sign structure design is proposed and

agreed upon by the Administration, the CSR for any structural support members shall be limited to 0.90. Alternate sign structure designs for Overhead structures shall be designed for a maximum sign area equal to the overall roadway width multiplied by the height of the tallest sign panel including exit panel(s); Cantilever sign structures shall be designed for a maximum sign area equal to the sign width multiplied by the sign height multiplied by a factor of 1.25. The wind speed to be used in design shall be 100 mph. The structure design life shall be a 10 year recurrence interval for ground mounted signs using breakaway steel supports. For signs using breakaway steel supports, the Design-Builder shall utilize the design assistance software provided by the manufacturer of the breakaway system and follow the ground mounted steel post breakaway system selection process provided by the Administration. All posts except for W6X9 wide flange steel I-beams shall have at least 7 foot clear distance between adjacent posts. All wide flange steel I-beam sign supports shall utilize ASTM A709 Grade 36 steel. All square steel posts shall utilize ASTM A500 Grade B structural tubing.

Sheet aluminum signs on State-maintained roadways shall be mounted on wood supports. Sheet aluminum signs on all other roadways may be mounted on either wood supports or square tubular steel posts. Signs over 32 square feet shall be installed on steel posts, unless otherwise noted by the Administration for a particular sign. Additionally, if the signs are installed at a location where steel posts are required, then extruded aluminum sign material shall be used. All exit gore signs shall be placed on steel supports.

No signs or sign structures will be allowed on bridge overpass structures. No signs shall be banded to utility poles, street lighting poles, and overhead or cantilever sign structure uprights without SHA approval.

Traffic barriers shall be provided for protecting all non-breakaway supports within the clear zone and for new structures within as well as outside the limits of work. Signs shall be placed outside the clear zone wherever possible.

The Design-Builder will be responsible for locating and marking all underground and overhead utilities prior to any signing work beginning.

3.12.05.02.06 Modification to Existing Overhead Signs

The Administration will provide the Design-Builder with blank ‘Structure Verification for Adding, Deleting or Modifying Signs on Existing Structures’ sheets. Any modifications to the existing overhead sign structures, including replacement of sign panels, shall be presented to the Administration for review and written comment. Review and written comments, if necessary, will be provided within 21 calendar days. Upon satisfactory resolution to comments, the Design-Builder shall draft the plans and/or notes using CADD for review with the

SHA.

Modifications to existing overhead signs may require new sign structures. The Design-Builder is fully responsible for determining when new sign structures are required, and for the design and construction of all new sign structures and the removal of existing sign structures no longer needed.

3.12.05.02.07 Sign Lighting

The Design-Builder shall provide sign lighting using LED luminaires for all new and existing overhead and cantilever signs within the Project limits and/or modified by the Project for all those signs that meet the criteria for sign lighting as defined by the SHA Lighting Guidelines. The sign lighting shall be provided in accordance with the lighting section of this RFP. All sign lighting shall be on dedicated circuits. The sign lighting design shall be shown on the roadway lighting plans.

3.12.05.03 Submittals

The Design-Builder shall submit the following items prior to the Final Design Signing Review:

A) Definitive Design Signing Roll Plan;

B) For all proposed sign structures, the Administration's sign structure input sheet for each overhead/cantilever sign structure along with the associated cross-sections; and proposed structure and foundation marks from the Book of Standards.

C) For all existing sign structures, the Administration's 'Structure Verification for Adding, Deleting or Modifying Signs on Existing Structures' sheets.

3.12.06 Pavement Markings

3.12.06.01 Design and Construction Requirements

All temporary pavement markings shall be shown on the Traffic Control Plans (TCP). Temporary pavement markings shall be designed and installed to provide motorist guidance throughout and within the Project limits. Temporary pavement marking tape shall be used on all concrete and HMA final 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 markings 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. Dimensions shall be included for placement of arrows, "only's" stop lines and length of longitudinal left turn lane lines. The plan shall also clearly define locations where pavement markings change color, width, or material. Existing pavement markings that are to remain shall be shown on the plans and locations where proposed pavement markings tie-in to existing pavement markings shall be denoted on the plans.

The Design-Build Team shall be responsible for the design and construction of all pavement markings. For all final pavement marking lane lines, including parallel, acceleration/deceleration lanes for ramps, intersection auxiliary lanes, and Snowplowable Raised Pavement Markers (SRPMS), the following Pavement Marking Material Table shall be adhered to:

Pavement Marking Abbreviations

SRPMs – 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	Interstate Highway/Freeway	---------	Contrast PPPRP with SRPM's	PPPRP
2	Multi-Lane or Divided Highway (other than Interstate/Freeway) AADT ≥ 50,000	PPPRP with SRPM'S	Contrast PPPRP with SRPM's	PPPRP

PAVEMENT MARKING MATERIAL TABLE				
CATEGORY	ROADWAY TYPE	LINE STRIPING MATERIAL		
		Center Lines	Lane Lines	Edge Lines
3	Multi-Lane or Divided Highway (other than Interstate/Freeway) AADT < 50,000	PPPRP with SRPM'S	Contrast PPPRP with SRPM's	PPPRP
	HOT MIX ASPHALT (HMA)			
1	Interstate Highway/Freeway	---------	Contrast PPPRP with SRPM's	PPPRP
2	Multi-lane or Divided Highway (other than Interstate/Freeway) AADT ≥ 50,000	PPPRP with SRPM'S	PPPRP with SRPM's	PPPRP
3	Multi-lane or Divided Highway (other than Interstate/Freeway) AADT < 50,000	Durable with SRPM'S	Durable with SRPM's	Durable
4	2-Lane 2-Way Roadway AADT ≥ 30,000	Durable	------	Durable
5	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.

Crosswalks shall be provided across roads at all signalized intersections as specified in section 3.12.07 Traffic Signals.

All permanent pavement markings installed on the Project shall be listed on the Administration's List of Qualified Permanent Pavement Markings, unless submitted and approved through the Administration's Maryland Product Evaluation List (MPEL) program.

3.12.07 Traffic Signals

3.12.07.01 Traffic Signal Functional Operation Requirements

Based on the general geometric layout included in the RFP, Design Request Forms have been completed and approved for permanent traffic signals at the intersections of Kerby Hill Road/Livingston Road with Ramps to and from MD 210 and modifications to the existing traffic signal at the MD 210/Kerby Hill Road/Livingston Road Intersection. The temporary and permanent traffic signals shall be designed as per the requirements outlined in the Design Request Forms,

and as noted below (if the general geometric layout remains the same at the following intersections):

Kerby Hill Road/Livingston Road at Ramps to/from MD 210

- New traffic signal installation
- Typical signing, marking, and lighting
- Typical signal design layout, features, and materials
- Install phone line for video detection

3.12.07.02 Design and Construction Requirements

3.12.07.02.01 Definitive Design Traffic Signal Roll Plan

The Design-Builder shall prepare a Definitive Design in the form of a traffic signal location roll plan for Administration review that includes all existing signal equipment and Traffic Signal interconnect, and displays all proposed Traffic signal equipment and Traffic Signal interconnect within the Project. The plan shall also display all existing and proposed crosswalks within the Project. Any temporary Maintenance of Traffic (MOT) Traffic Signal Plan(s), and Traffic signal plans showing the phasing of signal construction, shall also be presented at this time.

3.12.07.02.02 Plan Sheet Requirements

The Design-Builder shall prepare Traffic Signal plans to address any new traffic signals, temporary traffic signals, or modifications to existing traffic signals that are required. The traffic signals shall be designed as per the approved Design Request and as specified in section 3.12.07.01 Traffic Signal Functional Operation Requirements for each intersection. All traffic signal plans shall be drawn in accordance with the Administration's Traffic Control Device design manual, CADD standard requirements, and the MD MUTCD.

Design and construction of all permanent traffic signal shall use mast arm signal poles unless otherwise approved by the Administration. The use of diagonal single mast arms is not permitted, unless approved by the Administration. Design and construction of temporary traffic signals may use strain poles or wood poles (if the estimated duration of signal operation is less than one year) with span wires.

LED Lighting shall be provided on signal poles in accordance with SHA's Lighting Guidelines, and shall be coordinated with adjacent existing and/or proposed roadway and/or sign lighting. Electrical cables for intersection lighting shall not pass through the signal cabinet.

Pedestrian signals and pushbuttons shall be installed at crosswalk locations as specified in section 3.12.07.01 Traffic Signal Functional Operation Requirements and the approved Design Request. All pushbutton locations shall be in compliance with the current SHA ADA and Accessible Pedestrian Signal (APS) standards and standards. The traffic signals shall have countdown pedestrian signal heads and APS pushbutton stations at all locations where signalized cross-walks are provided. The Design-Builder shall prepare and submit APS worksheets with the readiness for construction review plans for approval for the APS messages.

All conduits crossing roadways shall be installed perpendicular to the roadway being crossed, unless there are constructability of or utility conflicts. With the exception of conduit being used for non-invasive probes, all conduit crossing underneath a roadway shall be 4 inch Schedule 80 rigid PVC conduit. Conduit used for the installation of non-invasive probes shall be 3 inch Schedule 80 rigid PVC conduit. Three (3) inch Schedule 80 rigid PVC may be used between handholes and pedestal poles. Two (2) inch Schedule 80 rigid PVC conduit may only be used for power feeds.

3.12.07.02.03 Interconnect Plans

The Design – Builder shall prepare traffic signal interconnect plans. Interconnect shall be installed in accordance with the Design Request provided by SHA and Section 3.12.07.01 Traffic Signal Functional Operation Requirements. Interconnect plans shall be drawn at a scale of 1"=50'. The Design–Builder shall obtain all existing interconnect information and all existing interconnected signals shall remain connected under the final design. Interconnect plans shall include controller cabinet locations, conduits, handholes, sampling stations, wiring diagram, cables, construction details, and equipment list in accordance with SHA's design and CADD requirements. All existing traffic signal interconnect shall be maintained throughout construction, which may require relocation or temporary interconnect. Along any run of existing interconnect there shall be no net increase in splice points. The Design – Builder shall utilize twelve-pair communication cable for all proposed interconnect. All impacted or damaged interconnect cables shall be replaced in-kind.

The Design – Builder shall be solely responsible for all Work and costs associated with maintaining communication cable throughout construction for all signals. The Design – Builder shall be responsible for utility pole removals required when relocating existing interconnect. All interconnect shall be relocated prior to roadway construction in order to assure that interconnect can be maintained throughout construction. The Design – Builder shall be responsible for relocation of any existing interconnect or fiber optic cables impacted by construction. The Design – Builder shall coordinate with SHA/Prince George's County to facilitate the relocation of existing interconnect and fiber optic cables and equipment. All proposed splices shall occur in signal or splice cabinets. If a section of

interconnect run is not long enough to be relocated, the entire section of cable shall be replaced. The Design – Builder shall be responsible for obtaining all permits required for placing interconnect on utility poles and shall be responsible for all associated costs.

3.12.07.02.04 Utility Requirements

The Design-Builder shall be responsible for locating and marking all underground and overhead utilities prior to any signal installation work. The Design-Builder shall be responsible for all Work, materials, and costs associated with obtaining power (including coordination with the utility company). Electric costs for maintaining power throughout construction for all traffic signals and other electrical work required for this Project shall be the responsibility of the Administration. The Design-Builder shall be responsible for completing all electrical service application materials necessary for obtaining and/or removing service from the appropriate power company. All materials shall be submitted to the power company through the Administration. The Design-Builder shall use 200A Metered Service Pedestals (see TYP. 807.07-01 and 807.07-02) at all traffic signal locations, unless otherwise noted by the Administration. The Design-Builder shall install conduit between the metered service pedestal and the nearest handhole (bypassing the signal cabinet) for intersection lighting. The Administration will be responsible for all on-going electric costs of proposed signal equipment after the signals have been Accepted for Maintenance by the Administration. Metered Service Pedestals shall only be used to service traffic signal equipment and related intersection lighting, unless otherwise noted by the Administration. The current party responsible for any existing metered service that needs to be upgraded or replaced will continue to be responsible for all on-going electric costs after the Project is complete. For each location requested, it is the Design-Builder's responsibility to complete all paperwork, coordinate with the utility company, and schedule all utility connections so as to not adversely affect the project schedule.

3.12.07.02.05 Sight Distance Requirements

The Design-Builder shall ensure all traffic signal heads for existing, temporary, and permanent conditions can be seen by all approaching traffic at the required sight distance at all times during and after construction. The Design-Builder shall also provide calculations that the sight distance will be adequate for vehicles approaching signalized intersections to see the back of the queue and decelerate to a stop condition for all approaches to traffic signals under existing, temporary, and permanent conditions.

The Design-Builder shall prepare and present sightline plans for all traffic approaches to the Administration for review and written comment.

The Design-Builder shall also prepare and submit to the Administration for review and written comment sightline profiles for all overhead signs, bridges, and hazard identification beacons that are on traffic signal approaches. The Design-Builder shall prepare and present to the Administration for review and written comment separate sightline plans and profiles for each MOT phase that has different sightlines approaching a traffic signal. If sight lines do not meet the MD MUTCD requirements, the Design-Builder shall provide a recommendation for meeting the requirements to the Administration, such as red signal ahead warning signs or flashing beacon signs.

3.12.07.02.06 Materials

Traffic signals shall be designed and constructed in accordance with the following:

A) Using Video Detection systems for vehicle detection;
B) Using passage detection on intersection approaches, as per SHA's Traffic Control Devices Design Manual;
C) Using base mounted (NEMA size S) Maryland State Econolite Traffic Signal Cabinets wired in accordance with Administration specifications for all permanent traffic signals. Pole mounted (NEMA size 5) cabinets may be permitted for use at temporary traffic signals only. All signal cabinets, controllers, and rack mounted modules will be supplied by the Administration. The Design-Builder shall be responsible for delivering the assembled cabinet from the Administration's Traffic Signal Shop to the site and installing. The Administration will provide final connection of all cables within the cabinet;
D) Wiring required;
E) Using Light-Emitting Diode (LED) traffic signal heads and countdown pedestrian signal heads;
F) Using schedule 80 rigid PVC conduit for underground installations;
G) Furnishing and installing required signal related signing; and
H) All exposed conduit shall be constructed of galvanized rigid steel.
I) The addition of S cabinet uninterruptable power supply (UPS) battery backup

3.12.07.03 Temporary Traffic Signals

The Design – Builder shall provide temporary traffic signals as required by the traffic control plans. The Design – Builder shall perform all studies and prepare all design requests (DRs), as necessary, for placement of Temporary Traffic signals and present all information to SHA for review and written comment.

3.12.07.04 Submittals

The Design-Builder shall submit the Definitive Design Traffic Signal Roll Plan prior to advancing design to the readiness for construction review. The Design-Builder shall submit the traffic signal roll plan at the same time of submitting the signing roll plan.

3.12.08 Lighting

3.12.08.01 Design and Construction Requirements

For existing lighting, the maximum outage time for luminaires shall be 24 hours unless otherwise approved by the Administration. All proposed luminaires within the Project limits shall be working upon completion of the Project. All existing (to remain) luminaires within the Project limits that were working at the time of conducting the existing lighting inventory shall be working upon completion of the Project.

All underground lighting conduits shall be schedule 80 rigid PVC conduit. All exposed conduits shall be galvanized rigid steel conduit.

All roadway lighting installed under this Project shall be located a minimum of 50 feet from any overhead or cantilever structure.

All lighting cabinets shall be designed and constructed with at least 20 amps spare capacity for the Administration's future use.

All proposed lighting equipment shall be located such that it can be readily maintained by personnel of the maintaining agency. Where possible, the Design-Builder shall locate signal and lighting cabinets in the same quadrant of the interchange. Lighting placed on traffic signal equipment shall be serviced from a metered service pedestal. Each luminaire mounted on a signal structure shall be equipped with a photocell. Power supply for signal structure mounted lighting and the traffic signal may be installed in the same conduit system. Power supply for roadway lighting shall be installed in separate conduits and on independently metered circuits for respective jurisdictional owners.

The Design-Builder shall provide voltage drop calculations for all circuits. The voltage drop for each branch circuit shall not exceed three percent for new circuits and five percent for existing circuits, assuming a cable temperature of 40 degrees Celsius. A minimum of two branch circuits shall be used for each continuous succession of lighting structures. All lighting circuits shall have balanced lighting loads. The voltage drop for each feeder circuit shall not exceed the maximum recommended by the National Electric Code (NEC).

Lighting circuits shall be direct-buried duct cable unless under roadway surfaces, in structures, or in locations where protection from surface loading is needed. Two conductor duct cables shall be used for all roadway lighting circuits. Four conductor duct cable is permitted for sign lighting circuits. Only the conductors that serve the lighting structures shall enter the foundation of the lighting structures. All other conductors shall

remain un-spliced and bypass the foundation. The Design-Builder shall furnish and install single conductor cables in Schedule 80 rigid PVC conduit under all roadway surfaces. Single conductor cables shall be used any place cables are to be installed in conduit. For cable runs in bridges and/or parapets, cables sizes equal to or less than #6 AWG shall be used. The Design-Builder shall provide electrical manholes (or vaults) and connector kits to splice the conductors. The Design-Builder shall provide no more than 30 connector kits in each manhole and no more than 50 connector kits in each electrical vault. No in-ground splices of electrical cables shall be permitted for any reason. The use of 'splitbolt' type connectors for splicing conductors shall not be permitted. The Design-Builder shall use waterproof electrical splice kits (sealed with silicone gel) or approved equal for splicing conductors in non-breakaway applications such as manholes and other similar underground locations. No electrical handholes/handboxes/manholes shall be placed in drainage ditches. Electrical manholes shall be constructed of concrete. Manholes constructed of composite materials will not be permitted for use on the Project. Electrical manholes shall not be installed in drainage ditches. All electrical manholes shall be installed with underdrain as shown in Maryland Standard No. MD 811.04. The stone surrounding these structures shall not be considered a suitable outfall. Underdrain shall be connected to a suitable outlet such as a drainage pipe or structure. If a drainage structure is not available, other options, such as running the underdrain outlet pipe to a nearby slope, shall be developed and submitted for the Administration's approval. The Design-Builder shall abandon existing conductors between poles that are to be removed. Power supply for lighting (other than that mounted on signal structures) shall be installed in separate conduit (including cabinets, handboxes, handholes, and manholes/vaults) and on independently metered circuits for respective jurisdictional owners.

All underground lighting conduits shall be constructed of Schedule 80 rigid PVC conduit. All exposed conduit shall be constructed of galvanized rigid steel. Conduit fill ratios shall not exceed 25% of conduit area.

Any existing lighting structure that is impacted by construction of this Project shall be disconnected, reconnected, and made fully operational by the Design-Builder as part of this Project unless it is being removed. All abandoned cables shall be made safe.

The Design-Builder shall remove existing light poles that are no longer required due to construction of the Project. The equipment shall be the property of the Design-Builder upon removal. The Design-Builder shall notify the owner of the lighting being removed at least two weeks in advance of the scheduled equipment removal.

All light poles that are not protected by traffic barrier and are in the clear zone as defined in the AASHTO Roadside Design Guide shall be installed on a breakaway transformer base complying with the Maryland Book of Standards. Light poles shall not be installed in front of traffic barrier.

The lighting system shall utilize cabinets, conduits, and handboxes/manholes/vaults/junction boxes separate from the traffic signal equipment.

The Design-Builder shall place luminaries approximately one foot over the pavement marking edge line. To avoid foundation conflicts, the luminaire location may be adjusted approximately 3 feet over the pavement marking edge line, subject to review and concurrence by the Administration.

3.12.08.01.01 Definitive Design Lighting Roll Plan

A lighting roll plan shall be presented at the definitive review and concurrently with the signing and signal roll plans for review and written comment by the Administration. The lighting roll plans shall include proposed locations for all lights and photometric calculations supporting the light locations. The lighting roll plan shall be submitted to the Administration for consultation and written comment prior to the Design-Builder proceeding with the design, installation, or modification of lighting.

The Design-Builder shall provide spacing computations showing illuminance and veiling luminance calculations, as appropriate. The calculations shall include uniformity ratios (average-to-min and max-to-min), point-by-point computations, and a summary of the minimum and average maintained lighting levels and the critical veiling luminance ratios. The Design-Builder shall apply a light loss factor of 0.64 when computing photometrics. The computations shall use the lamp lumen requirements in Section 950.12.02 of the Administration's Standard Specifications for Construction and Materials. For lamp types not listed in Section 950.12.02, the Design-Builder shall use the values provided by the manufacturer. The light loss factor and lamp lumens shall be provided with the illuminance and veiling luminance calculations.

The Design-Builder shall design, fabricate, and install all roadway lighting shown on the definitive design plan within 5 feet of the location shown on the definitive design plan or as otherwise approved by the Administration.

3.12.08.01.02 Plan Sheet Requirements

The Design-Builder shall prepare and present lighting plans with a scale appropriate for the Project, generally 1"=50'. Plans shall include existing and proposed geometry, existing and proposed utilities, right-of-way, landscape features, applicable drainage features, ditch lines, applicable structural facilities, and other information required for coordination of utilities. Plans shall show location of new lighting, type and mounting height of poles, type and wattage of luminaires, length of luminaire arms, removal and relocation of existing lighting, conduit, circuit routings, cable types and installation method, manholes/junction boxes, splice locations with appropriate connector kits, ground rod locations, signs to be lit, electrical service locations, and other details pertinent to the construction. The plans shall include standard Administration identifiers for light

poles and manholes as well as standard designations for cable sizes. The plans shall include a panel schedule (including pole and base mounted lighting cabinets and metered service pedestals) showing the circuit breaker loads and equipment connected to each circuit breaker. The plan shall include a schedule of light poles, a sign lighting schedule, and a schedule of enclosures (manholes/vaults/junction boxes.) Voltage drop calculations shall be provided concurrently with the lighting plan sheets.

For each lighting submittal, the Design-Builder shall submit all available lighting sheets (updated and previously submitted) as one complete package, unless otherwise specified by the Administration.

3.12.08.01.03 Existing Lighting

All impacted existing roadway lighting shall be replaced by the Design-Builder. Lighting shall incorporate the same luminaire and pole type as on the rest of the roadway in order to maintain consistency.

The Design-Builder shall design and construct the lighting system consistent with operational and engineering requirements of the utility company and owning/maintaining agencies. For locations where luminaires are attached to a utility pole, the Design-Builder (as a part of the utility relocation effort) shall contact the owner of the lighting to coordinate relocation of the light fixture. The Design-Builder is responsible for coordinating agreements between the owner and the utility company.

The Design-Builder shall remove existing light poles that are no longer required due to construction of the Project. The equipment shall be the property of the Design-Builder upon removal. The Design-Builder shall notify the owner of the lighting being removed at least two weeks in advance of scheduled equipment removal.

3.12.08.01.04 Intersection Lighting

All intersections (both signalized and unsignalized) along Kerby Hill Road and Livingston Road 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. A photometric analysis at each intersection is required as part of the Definitive Design roll plan.

3.12.08.01.05 Sign Lighting

Lighting for new sign structures shall consist of individually mounted sign lighting fixtures. Signs shall be only lit from beneath the signs. Acceptable lighting shall consist of a long-life system, meeting the following requirements:

A) Using Light Emitting Diode (LED) luminaires approved by the Administration;
B) Having a functional life time of at least 100,000 hours, including lamp and ballast;
C) Having < 50% failure of any component at 60,000 hours, including lamps; and
D) Having a lamp lumen depreciation not worse than 70% at 60,000 hours.

All sign lighting shall be on dedicated circuits. For each sign structure a minimum of two circuits shall be used. The sign lighting design shall be shown on the roadway lighting plans. The design of luminaires for sign illumination using long-life lighting systems shall be in accordance with OOTS standard lighting charts.

All other sign lighting systems shall be designed to provide an average of 20 to 40 foot candles with 6:1 max to min uniformity. Photometric calculations shall be on a 1 foot grid over the entire surface of the sign. All existing sign lighting within Project limits that is impacted by construction activities shall be maintained throughout construction.

3.12.08.01.06 Underpass Lighting

The Design-Builder shall provide nighttime underpass lighting as necessary to maintain continuity of roadway lighting and where warranted by governing documents in Table 3 of section 3.12.02.01 References. The underpass lighting shall provide lighting in daytime periods if warranted. The Design-Builder shall provide analysis, including photometric and height to length ratios, at each location, to justify installing or not installing underpass lighting. Areas being evaluated shall be noted on the Definitive Design roll plan. A photometric analysis at each underpass is required as part of the Definitive Design roll plan.

3.12.08.01.07 Low Level Lighting

Partial Interchange Lighting (PIL)
Low level partial interchange lighting shall be provided at the interchange of MD210 & Kerby Hill/Livingston Roads. It shall consist of luminaires located in the general areas where entrance and exit ramps connect with through traffic lanes on a freeway (i.e. lighting between the entry gore and the end of the acceleration ramp or exit gore and the beginning of the deceleration ramp). All deceleration lanes shall be illuminated from the beginning of the deceleration lane (including the taper) or 500 feet upstream of the painted nose (whichever is shorter) to 140 feet beyond the physical gore nose. Light poles shall not be placed inside the gore

within 100 feet of the physical gore nose along mainline lanes. Mainline lanes downstream of the exit ramp gores shall be illuminated to 140 feet beyond the physical gore nose. All acceleration lanes shall be illuminated from the physical gore nose to the end of the acceleration lane (including the taper) or 500 feet beyond the painted nose (whichever is shorter). If the requirements for interchange lighting extend beyond the Project Limits, it will be the responsibility of the Design-Builder to design and construct that lighting. The Administration will secure all additional environmental approvals, easements, and/or right-of-way required by the Design-Builder's approved lighting concept. A photometric analysis for Partial Interchange Lighting is required as part of the Definitive Design roll plan.

The Design-Builder shall design and construct lighting that consists of LED cobrahead style luminaires mounted at a maximum of 40 feet above the pavement with Type III full cutoff optics.

Non-Interchange Lighting

In locations where the Project will impact existing SHA and Prince George's County lighting, lighting shall be replaced by the Design-Builder. Lighting shall incorporate the same luminaire and pole type as on the rest of the roadway in order to maintain consistency. A photometric analysis for Non-Interchange Lighting is required as part of the Definitive Design roll plan.

3.12.08.01.08 Leased Lighting

For locations where luminaires are attached to a utility pole, the Design-Builder (as part of the utility relocation effort) shall contact the appropriate agency to coordinate relocation of the light fixture or installation of new light fixtures provided photometric analysis supports the changes. In cases where the photometric analysis supports the change, the Design-Builder shall also develop lighting plans for approval. The Administration will be responsible for coordinating agreements with the utility company.

The locations where there are impacts to the County leased lighting from PEPCO, the County will require HPSV (with flat lens) on Kerby Hill Rd, Livingston Rd and on Murray Hill Dr. Due to future maintenance responsibilities by PEPCO, the design of the electrical infrastructure system, conduits, cables etc. will be performed by a third party.

The design for the Prince George's County street light must be in compliance with Prince George's County DPW&T Specifications and Standards for Roadways and Bridges to ensure adherence to the County's standards when developing the necessary plans for either street lighting, signing, traffic signals, etc.

A Street Light check list has been provided as guidance in developing the required Prince George's County Street Light Plan.
Please find the below link to Prince George's County Department "Specification and Standards for Roadways and Bridges".

http://www.princegeorgescountymd.gov/sites/DPIE/Resources/Forms/Inspection%20Forms/DPWT.Publication_SpecificationsAndStandardsForRoadwaysAndBridges_12.12.13.pdf

3.12.08.01.09 Pedestrian Lighting

The Design-Builder shall be responsible for providing street lighting along County maintained facilities in accordance with Prince George's County requirements and the standards noted in Table 3. A photometric analysis for Pedestrian Lighting is required as part of the Definitive Design roll plan.

3.12.08.01.10 Temporary Lighting

All existing roadways which have roadway lighting shall remain illuminated at IES minimum levels for the duration of the Project unless approved otherwise by the Administration.

The Design-Builder shall maintain all existing lighting within the Limits of Work throughout construction. Where temporary lighting is needed to maintain the existing lighting levels in the Project area, the Design-Builder shall install and maintain temporary lighting (cobra heads attached to wood poles). Temporary overhead electrical service is acceptable for non-breakaway poles. The Design-Builder shall remove temporary lighting when no longer needed. The Design-Builder shall be responsible for the power costs of any and all temporary lighting that may be required and it is the Design-Builder's responsibility to schedule all utility connections.

3.12.08.01.11 Electrical Service for Lighting

The Design-Builder shall be responsible for locating and marking all underground and overhead utilities prior to any lighting work beginning. The Design-Builder shall be solely responsible for all Work, and materials, and costs associated with obtaining power (including coordination with the power company). Electric costs for maintaining power throughout construction for all lighting facilities and other electrical work required for this Project shall be the responsibility of the Administration. The Design-Builder shall be responsible for completing all electrical service application materials necessary for obtaining service from the

appropriate power companies. All materials shall be submitted to the power company through the Administration. The Design-Builder shall contact all utility companies to fulfill requirements to determine the location of all existing and proposed utilities, obtain power company requirements for service and obtain power company approval for service location(s). For each location requested, it is the Design-Builder's responsibility to complete all paperwork, coordinate with the utility company, and schedule all utility connections so to not adversely affect the Project schedule.

Lighting systems owned by different jurisdictions shall have separate power sources derived from the utility company. Exceptions shall require written approval and agreement of all jurisdictions involved and will require separate circuits for each jurisdiction's electrical elements fed from the electrical service equipment.

3.12.08.01.12 Light Pollution

For all proposed roadway lighting, the maximum allowable vertical and horizontal illuminance at residential property lines shall not exceed 0.05 foot-candles (fc). House side shielding shall be provided where necessary to achieve the 0.05 fc horizontal or vertical illuminance requirement. House side shielding shall also be provided with all roadway lighting within 75 feet of a residential structure. Photometric analyses for light trespass at residential property lines is required and the analysis shall utilize a light loss factor of 1.00.

3.12.08.02 Submittals

The Design-Builder shall submit the Definitive Design Lighting Roll Plan prior to or at the same time of submitting the Definitive Design Signing Roll Plan.

3.12.09 Submittals

The Design – Builder shall submit traffic design plans as follows:

A) Definitive Design Signing, Traffic Signal, and Lighting Roll Plans shall be submitted concurrently. The Design-Builder shall be responsible for coordinating a review meeting at the Office of Traffic and Safety (OOTS) to discuss comments on the Definitive Design roll plans. The Administration will provide written comments to the Design-Builder on the Definitive Design roll plans within 28 days of submittal or within seven (7) days following the review meeting at OOTS, whichever is later. The Design-Builder shall not advance design to the readiness for construction review until approval has been granted by the OOTS. It may be necessary to resubmit the roll plans in order to obtain this approval.

B) For all proposed overhead/cantilever sign structures, SHA's sign structure input sheets, along with the associated cross-sections shall be submitted and approved by OOTS prior to preparing SN-8 and SN-9 sheets for the readiness for construction review.

C) For all existing sign structures being modified, SHA's "Structure Verification for Adding, Deleting or Modifying Signs on Existing Structures" sheets shall be submitted and approved by OOTS prior to the readiness for construction review.

D) For all proposed ground mounted signs, cross sections shall be submitted with the readiness for construction review. Each cross section shall show the proposed sign, dimensions for each sign post length, and labels for the lateral offset and sign mounting height relative to the ground and roadway.

E) Readiness for construction review plans shall be submitted along with SHA's APS worksheets for all APS messages and SHA's TEDD Design Checklist.

3.12.10 Advisory Speeds

The Design-Builder shall be responsible for providing a report to the Administration that documents all advisory speeds. The report shall include an investigation of the horizontal geometrics based on AASHTO roadway design guidelines. The investigation shall define the critical stopping sight distance for each curve. These above values shall be field verified to determine if the actual conditions provide the critical distances required. Pavement conditions of the roadway shall also be noted. Photographs for each curve shall be taken and included in the report. The Design-Builder shall evaluate curves with an electronic accelerometer (CurveRite Model 1100 or approved equivalent). All electronic accelerometer measurements shall follow the manufacturer's instructions. The field testing shall not exceed the posted regulatory mainline speed limit and shall be stopped if g-force measurements exceed 0.40 g-ft/sec^2. The recommended average g-force for determining advisory speeds is 0.28 g-ft/sec^2 and the advisory speeds should be posted in 5 MPH increments.

3.12.11 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.

3.12.12 Traffic Control Device Verification

The Design-Builder shall schedule meetings with the Administration to verify traffic control device work as follows:

A) At the completion of all cabling and wiring and prior to electrical utility service connection; and

B) Prior to traffic control device activation.

TC 3.13 LANDSCAPE AND REFORESTATION DESIGN PERFORMANCE SPECIFICATIONS

3.13.01 Preservation of Trees and Woodlands

The Administration has imposed restrictions on construction activities that increase the removal of existing trees. The Administration will also require that the project design minimize the amount of trees removed and avoid or minimize impacts to existing tree stands and specimen trees through sound tree protection measures in accordance with the requirements of the Administration's 2008 *Standard Specifications for Construction and Materials* (*SSCM*) Section 120-Tree Preservation Area. Impacts to specimen trees, defined as trees having a 30 inch or greater diameter at breast height (DBH) or trees having a DBH of 75% or greater of the State or County Champion of the species, shall be avoided where feasible.

A. All impacts to individual trees, woods, and forest areas occurring as part of this project, including, but not limited to: crown and branch pruning, tree clearing, and root pruning shall be in accordance with the MD Reforestation Law and/or Roadside Tree Law as applicable and Section 120-Tree Preservation Area. Tree removals 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 **14.08 acres.** These calculations are based on the Forest Impact Plans from SHA.

B. The Design Builder is advised of the expansion of the Maryland Department of Agriculture (MDA) Quarantine due to the discovery of Emerald Ash Borer in Howard and Anne Arundel Counties in 2011. Per Plant Protection Order #11-02, effective July 11, 2011, regulated materials are not to be moved out of quarantine areas. Regulated areas include all 14 Maryland Counties west of the Chesapeake Bay and Baltimore City. Regulated materials for the Emerald Ash Borer Quarantine include the following:
    1. Emerald Ash Borer
    2. Hardwood firewood
    3. Any piece of Fraxinus spp. (Ash), including cut or fallen, living or dead.
    4. Any uncomposted Ash chips or uncomposted Ash bark, larger than 1 inch in any two dimensions.

C. The Design-Build Team shall employ the services of an individual who is an ISA Certified Arborist, MD Licensed Tree Expert, MD Registered Forester, or Maryland Licensed Landscape Architect, who shall conduct an on-site inspection to locate and identify any specimen or significant trees within the limits of disturbance plus 30 feet beyond the limits of disturbance.

        a. Specimen trees are defined as trees with a Diameter at Breast Height (DBH) of 30" or greater or at least 75% of the

DBH of the MD State or Champion of the species, whichever DBH measurement is smaller.

b. For the purpose of this contract significant trees are defined as trees a DBH of 24 inches or larger.

D. The Design-Build Team shall employ the services of an ISA Certified Arborist and/or MD Licensed Tree Expert as necessary who will be responsible for:

a. Preparing a Tree Impact Avoidance and Minimization Report as described under Deliverables and consistent with the *SSCM* Section 120-Tree Preservation. The Report does not include the advance clearing and grubbing plan provided by SHA. The Report shall be submitted to the Office of Environmental Design, Landscape Operations Division (OED-LOD) for approval, prior to installation of erosion and sediment controls.

b. Direct oversight of tree work as required by State Law and/or as described in Sections 712 through 716 in the SSCM.

c. Maintaining project compliance with the MDA Quarantine on the Fraxinus (Ash) species; to include providing a plan for disposal of Ash trees impacted by the project, subject to the approval of MDA.

E. The Administration has obtained a Reforestation Site Review Approval for impacts to trees and forest areas within the proposed limits of work shown on the Forest Impact Plans. The Design-Build Team shall be responsible for the complete process of preparing the documentation and submitting required information to OED-LOD for review of conformance with the current MD Department of Natural Resources Forest Service (DNR-FS) Reforestation Site Review Approval. Tree and forest mitigation plantings shall be coordinated with, and approved by the Administration.

a. The Design Build Team shall provide necessary documentation for required modifications to the approved Reforestation Site Review to OED-LOD for submittal to DNR-FS in the event that work will impact trees beyond the permitted limits. The Design Build Team will be required to attend site review meetings with SHA/DNR-FS if so requested by the Administration. Compliance with additional DNR-FS requirements or conditions associated with the modification of the Reforestation Site Review Approval shall be the responsibility of the Design Build Team, in coordination with the Administration.

F. The Design-Build Team is responsible for maximizing on-site individual tree and/or reforestation mitigation for impacts to trees and/or forest areas per the Roadside Tree Law or MD Reforestation Law as applicable. On-site reforestation

described in this document shall be made part of this contract. Proposed changes requiring revisions to the Reforestation Site Review Approval shall be coordinated with the Landscape Architecture Division (OED-LAD), OED-LOD, and DNR-FS. Compliance with DNR-FS requirements or conditions associated with the modification of the Reforestation Site Review Approval shall be the responsibility of the Design Build Team. The preference for the location of reforestation is cleared land within the project limits that is not otherwise allocated for reforestation for (a) current or future SHA project(s) or reserved for future roadway widening or other improvements.

3.13.02 Guidelines and References

3.13.02.01 Guidelines

Design and construct the Landscape and Reforestation plantings in accordance with the relevant requirements of the Guidelines listed by priority in Table 1, unless otherwise stipulated. Guidelines 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 prior to proceeding with design. The most current version of each Guideline shall be used.

Table 1

Guidelines for Landscape

Priority	Author or Agency	Title
1	SHA	2008 Standard Specifications for Construction and Materials
2	SHA	Maryland State Highway Landscape Design Guide
3	SHA	Integrated Vegetation Management Manual for Maryland Highways
4	MDE	2000 Maryland Stormwater Design Manual, 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	COMAR	Nutrient Management Law

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Table 1

Guidelines for Landscape

Priority	Author or Agency	Title
14	SHA	Storm Water Management Safety Policy
15	SHA	Maryland State Highway Administration Stormwater Management Site Development Criteria

3.13.02.02 References

Use the references listed in Table 2 as supplementary materials for the design and construction of the Landscape plantings. These publications have no established order of precedence. Should the requirements in any Guideline below conflict with those in another, OED-LAD, in consultation with other SHA divisions and State and Federal Agencies, will determine which guideline will apply.

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
USDA NRCS	USDA NRCS, The Plants Database http://plants.usda.gov
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	The Maryland Roadside Tree Law Title 08 Department Of Natural Resources Subtitle 07 Forest And Parks Chapter 02 Roadside Tree Care

3.13.03 General

The Design-Builder shall design and construct Landscaping and Mitigation Plantings associated with the Project in accordance with these specifications.

A. The Design-Build Landscape Architect shall prepare a set of Landscape Plans for Landscaping, Reforestation, and other Plantings. Plans shall be at 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 (LAD) and Landscape Operations Division

(LOD), for review and approval. Roadside Landscape and Reforestation Plans should include the following information:

1. Vicinity Map of site location for on-site areas.

2. Critical Root Zones for individual significant or specimen trees, as defined by the Maryland Department of Natural Resources: Measured from the center of the trees trunk; 1 foot of radius per inch of DBH (Diameter at Breast Height), for trees 30" DBH or less; and 1.5 feet of radius per inch of DBH for trees greater than 30" DBH.

3. Tree preservation details including but not limited to fencing, fertilizing, root aeration, signage, and root pruning/sequencing of construction indicating any additional requirements for tree preservation not identified in the specifications.

4. Environmental/surface features, extending at least 100' beyond Property Line or Right-of-Way of adjacent parcels. Ownership and parcel numbers should be identified for each adjacent parcel.

5. Existing roadway and incidental structures, including utilities.

6. Proposed Roadway Improvements, including traffic control devices, highway and incidental structures, drainage features and SWM facilities, utilities, etc.

7. Limit of Disturbance

8. Density and quantity of plantings area provided for mitigation

9. A schedule of materials, indicating plant quantities for each type and size of plant material, proper nomenclature for plant species, root of materials; B&B or Container Grown (CG) and proposed spacing.

10. Defined limits of mowing and limits of mulching where applicable.

11. Additional information as required by the Administration.

B. The Design-Build Team shall coordinate the Landscape Plans with all other elements of work to be performed under the Contract including, but not limited to: grading, stormwater management facilities and ancillary structures, drainage swales, storm drain, stormwater management BMP outfalls and cross culvert outfalls, utilities, paved areas, maintenance accessways, and traffic control devices, and lighting, bridge walls and noise walls.

C. Landscape Plantings required as part of the stormwater management plans shall be coordinated with the landscape and reforestation plans to ensure a unified planting theme is created for the project.

D. Landscaping shall conform to the Administration's *Integrated Vegetation Management Manual for Maryland Highways.*

3.13.03.01 Landscape and Reforestation Preliminary Design Meeting.
The Design-Build Team shall conduct an on-site meeting and design charrette with representatives of the Landscape Architecture Division (OED-LAD) and Landscape Operation Division (OED-LOD) to discuss and review the Preliminary Landscape Plans. The Design-Build Team shall schedule this meeting early in the design process to ensure adequate opportunity for coordination and integration with other engineering and design disciplines.

A. Preliminary Landscape Plans shall be prepared by the Design-Build Team.

1. The development of the Preliminary Landscape Plans shall be done in close coordination with the development of the various engineering plans to identify and reduce any potential conflicts.

2. The preliminary plans shall be at a scale appropriate for the project but no less than 1''= 50' and may include graphics, sketches and illustrations to convey the Landscape Architect's design intent in complying with the requirements of RFP.

3. Information shown on the Preliminary Landscape Plans shall include, but not be limited to: existing conditions, proposed and existing utilities, proposed roadway and paved areas, tree preservation areas, reforestation areas, general plant types, locations and potential species selections, stormwater management facilities and landscaping concepts, cut and fill lines, limit of disturbance lines, right-of-way lines, and other information deemed necessary for adequately evaluating the proposed planting locations.

B. The Design-Build Team shall prepare meeting minutes and distribute them to attendees for review and comments. After approval of the Preliminary Landscape Plans by OED-LAD, the Design-Build Team may then begin to develop Semi-final and Final Landscape Plans.

C. In the event that unexpected site conditions are encountered or revisions to other design elements occur during the design process that affect the design integrity of the approved preliminary plan, it is the responsibility of the design-build team Landscape Architect to inform OED-LAD immediately of the situation and recommend remedies that may be considered by the Administration.

3.13.03.02 General Landscape Design and Construction Requirements
In addition to other requirements provided in the Contract Documents, the Design-Builder shall design, construct, and establish landscape and mitigation plantings according to the following criteria:

A. The Design-Builder shall be responsible for determining whether existing subsoil and topsoil in salvageable condition is available in sufficient quantities for proposed work.

1. The Design-Builder shall contact the Office of Materials Technology Soils and Aggregate Technology Division (OMT-SATD) to request sampling and testing of all areas proposed for salvaging of subsoil and/or topsoil.

2. If OMT-SATD determines that salvageable subsoil and/or topsoil is available, the Design-Builder shall contact OED-LOD to obtain a Nutrient Management Plan. If OMT-SATD determines that salvageable subsoil and/or topsoil is not available on the project, the Design-Builder shall submit a Source of Supply for furnished subsoil and/or topsoil.

3. The Design-Builder shall ensure that soil which is to be planted, seeded, or sodded is properly prepared and/or amended in accordance with an approved Nutrient Management Plan (701.03.01 (b) *SSCM*) to provide successful plant establishment.

4. The Design-Builder shall provide the appropriate soil profile, including subsoil and topsoil, where necessary for proposed vegetative treatment and/or landscaping as per the Concept Plans or as specified in the Contract Documents. Subsoil quantities indicated on the Concept Plans in locations of paving removal are approximate and may require adjustment to comply with the following:

a. A minimum of 12 inch depth subsoil is required in all areas to be landscaped, except where approved by the Administration. This requirement may be reduced or waived on steep slopes and engineered reinforced slope systems at the discretion of the Administration.

b. In locations where individual landscape trees and shrubs in planting pits or planting beds are to be installed, a minimum of 18 inch depth subsoil is required.

c. Install a minimum of 4 inch depth topsoil in Turfgrass Establishment and Turfgrass Sod Establishment areas. This requirement may be reduced or waived on steep slopes and reinforced slope systems at the discretion of the Administration.

d. Install a minimum of 6 inch depth topsoil in planting bed locations and in curbed medians that are to receive Turfgrass Establishment, Turfgrass Sod Establishment, or planting.

5. The Design-Builder shall be responsible for removing unsuitable subgrade, loosening highly compacted subgrade, and furnishing additional subsoil and topsoil as necessary to provide successful plant establishment.

B. If the Design-Builder or SHA identifies a conflict between the Landscape Plans and other plan sheets or as-built conditions, the Design-Builder shall be responsible for modifying the plans to the satisfaction of OED-LAD.

C. Areas used for stormwater management shall not be used for Reforestation plantings or Landscape plantings other than what is required or recommended as part of the stormwater management design performance specifications or as according to the Guidelines referenced or contained in the Contract specifications.

D. The Design-Builder shall furnish seed and seed mixes according to the *SSCM* and in accordance with applicable State and Federal Law.

E. Plant selections shall be appropriate for the field environmental conditions of the planting site, including microclimate, air and water-borne salt, drainage, soil chemistry and pH. Recommended plant species, sizes, forms, and spacing or density requirements are listed in each of the Landscape Zones. Requests for substitution of other species, selections, and cultivars, sizes, forms, or root conditions are to be submitted in writing will be reviewed by OED-LAD and approved where appropriate.

F. **Utility and Safety Setbacks**. The Design-Builder shall avoid conflicts between trees and shrubs and existing and proposed/relocated utilities during design and shall be responsible for resolving conflicts during construction, subject to approval by OED-LAD.

1. Trees and shrubs shall be planted a minimum of 7 ft. plus half the pipe/culvert diameter or other underground utility from the centerline of cross culverts, or pipes. Additional setbacks may be required at the discretion of the utility owner or the District Utility Engineer.

2. Trees which reach a height of 25 ft. or greater under typical highway conditions shall not be installed within 20’ of overhead electric lines. The Design-Build Landscape Architect shall confirm appropriate setbacks for trees and/or shrubs from overhead and underground utilities and associated structures with the District 3 Utility Engineer in consultation with OED-LAD prior to commencing design of landscape plans.

3. The mulch edge of planting pits for individual trees and shrubs, and the edge of mulched landscape beds shall be planted a minimum of 7 ft. from the centerline of swales and ditches. Larger setbacks may be required for lined and/or rip-rapped swales or swales with higher volume or velocity of flow.

4. Trees shall be offset from the edge of travel lanes and bridges as required according to the roadway section and design speed in conformance to the *AASHTO Roadside Design Guide* and the *SHA Integrated Vegetation Management Design Manual for Maryland Highways.*

5. Additional setbacks may be required by the Administration for safety clear zones/recovery areas, to maintain sight distance, and/or for maintenance needs.

3.13.03.03 Low Maintenance Landscape Design. Roadside plantings, including but not limited to: landscaping and screening, reforestation, revegetation, and stormwater management facility landscaping shall be designed following a design approach that balances aesthetic appeal, safety, and environmental stewardship with maintenance requirements. The Design-builder shall develop designs that minimize landscape maintenance requirements as follows:

A. Arrange individual tree plantings, landscape beds, and plant massings to accommodate mowing and other maintenance operations in locations within or abutting areas of regularly mowed turfgrass and where otherwise requested by the Administration.

B. The Design-Builder shall use Turfgrass Establishment (*SSCM* 705) or Turfgrass Sod Establishment (*SSCM* 708) in all locations requiring regular mowing maintenance as per the *SHA Integrated Vegetation Management Manual for Maryland Highways*, in areas were vegetation height must be controlled to maintain sight distance such as merge areas and roadside shoulder areas, in SWM management facilities, and elsewhere as specified in the Contract Documents.

C. In locations where regular mowing is infeasible or unnecessary for maintenance or safety considerations, (i.e. on areas of future roadway expansion, slopes steeper than 4:1 or in reforestation, revegetation, or other naturalized areas) the Design-Builder shall specify meadow establishment, shrub seeding, and/or other native seeding approved by OED-LAD in lieu of turfgrass establishment or turfgrass sod establishment.

D. Minimize the use of shrub and perennial beds primarily to high-visibility locations and tighten plant spacing to minimize weed growth. Where space is available, masses of evergreens, flowering, and deciduous trees can provide

substantial aesthetic benefit while requiring less annual maintenance than shrub or perennial beds. Shrub masses in areas that will be allowed to naturalize rather than receive frequent maintenance are to be mulched to discourage weed growth and aid plant establishment.

3.13.03.04 Invasive Species Management. Successful landscape and mitigation plantings cannot be successfully established without management of invasive species and woody and herbaceous weeds.

A. Invasive species and prohibited weeds list below shall be treated and removed within the project limits in coordination with the OED-LOD.

Invasive species and prohibited weeds.

Herbaceous	Vines	Trees/Shrubs
Common Reed (Phragmites)	English Ivy	Bradford/Callery pear
Japanese Knotweed	Grape	Mimosa
Johnsongrass	Japanese Honeysuckle	Mulberry
Purple Loosestrife	Kudzu	Multiflora Rose
Thistle (all types)	Mile-a-minute	Paulownia
	Oriental Bittersweet	Privet
	Porcelain-berry	Russian/Autumn Olive
		Tartarian Honeysuckle
		Tree of Heaven
		Winged Euonymus

B. The Design-Builder shall develop a treatment plan and schedule detailing proposed methods for control and removal of invasive species/prohibited weeds for review and approval by the OED-LOD

C. The Design-Builder shall conduct invasive species management operations as appropriate for proposed final landscape treatments. For example, operations using herbicides will be scheduled with sufficient lead time prior to plant installation or seeding. Herbicides shall be applied according to MDA requirements and applicable State and Federal Laws. Appropriate licenses will be required.

3.13.04 Planting Zones and Landscape Requirements

3.13.04.01 Planting Zone Types

The Design-Builder shall prepare a Planting Plan for the Landscape and Reforestation Plantings, to be prepared by a licensed Landscape Architect. The landscape planting plan shall be developed to incorporate the use of

native plants and to revegetate disturbed areas within the Project to the fullest extent possible. Large masses or groupings of trees and shrubs shall be used to create plantings that have continuity from one planting zone to the next, wherever possible. Plantings shall be designed to provide multi-season aesthetic interest to the fullest extent possible. The Design-Builder shall be responsible for coordinating the Planting Plan for Landscape and Reforestation with all other elements of work to be performed under the Project, including but not limited to final grading, stormwater management best management practices (BMP) locations, highway clear zones and sight distances, storm drain and stormwater management BMP outfalls and cross culvert outfalls, utilities, signing, lighting, noise walls, retaining walls and bridges. Depending on the roadway section, trees shall be offset from the edge of travel lanes conforming to the AASHTO Roadside Design Guide and the Integrated Vegetation Management Design Manual for Maryland Highways. Areas used for stormwater management BMPs shall not be used for Reforestation plantings or Landscape plantings other than what is required as part of the stormwater management plans. Stormwater management BMP landscape plans shall be coordinated with other landscape and reforestation plans to ensure a unified planting theme is created for the Project corridor. The Design-Builder shall furnish all specified seed, seed mixes and sod according to the MDOT/SHA Standard Specifications for Construction and Materials 2008, Section 920.

The approved plant species, minimum acceptable sizes, and minimum spacing are listed in this Special Provision. Requests for substitution of other species shall be submitted in writing to the Administration.

3.13.04.02 Forest Edge

The Design-Builder shall prepare Landscape Plans for Forest Edge areas. 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. Root Pruning shall be done in accordance with SHA standards. A new "edge" shall be replanted using shrubs, understory, and evergreen and overstory tree species. The Design-Builder shall employ this planting association at the edges of clearing of existing forest. The plant association shall be designed as a band between the forest edge and the safety/clear zone limits, in accordance with the Administration's Slope Management Standards in the Integrated Vegetation Management Manual for Maryland Highways and the AASHTO Roadside Design Guide. The plantings shall, at a minimum, consist of randomly mixed tree and shrub groupings.

Density of plantings shall be 1 shade tree for each 1,500 square feet, 1 evergreen tree for each 3,000 square feet, 1 flowering tree for each 2000 square feet, and 1 shrub for each 400 square feet. A minimum of 7 tree species and a

minimum of 5 shrub species shall be selected for use. Forest Edge plant selections shall be appropriate for the field environmental conditions of the project corridor. Forest edge plantings shall not be planted in long groups of the same species. Forest edge plantings shall be located in small random groupings of odd numbers of plants to achieve a naturalized appearance. The trees and shrubs located along the leading edge of the roadway side of the plantings shall be of larger sizes to better delineate the edge, and 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. Understory species shall be multi-stem form unless specified otherwise.

PLANT MATERIAL: Forest Edge Planting Areas

Botanical Name	Common Name	Maximum Spacing	Minimum Size
Overstory Trees (Major Deciduous Trees):			
Acer rubrum	Red Maple	35’ OC	2” Cal. B&B
Acer saccharinum	Silver Maple	35’ OC	2” Cal. B&B
Gleditsia triacnathus var. inermis	Honeylocust	35’ OC	2” Cal. B&B
Liquidambar styraciflua	Sweetgum	35’ OC	2” Cal. B&B
Liriodendron tulipifera	Yellow Poplar/ Tulip Tree	35’ OC	1.5” Cal. B&B
Nyssa sylvatica	Black Gum	35’ OC	1.5” Cal. CG
Platanus occidentalis	American sycamore	35’ OC	2” Cal. B&B
Quercus coccinea	Scarlet Oak	35’ OC	2” Cal. B&B
Quercus palustris	Pin Oak	35’ OC	2” Cal. B&B
Quercus phellos	Willow Oak	35’ 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 Basswood	35’ OC	2” Cal. B&B

Botanical Name	Common Name	Maximum Spacing	Minimum Size
Evergreen Tree Species:			
Ilex opaca (Provide 10% male plants of OED approved compatible varieties)	American Holly	15’ OC	5’Height B&B
Pinus strobus	Eastern White Pine	15’ OC	5’Height B&B
Pinus taeda	Loblolly Pine	15’ OC	3’ Height CG
Pinus virginiana	Virginia Pine	15’ OC	3’ Height CG

Understory Trees (Flowering/Small Deciduous Trees):

Amelanchier arborea	Downy Serviceberry	15' OC	5' Height CG
Amelanchier laevis	Allegheny Serviceberry	15' OC	5' Height CG
Amelanchier canadensis	Shadblow Serviceberry	15' OC	5' Height CG
Cercis canadensis	Eastern Redbud	15' OC	5' Height CG
	(Single Stem, Tree Form)		
Chionanthus virginicus	White Fringetree	15' OC	5'Height B&B
Hamamelis virginiana	Common Witchhazel	15' OC	5' Height CG
Magnolia virginiana	Sweetbay Magnolia	15' OC	5' Height CG

Understory Shrub Species:

Aronia arbutifolia	Red Chokeberry	5' OC	3' Height CG
Clethra alnifolia	Summersweet	5' OC	3; Height CG
Ilex verticillata	'Winter Gold' Winterberry	5' OC	3' Height CG
	(Provide 10% male plants of OED approved compatible varieties)		
Ilex verticillata	'Winter Red' Winterberry	5' OC	3' Height CG
	(Provide 10% male plants of OED approved compatible varieties)		
Myrica pensylvanica	Northern Bayberry	5' OC	3'Height CG
Rhus aromatica	Fragrant Sumac	5' OC	3' Height CG
Rhus glabra	Smooth Sumac	5' OC	3' Height CG
Viburnum acerifolium	Mapleleaf Viburnum	5' OC	3' Height CG
Viburnum dentatum	Southern Arrowwood	5' OC	3' Height CG
Viburnum x pragense	Prague Viburnum	5' OC	3'Height B&B
Viburnum prunifolium	Blackhaw Viburnum	5' OC	3'Height B&B

Note:
B&B indicates Balled and Burlapped.
CG indicates Container Grown.
OC indicates On Center Spacing.

3.13.04.03 ROADSIDE PLANTINGS

DESIGN INTENT:

The intent is to provide shade trees and/or shrubs in areas within the project right of way that are suitable for roadside plantings. It is the responsibility of the Design-Build Team to determine which locations trees can be placed based on hydrologic site features, existing and proposed utility locations, and adjacent land uses.

The Design-Build Team shall employ this planting association along the roadside. The Design-Build Team shall submit a site analysis plan indicating the planting opportunities for this category. Design-Build team shall maximize planting whenever possible. The plantings shall, at a minimum, consist of a single row of shade trees, planted in long

groups of the same genus, or shrubs or ornamental grasses planted in mass groupings of 15 plants minimum of the same genus. These groupings of one shrub genus may be combined with groupings of another genus (shrubs or ornamental grasses) in order to extend seasonal interest or enhance texture differences between plants. Areas of separation between groups of plants shall also serve as the starting point for changing to a different plant genus. Density of plantings shall be approved by SHA according to the approved site analysis plan. Plant selections shall be appropriate for the field environmental conditions of the planting site; coordination shall include but not be limited to above ground, below grade utilities, business locations, roadway signage and walls. Maintain appropriate sight lines at all times. Understory species shall be multi-stem form unless specified otherwise. The approved plant species, minimum acceptable sizes, and maximum spacings are listed. Requests for substitution of other species, submitted in writing, may be approved by the state Highway Administration Office of Environmental Design.

PLANT MATERIAL: Roadside Plantings

Botanical Name	**Common Name**	**Maximum Spacing**	**Minimum Size**
Overstory Tree Species (Major Deciduous Trees)			
Acer rubrum 'Red Sunset'	Red Sunset Maple	30' OC	2.5" Cal. B&B
Acer rubrum 'October Glory'	October Glory Maple	30' OC	2.5" Cal. B&B
Gleditsia triacanthus var. inermis	Honeylocust	35' OC	2.5" Cal. B&B
Liquidambar styraciflua	Rotundiloba Sweetgum	35' OC	2.5" Cal. B&B
Platanus x acerifolia 'Bloodgood'	Bloodgood London Planetree	35' OC	2.5" Cal. B&B
Quercus palustris	Pin Oak	35' OC	2.5" Cal. B&B
Quercus phellos	Willow Oak	35' OC	2.5" Cal. B&B
Quercus rubra	Northern Red Oak	35' OC	2.5" Cal. B&B
Tilia cordata 'Greenspire'	Greenspire Littleleaf Linden	35' OC	2.5" Cal. B&B
Ulmus Americana 'Valley Forge'	Valley Forge American Elm	30' OC	2.5" Cal. B&B
Ulmus Americana 'Princeton'	Princeton' American Elm	30' OC	2.5" Cal. B&B

Botanical Name	**Common Name**	**Maximum Spacing**	**Minimum Size**
Deciduous Trees Species Acceptable for Planting Beneath Overhead Utilities			
Acer campestre Straight Single Trunk	Hedge Maple	20' OC	2" Cal. B&B
Acer ginnala	Amur Maple	20' OC	8'Height B&B
Amelanchier laevis	Allegheny Serviceberry	20' OC	2" Cal. B&B
Maackia amurensis	Amur Maackia	20' OC	2" Cal. B&B
Prunus Sargentii	Sargent Cherry	20' OC	2" Cal. B&B

Understory Tree Species (Flowering Deciduous Trees)

Amelanchier laevis	Allegheny Serviceberry	20' OC	2" Cal. B&B
Prunus Sargentii	Sargent Cherry	20' OC	2" Cal. B&B
Single Trunk, Tree Form			
Prunus x incam 'Okame'	Okame Cherry	20' OC	2" Cal. B&B
Single Trunk, Tree Form			

Understory Shrub Species

Aronia arbutifolia	Red Chokeberry	4' OC	3' Height CG
Ilex verticillata	Winterberry	4' OC	3' Height CG
Juniperus spp. (OED approved sp.)	Juniper	3' OC	15"Spread CG
Myrica cerifera	Wax Myrtle	4' OC	3' Height CG
Sambucus canadensis	American Elder	4' OC	2' Height CG
Viburnum carlesii	Koreanspice Viburnum	4' OC	3' Height CG
Viburnum dilitatum	Linden Viburnum	4' OC	3' Height CG

Ornamental Grasses

Calamagrostis 'Karl Foerster'	Feather Reed Grass	3' OC	3 Gallon CG
Panicum virgatum 'Shenandoah'	Red Switchgrass	3' OC	3 Gallon CG
Pennisetum alopecuroides	Fountain Grass	3' OC	3 Gallon CG

Note:
B&B indicates Balled and Burlapped.
Cal. indicates Caliper inches.
OC indicates On Center Spacing.

3.13.04.03 STREET TREE PLANTINGS ON PRINCE GEORGE'S COUNTY ROADS

DESIGN INTENT:
The intent is to provide shade trees in project areas within Prince George's County Right of Way, which are suitable according to Prince George's County street tree planting standards. It is the responsibility of the Design-Build Team to use the Prince George's County, Specifications and Standards for Roadways and Bridges, Section 111, Standard Roadway Sections and Details, produced by the Department of Public Works and Transportation dated February 2007. The Design-Build Team shall use *Standard 500.12*

Street Lighting Spacing (Urban Area Standard 600.01) and *Street Tree Placement in Urban R/W)* to determine which locations trees can be placed.

The Design-Build Team shall employ Standard 600.03 for Street Tree Installation in Urban R/W and *Standard 600.07 Tree Selection Standards*. Plant selections shall be appropriate for the field environmental conditions of the planting site; coordination shall include but not be limited to above ground, below grade utilities, driveways and lights. Maintain appropriate sight lines at all times... The approved plant species, minimum acceptable sizes, and maximum spacings are listed in *Standard 600.08, PLANT SELECTION GUIDE FOR SHADE TREES, Standard 600.09, PLANT SELECTION GUIDE FOR ORNAMENTAL TREE,* and *Standard 600.10, PLANT SELECTION GUIDE FOR EVERGREEN TREES.* Requests for substitution of other species will not be allowed.

3.13.04.04 REFORESTATION PLANTINGS

DESIGN INTENT:
In the design and execution of reforestation plantings, the Design-Build Team shall comply with the requirements of the Reforestation Law. In designing and executing the reforestation plantings, the Design-Build Team shall employ a method of "random spacing" and a density of 200 stems per acre. A full 70% of the species shall be "Overstory" species, and 30% shall be "understory" species, chosen from the list of approved species, below. A minimum of 5 major Deciduous Tree species shall be selected for the Overstory, and a minimum of 3 flowering Tree, Evergreen Tree, or Shrub species shall be selected for the understory. *In no case shall 3 of the same plant genus constitute the minimum selection.* In addition to the reforestation-sized planting stock, each reforestation area shall contain, interspersed randomly among the reforestation stock, trees chosen from the Major Deciduous Tree List, which are a minimum of 2.5 inches in caliper, at a planting density of 20 trees per acre. Reforestation plant selections shall be native, and appropriate for the field environmental conditions of the planting site. Plants specified shall be native to the Coastal Plain region of Maryland.

PLANT MATERIAL: Reforestation Plantings

Botanical Name	**Common Name**	**Maximum Spacing**	**Minimum Size**
Overstory Tree Species (Major Deciduous Trees)			
Acer rubrum	Red Maple	15' OC	1" Cal. CG
Acer saccharinum	Silver Maple	15' OC	1" Cal. CG
Diospyrus virginiana	Common Persimmon	15' OC	1" Cal. CG
Fagus grandifolia	American Beech	15" OC	1" Cal. CG
Gleditsia triacnathus	Honeylocust	15' OC	1" Cal. CG

var. inermis			
Liquidambar styraciflua	Sweetgum	15’ OC	1” Cal. CG
Liriodendron tulipifera	Yellow Poplar/ Tulip Tree	15’ OC	1” Cal. CG
Nyssa sylvatica	Black Gum	15’ OC	1” Cal. CG
Platanus occidentalis	American sycamore	15’ OC	1” Cal. CG
Quercus coccinea	Scarlet Oak	15’ OC	1” Cal. CG
Quercus palustris	Pin Oak	15’ OC	1” Cal. CG
Quercus phellos	Willow Oak	15’ OC	1” Cal. CG
Quercus rubra	Northern Red Oak	15’ OC	1” Cal. CG
Quercus velutina	Black Oak	15’ OC	1” Cal. CG
Tilia americana	American Basswood	15’ OC	1” Cal. CG

Understory Tree Species (Flowering and NonFlowering Deciduous Trees)

Amelanchier arborea	Downy Serviceberry	15’ OC	5’ Height CG
Amelanchier laevis	Allegheny Serviceberry	15’ OC	5’ Height CG
Amelanchier canadensis	Shadblow Serviceberry	15’ OC	5’ Height CG
Betula nigra	River Birch	15’ OC	5’ Height CG
Chioanthus virginicus	White Fringetree	15’ OC	4’ Height CG
Cercis canadensis	Eastern Redbud	15’ OC	5’ Height CG
Lindera benzoin	Spicebush	15’ OC	4’ Height CG
Magnolia virginiana	Sweetbay Magnolia	15’ OC	5’ Height CG

Evergreen Tree Species

Ilex opaca	American Holly	15’ OC	4’Height B&B
(Provide 10% male plants of OED approved compatible varieties)			
Pinus rigida	Pitch Pine	15’ OC	3’ Height CG
Pinus strobus	Eastern White Pine	15’ OC	3’Height B&B
Pinus taeda	Loblolly Pine	15’ OC	3’ Height CG
Pinus virginiana	Virginia Pine	15’ OC	3’ Height CG

Understory Species (Shrubs)

Aronia arbutifolia	Red Chokeberry	5’ OC	3’ Height CG
Clethra alnifolia	Summersweet	5’ OC	3’ Height CG
Cornus amomum	Silky Dogwood	5’ OC	3’ Height CG
Cornus sericea	Redosier Dogwood	5’ OC	3’ Height CG
Hamamelis virginiana	American witchhazel	5’ OC	3’ Height CG
Botanical Name	**Common Name**	**Maximum Spacing**	**Minimum Size**
Ilex glabra	Inkberry	5’ OC	3’ Height CG
Ilex verticillata	‘Winter Gold’ Winterberry	5’ OC	3’ Height CG
(Provide 10% male plants of OED approved compatible varieties)			
Ilex verticillata	‘Winter Red’ Winterberry	5’ OC	3’ Height CG
(Provide 10% male plants of OED approved compatible varieties)			
Itea virginica	Virginia Sweetspire	5’ OC	3’Height CG
Myrica pensylvanica	Northern Bayberry	5’ OC	3’Height CG
Rhus aromatica	Fragrant Sumac	5’ OC	3’ Height CG

Rhus glabra	Smooth Sumac	5’ OC	3’ Height CG
Viburnum acerifolium	Mapleleaf Viburnum	5’ OC	3’ Height CG
Viburnum dentatum	Southern Arrowwood	5’ OC	3’ Height CG
Viburnum opulus	American Cranberry Bush	5’ OC	3’Height CG
Viburnum prunifolium	Blackhaw Viburnum	5’ OC	3’Height CG

Note:
B&B indicates Balled and Burlapped.
CG indicates Container Grown.
OC indicates On Center Spacing.

3.13.04.05 SWM PLANTINGS

In the design and execution of stormwater management plantings, the Design-Build Team shall comply with the requirements of the SHA’s Visual & Environmental Quality and Safety Criteria Review Guidelines. Plants specified shall be native to the Coastal Plain region of Maryland. Recommended species for *Canopy Trees*, *Understory or Flowering Trees*, and *Woody Shrubs* for the stormwater management facilities are listed. Plant species selections for the Wetland Hydrologic Zones shall be determined by the Design Builder based on the final designs of each stormwater management facility.

PLANT MATERIAL: SWM Planting

Botanical Name	**Common Name**	**Maximum Spacing**	**Minimum Size**
Canopy Tree Species			
Acer negundo	Box Elder Maple	15’ OC	2” Cal. CG
Acer rubrum	Red Maple	15’ OC	3” Cal. B&B
Betula nigra	River Birch	15’ OC	6’Height B&B
Multi-stem, clump form			
Celtis occidentalis	Common Hackberry	15’ OC	1” Cal. CG
Liquidambar styraciflua	Sweetgum	15’ OC	2”Cal.B&B
Nyssa sylvatica	Black Gum	15’ OC	2” Cal. B&B
Platanus occidentalis	American Sycamore	15’ OC	3” Cal. B&B
Quercus phellos	Willow Oak	15’ OC	3” Cal. B&B
Salix nigra	Black Willow	15’ OC	1” Cal. CG
Taxodium distichum	Bald Cypress	15’ OC	4’ Height CG
Botanical Name	**Common Name**	**Maximum Spacing**	**Minimum Size**
Understory or Flowering Tree Species			
Amelanchier canadensis	Shadblow Serviceberry Multi-stem, clump form	15’ OC	6’Height B&B
Magnolia virginiana	Sweetbay Magnolia	15’ OC	2” Cal. B&B
Ostrya virginiana	Ironwood	15’ OC	2” Cal. B&B
Woody Shrub Species			
Alnus serrulata	Smooth Alder	5’ OC	2’ Height CG

Aronia arbutifolia	Red Chokeberry	3’ OC	2’ Height CG
Aronia meloncarpa	Black Chokeberry	3’ OC	2’ Height CG
Cephalanthus occidentalis	Buttonbush	5’ OC	3’ Height CG
Clethra alnifolia	Summersweet	5’ OC	3; Height CG
Ilex verticillata	‘Winter Red’ Winterberry	5’ OC	3’ Height CG
(Provide 10% male plants of OED approved compatible varieties)			
Itea virginica	Virginia Sweetspire	5’ OC	2’ Height CG
Rhododendron viscosum	Swamp Azalea	5’ OC	2’ Height CG
Sambucus canadensis	Common Elderberry	5’ OC	3’ Height CG
Viburnum dentatum	Southern Arrowwood	5’ OC	3’ Height CG
Viburnum prunifolium	Blackhaw Viburnum	5’ OC	3’Height B&B

Herbaceous species

Andropogon gerardii	Big Bluestem	3’ OC	2 Gallon Cont.
Carex comosa	Longhair Sedge	3’ OC	2 Gallon Cont.
Carex lurida	Shallow Sedge	3’ OC	2 Gallon Cont.
Eupatoriadelphus dubius	Coastal Plain Joe Pye Weed	3’ OC	2 Gallon Cont.
Helianthus angustifolia	Swamp Sunflower	4’ OC	2 Gallon Cont.
Hibiscus moscheutos	Crimsoneyed Rosemallow	3’ OC	2 Gallon Cont.
Panicum virgatum	Switchgrass	4’ OC	2 Gallon Cont.
Panicum virgatum ‘Shenandoah’	Shenandoah Switchgrass	4’ OC	2 Gallon Cont.
Rudbeckia fulgida	Orange Coneflower	2’ OC	1 Gallon Cont.
Symphyotrichum novae- angliae	New England Aster	3’ OC	2 Gallon Cont.

Note:
B&B indicates Balled and Burlapped.
CG indicates Container Grown.
OC indicates On Center Spacing.

TC 3.14 GEOTECHNICAL PERFORMANCE SPECIFICATION FOR EMBANKMENT AND CUT SLOPES

3.14.01 GENERAL

The Design-Builder shall conduct supplemental subsurface explorations, analyses, design and construction for embankment and cut slopes of the project in accordance with all applicable criteria and standards cited herein and in accordance with this Geotechnical Performance Specification for embankment and cut slopes (referred as "Geotechnical Performance Specification" herein).

3.14.02 GUIDELINES AND REFERENCES

3.14.02.01 Guidelines

Design and construction of embankment and cut slopes shall be in accordance with this Geotechnical Performance Specification and the relevant requirements of the following Guidelines and references unless otherwise stipulated in this specification. Should the requirements in any guideline conflict with those in another, the guideline listed with highest priority in Table 1 shall govern unless otherwise stipulated in this specification. Listed under references are reports and resources that the Design-Builder may use to address the geotechnical requirements as the Design-Builder sees fit. It is the Design-Builder's responsibility to obtain clarification for any unresolved ambiguity prior to proceeding with any design and construction. Geotechnical Reports and Submissions will be reviewed based upon FHWA Geotechnical Checklist and Guidelines (FHWA-ED-88-053) and the guidelines listed below.

Use the most current version of each listed guideline as of the initial publication date of this RFP unless revised by addendum or contract modification.

TABLE 1 GUIDELINES FOR GEOTECHNICAL DESIGN AND CONSTRUCTION		
PRIORITY	**AUTHOR OR AGENCY**	**TITLE**
1	SHA	Office of Structures, Policy and Procedure Manual
2	SHA	Standard Specifications for Construction and Materials (Part III Technical Requirements)
3	SHA	Standard Specifications for Subsurface Explorations
4	SHA	Book of Standards for Highways, Incidental Structures and Traffic Control Applications for items identified as Standard in Appendix B of Part 3-Design Requirements
5	SHA	Manual for the Inspection of Highway Right of Way in Karst Areas
6	AASHTO	AASHTO LRFD Bridge Design Specification, 5th Edition
7	AASHTO	Manual on Subsurface Investigations
9	AASHTO	Guide Specifications for Structural Design of Sound Barriers
10	AASHTO	Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals, 4th Edition
11	AASHTO	Standard Specifications for Transportation Materials and Methods of Sampling and Testing – Parts I and II
12	ASTM	Annual Books of Standards
13	MDE	Applicable Maryland Storm Water Design Manual
14	FHWA	Mechanically Stabilized Earth Walls and Reinforced Soil slopes, Design and Construction Guidelines

3.14.02.02 References

Use the references listed in Table 2 as supplementary references for the design and exploration of the geotechnical subsurface. These publications have no established order of precedence.

TABLE 2
REFERENCES FOR GEOTECHNICAL DESIGN AND CONSTRUCTION

AUTHOR OR AGENCY	TITLE
FHWA	Corrosion/Degradation of Soil Reinforcements for Mechanically Stabilized Earth Walls and Reinforced Slopes
FHWA	Design and Construction of Driven Pile Foundations
FHWA	Drilled Shafts: Construction Procedures and Design Methods
FHWA	Geosynthetic Design and Construction Guidelines
FHWA	Geotechnical Aspects of pavements
FHWA	Continuous Flight Augur Pile foundations
FHWA	Ground Improvement Technical Summaries Volumes I & II
FHWA	Geotechnical Engineering Circular No. 1: Dynamic Compaction
FHWA	Geotechnical Engineering Circular No. 2: Earth Retaining Systems
FHWA	Geotechnical Engineering Circular No. 4: Ground Anchors and Anchored Systems
FHWA	Geotechnical Engineering Circular No. 5: Evaluation of Soil and Rock Properties
FHWA	Geotechnical Engineering Circular No. 6: Shallow Foundations
FHWA	Geotechnical Engineering Circular No. 7: Soil Nail Walls
FHWA	Durability of Geosynthetics for Highway Applications
FHWA	Micropile Design and Construction Guidelines
FHWA	The Osterberg Load Cell for Load Testing Drilled Shafts and Driven Piles
Dunnicliff	Geotechnical Instrumentation for Monitoring Field Performance, Dunnicliff, 1986
FHWA	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

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, Su. 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 Su 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 Su 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 (Le) is defined as the length of reinforcement behind the most critical sliding surface. The embedded length for each reinforcement layer shall be sufficient to provide adequate pullout resistance as shown by the Contractor's design calculations.

Adequate drainage provisions, slope protection and erosion control provisions shall be incorporated into the RSS designs in accordance with requirements of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Design and Construction Guidelines.

Material requirements such as gradation, partial reduction factors of safety (creep, installation damage, durability, etc) for reinforcement fill, geosynthetic materials: geogrid, geotextile, etc., shall be submitted for review. The geosynthetic reinforcement material for RSS shall be a geogrid or high tenacity polyester geotextile. Geosynthetic reinforcement shall be manufactured

from high strength polypropylene (PP), or high density polyethylene (HDPE), or high tenacity polyester (PET) material. This reinforcement material shall have a high resistance to damage during construction, to ultraviolet (UV) degradation, and to all forms of chemical and biological degradation in the soil being reinforced.

Allowable Tensile Strength. Allowable tensile strength (Ta) of the geosynthetic shall be determined using a "partial factors of safety" approach. Partial factors of safety shall be developed from the test results provided with the geosynthetic material certifications.

The Allowable Tensile Strength shall be determined using the following formula:

$$T_a = T_{ult} / (FS_{CR} \times FS_{ID} \times FS_{CD} \times FS_{BD} \times FS_{JNT})$$

Where:

T_a = Allowable geosynthetic tensile strength, (plf) for use in stability analyses;
T_{ult} = Ultimate geosynthetic tensile strength, (plf)
FS_{CR} = Partial factor of creep deformation, (dimensionless);
FS_{ID} = Partial factor of safety for installation damage, (dimensionless);
FS_{CD} = Partial factor of safety for chemical degradation, (dimensionless);
FS_{BD} = Partial factor of safety for biological degradation, used in environments where biological degradation potential may exist, (dimensionless);
FS_{JNT} = partial factor of safety for joints (Seams and connection), (dimensionless).

Default Partial Factor of Safety Values: If test documentation is not provided, or the Engineer determines that the test documentation is not adequate, the following partial factor of safety values shall be used for the computation of allowable tensile strength. In absence of valid test results, the Administration will reject the use of the materials or use the following values to determine the allowable tensile strength of Geosynthetic material:

FS_{ID}	FS_{CR}	FS_{CD}	FS_{BD}	FS_{JNT}
3.0	5.0	2.0	1.3	2.0

Default Coefficient of Interfering Friction Values: Laboratory interface friction tests shall be conducted on all interfaces using ASTM D5321 – Standard test Method for Determining the Coefficient of Soil and Geosynthetics or Geosynthetic and Geosynthetic Friction by Direct Shear Method. Testing shall be accomplished by a GRI accredited laboratory that is specifically accredited for this test method and the results provided prior to construction.

If geotextile is used as the reinforcement material, 0.67 tan φ 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:

<table>
<tr><td></td><td colspan="2">Requirement</td></tr>
<tr><td rowspan="4">Gradation</td><td>Sieve Size</td><td>Percent Passing(by mass)</td></tr>
<tr><td>2"</td><td>100</td></tr>
<tr><td>No. 4</td><td>50 (max)</td></tr>
<tr><td>No. 200</td><td>7 - 12</td></tr>
<tr><td>PI</td><td colspan="2">Less than 5%</td></tr>
<tr><td>PH</td><td colspan="2">3-9 (AASHTO T 289)</td></tr>
</table>

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 ½-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.

3.14.04.04.02 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 3.05.20.1.

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 any geotechnical investigations. Prior to any geotechnical investigations, 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 SECTION 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.

3.15.01.01.01 Buy America Steel/Iron Materials

This section applies to projects partially or totally funded with Federal Funds. The prime contractor or its subcontractors shall comply with Section 165 of the Surface Transportation Assistance Act of 1982 as amended by Section 1041(a) and 1048(a) of the Intermodal Surface Transportation Efficiency Act of 1991 with regard to the furnishing and coating of iron and steel products.

The prime contractor or its subcontractors shall supply certifications to the Project Engineer from the manufacturer of all coating, iron or steel products which document that the steel and iron have been manufactured and the coatings for iron or steel have been applied by the manufacturer in the United States. The Project Engineer shall forward copies of the certifications to the Office of Materials Technology for review and approval prior to such items being incorporated into the permanent work. Certifications shall extend to materials utilized in manufactured and fabricated products purchased by the Contractor.

Products manufactured of foreign steel or iron materials may be used, provided the cost of such products as they delivered to the project does not exceed 0.1% of the total contract amount, or $2500, 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.

This applies to all iron, steel and coating materials used for utility work incorporated into the project including materials/items supplied by the Utility Company.

3.15.01.02 Utilities Within Project Limits

The Design-Build Team (DBT) is alerted to the presence of overhead and underground utilities including but not limited to water, sanitary sewer, gas, electric, communication, fiber optic, 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. Preliminary concept plans have been developed by the Administration and provided to the DBT for informational purposes.

There is a 12 – 18 month relocation timeframe that will encompass all of PEPCO, Verizon, Level 3 and Comcast's relocations. The commencement of said relocation activities is contingent on the completion of the clearing and grubbing activities. The DBT shall coordinate its design and construction activities with these utility relocations.

Contact Information:

Mr. Jeff Lohrmann
Washington Suburban Sanitary Commission
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Laurel, MD 20707
Phone: 301-206-8744

Mr. Jeffrey Hicks
Washington Gas
6801 Industrial Rd.
Springfield, VA 22151
Phone: 703-750-5972

Mr. Brad Zellmer
Potomac Electric Power Company (Pepco)
8300 Marlboro Pike
Upper Marlboro, MD 20772
Distribution Engineering, Maryland Division
Phone: 301-967-5354

Mr. Rick Miller &/or Mr. Jody Williams
Level 3 Communication
3005 Big Woods Rd.
Ijamsville, MD 21754
Phone: (720) 888-7568 or (202) 369-5470

Mr. Gabor Varsa
Verizon
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Silver Spring, MD 20904
Phone: 301-282-7031

Mr. Victor Grafton
SHA District Utility Engineer (DUE)
9300 Kenilworth Avenue
Greenbelt, MD 20770
Phone: 301-513-7351 or 301-513-7350

Mr. Darryl Renner 1
Comcast
9609 Annapolis Rd
Lanham, MD 20706
Phone: 301-343-1844

ADDENDUM NO. 1
11/20/14

3.15.01.03 Utilities Coordinator

The DBT shall provide a Utility Coordinator with experience in coordinating the relocation of utilities on major SHA roadway projects. Responsibilities for this position will include but are not limited to: continuous coordination with all utility companies, establishment of a schedule for the relocation of utilities, updating schedule for the relocation of utilities, facilitating the handling of issues and conflicts pertaining to utilities as they arise, organizing and facilitating at a minimum, monthly Utility Coordination Meeting, and preparation and distribution of meeting minutes.

3.15.01.04 Preconstruction Utility Conference

The DBT shall conduct and facilitate a utility coordination meeting as soon as possible after notification as the successful proposer and prior to issuance of the Notice to Proceed. Attendees shall include:

- DBT Design-Build Manager and/or Construction Manager
- DBT Utility Coordinator
- The SHA Design Project Engineer
- The SHA Construction Project Engineer
- The SHA District 3 Utility Engineer
- The SHA Area Engineer
- A responsible officer of any necessitated subcontractors
- Utility owners and/or their representatives

At a minimum the following shall be discussed at this meeting:

- Status of utility relocations
- Establishment of a schedule for utility relocations
- Discuss DBT planned design and construction schedule
- How utility relocation schedule will be facilitated within the DBT's planned design and construction schedule
- Plan for how issues and conflicts will be handled as they occur
- Set up monthly utility coordination meetings

The DBT shall prepare all meeting minutes and distribute them to attendees for review and comments within five (5) calendar days from the meeting date.

3.15.01.05 Utility Coordination

The DBT shall incorporate and make provisions in the design for all existing and proposed utilities including relocations. The DBT shall establish and maintain ongoing coordination with utility owners after initial contact has been made by SHA to fulfill the following requirements:

a) Obtain plans from the utility companies.

b) Assure adequate protection of their utilities.

c) Maintain utility service at all times during construction of the project.

d) Identify all potential conflict areas both overhead and underground and perform test pits to verify conflicts.

e) Incorporate and accommodate utility relocations in the schedule and sequence of construction.

f) Conduct alternative studies to avoid utility relocation

g) Incorporate utility relocations in the schedule and sequence of construction.

h) Provide the construction associated with any utility service connections to existing and proposed Traffic Control Devices. The DBT shall be responsible for all conduits, manholes, cabling, meter cans, and disconnect switches as required by the utility to obtain the electrical utility connection. Monthly energy use charges and the final connection fees will be the responsibility of SHA.

3.15.01.06 Utility Relocations by Others

3.15.01.06.01 Relocation of Pepco Facilities

Pepco maintains aerial and underground facilities located within the limits of this project that have been found to be in conflict with SHA's conceptual design, and will be relocated by the utility owner concurrent to this project based on SHA's conceptual design. Conceptual Pepco relocation plans are being provided to the DBT for information purposes to demonstrate the intent of the final design and relocations to be performed by Pepco.

It is the responsibility of the DBT to coordinate Pepco relocations with the DBT's design, schedule and sequence of construction so that there are no delays to the utility relocations or SHA's project.

If the DBT impacts Pepco's relocated facilities, the cost of the redesign and relocation shall be 100% the DBT's responsibility.

3.15.01.06.01.01 Description

Pepco shall prepare the designs and perform relocation of all its impacted facilities within the project limits and within the utility corridor as shown on the SHA conceptual plans. The project is subdivided into four (4) quadrants, NE, SE, NW and SW. Stage 1 refers to the activities on the northbound side of MD 210, Stage 2 is the southbound side and Stage 3 being all work within the MD 210 median. The north-south dividing marker is the Kerby Hill Road/Livingston Road intersection. SHA is actively pursuing the Erosion and Sediment Control permit along MD 210 NB to allow for clearing and grubbing to commence once Notice to Proceed (NTP) has been issued to the DBT.

3.15.01.06.01.02 Timeframes

a) Pepco estimates a 12 to 18-month timeframe to complete all the required relocation, installation and tie-ins for its impacted facilities.

b) The DBT shall ensure that the project has been cleared and grubbed in accordance with the provided Advance Clearing and Grubbing Plan to facilitate the relocations. The commencement of Pepco's activities is contingent on the DBT performing the required clearing and grubbing. The key components of Pepco's relocation includes but, are not limited to the following items:

i. Two bore operations under MD 210 (Indian Head Highway) in the vicinity of the Kerby Hill Road/Livingston Road intersection. The DBT shall ensure that the proposed location for the bore operations and staging areas are adequately coordinated so as not to adversely impact the traffic patterns for the adjacent property owners.

ii. Relocation of aerial lines and utility poles within the NW – Stage 2 and SE – Stage 1 of MD 210 and also along Kerby Hill Road.

iii. Installation of underground cables in the vicinity of STA 718+50 to STA 725+74

3.15.01.06.01.03 Coordination with Other Work

The DBT shall coordinate with Pepco to avoid conflicts to their facilities and work by others, including the DBT roadway and drainage design.

3.15.01.06.01.04 Damage to Pepco Facilities

The DBT shall be responsible for the protection of facilities during the construction phase. Any damage to or paving over of Pepco's facilities will be repaired at the Contractor's expense.

3.15.01.06.01.05 Construction

Pepco shall perform all construction activities related to the relocation of its facilities.

The DBT shall ensure continued access by Pepco to its utility poles and manholes during all phases of construction.

3.15.01.06.01.06 Horizontal and Vertical Requirements

The following requirements shall be maintained by the DBT:

- Minimum 5 feet of horizontal separation between all Pepco facilities and any in service utility line.

3.15.01.06.02 Relocation of Verizon Facilities

Verizon maintains aerial and underground facilities located within the limits of this project that have been found to be in conflict with SHA's conceptual design and will be relocated by the utility owner concurrent to this project based on SHA's conceptual design. Conceptual Verizon relocation plans are being provided to the DBT for information purposes to demonstrate the intent of the final design and relocations to be performed by Verizon.

It is the responsibility of the DBT to coordinate Verizon's relocations with the DBT's design, schedule and sequence of construction so that there are no delays to the utility relocations or SHA's project.

If the DBT impacts Verizon's relocated facilities, the cost of the redesign and relocation shall be 100% the DBT's responsibility.

3.15.01.06.02.01 Description

Verizon shall prepare the designs and perform relocation of all its impacted facilities within the project limits and within the utility corridor as shown on the SHA conceptual plans. The project is subdivided into four (4) quadrants, NE, SE, NW and SW. Stage 1 refers to the activities on the northbound side of MD 210, Stage 2 is the southbound side and Stage 3 being all work within the MD 210 median. The north-south dividing marker is the Kerby Hill Road/Livingston Road intersection. SHA is actively pursuing the Erosion and Sediment Control permit along MD 210 NB to allow for clearing and grubbing to commence once Notice to Proceed (NTP) has been issued to the DBT.

3.15.01.06.02.02 Timeframe

a) The DBT shall ensure that the project has been cleared and grubbed in accordance with the provided Advance Clearing and Grubbing Plan to facilitate the relocations. The commencement of Verizon's activities is contingent on the DBT performing the required clearing and grubbing and subsequently the relocation of Pepco's poles.

b) Verizon estimates a 12 to 18-month timeframe to complete the required installation and tie-ins. It is noted that there will be overlap in the relocation timeframes between Verizon and Pepco. Relocation of Verizon's facilities within the NW quadrant – Stage 2 is contingent on the relocation of Pepco's utility poles in said quadrant. Relocation of Verizon's facilities within the SE quadrant – Stage 1 is contingent on the DBT performing the required clearing and grubbing. The key components of Verizon's relocation includes but, are not limited to the following items:

    i. Bore Operations under MD 210 (Indian Head Highway) in the vicinity of the Kerby Hill Road/Livingston Road intersection. The DBT shall ensure that the proposed location for the bore operations and staging areas are adequately coordinated so as not to adversely impact the traffic patterns for the adjacent property owners.

ii. Relocation of aerial lines along both the northbound and southbound roadway (MD 210) utility corridors. The relocation of the utility poles south of the Kerby Hill Road/Livingston Road intersection is a critical component in facilitating concurrent work along the northbound corridor.

iii. Installation of underground cables along the northbound and southbound roadway (MD 210) is independent of Pepco's relocation.

iv. Upon completion of the stream relocation by the DBT, Verizon shall install new fiber optic cables within the proposed utility corridor with the SW quadrant – Stage 2, and abandon its existing underground fiber optic cables within said quadrant.

3.15.01.06.02.03 Coordination with Other Work

The DBT shall coordinate with Verizon to avoid conflicts to their facilities and work by others, including the DBT roadway and drainage design.

3.15.01.06.02.04 Damage to Verizon Facilities

The DBT shall be responsible for the protection of facilities during the construction phase. Any damage to or paving over of Verizon's facilities will be repaired at the Contractor's expense.

3.15.01.06.02.05 Construction

Verizon shall perform all construction activities related to the relocation of their facilities.

The DBT shall ensure continued access by Verizon to its utility poles and manholes during all phases of construction.

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The DBT shall provide access by an established road for Verizon utility pole work per 3.15.01.07.07.01:

3.15.01.06.02.06 Horizontal and Vertical Requirements

The following requirements shall be maintained by the DBT:

- Minimum 5 feet of horizontal separation between all Verizon facilities and any in service utility line.

3.15.01.06.03 Relocation of Level 3 Facilities

Level 3 maintains underground facilities located within the limits of this project that have been found to be in conflict with SHA's conceptual design, and will be relocated by the utility owner concurrent to this project based on SHA's conceptual design. Conceptual Level 3 relocation plans are being provided to the DBT for information purposes to demonstrate the intent of the final design and relocations to be performed by Level 3.

It is the responsibility of the DBT to coordinate Level 3's relocations with the DBT's design, schedule and sequence of construction so that there are no delays to the utility relocations or SHA's project.

If the DBT impacts Level 3's relocated facilities the cost of the redesign and relocation shall be 100% the DBT's responsibility.

3.15.01.06.03.01 Description

Level 3 shall prepare the designs and perform relocation of all its impacted facilities within the project limits and within the utility corridor as shown on the SHA conceptual plans. The project is subdivided into four (4) quadrants, NE, SE, NW and SW. Stage 1 refers to the activities on the northbound side of MD 210, Stage 2 is the southbound side and Stage 3 being all work within the MD 210 median. The north-south dividing marker is the Kerby Hill Road/Livingston Road intersection. SHA is actively pursuing the Erosion and Sediment Control permit along MD 210 NB to allow for clearing and grubbing to commence once Notice to Proceed (NTP) has been issued to the DBT.

3.15.01.06.03.02 Timeframes

a) Level 3 estimates 4 months to complete the required relocation, installation and tie-ins. The DBT shall ensure that the project has been cleared and grubbed in accordance with the provided Advance Clearing and Grubbing Plan to facilitate the relocations. Level 3 shall be the first utility relocation along the northbound roadway utility corridor. Level 3's relocation activities are contingent on the completion of the DBT's clearing activities along said corridor.

b) The key components of Level 3's relocation includes but, are not limited to the following items:

   i. Bore Operations under MD 210 (Indian Head Highway) in the vicinity of Wilson Bridge Drive intersection. The DBT shall ensure that the proposed location for the bore operations and staging areas are adequately coordinated so as not to adversely impact the traffic patterns for the adjacent property owners.

   ii. Relocation of fiber optic cables along the northbound roadway (MD 210) utility corridor.

3.15.01.06.03.03 Coordination with Other Work

The DBT shall coordinate with Level 3 to avoid conflicts to their facilities and work by others, including the DBT roadway and drainage design.

3.15.01.06.03.04 Damage to Level 3 Facilities

The DBT shall be responsible for the protection of facilities during the construction phase. Any damage to or paving over of Level 3's facilities will be repaired at the Contractor's expense.

3.15.01.06.03.05 Construction

The DBT shall ensure continued access for Level 3 to their manholes during all phases of construction. It is noted that **Level 3's permissible shutdown timeframe is between midnight to 6AM on any given day**. The DBT Contractor shall coordinate with Level 3 to facilitate this work.

3.15.01.06.03.06 Horizontal and Vertical Requirements

The following requirements shall be maintained by the DBT:

- Minimum 42 inches of cover over all Level 3 utilities.
- Minimum 5 feet of horizontal separation between all Level 3 facilities and any in service utility line.

3.15.01.06.04 Relocation of Comcast Facilities

Comcast maintains aerial and underground facilities located within the limits of this project that have been found to be in conflict with SHA's conceptual design, and will be relocated by the utility owner concurrent to this project based on SHA's conceptual design. Conceptual Comcast relocation plans are being provided to the DBT for information purposes to demonstrate the intent of the final design and relocations to be performed by Comcast.

It is the responsibility of the DBT to coordinate these concurrent relocations with the DBT's design, schedule and sequence of construction so that there are no delays to the utility relocations or SHA's project.

If the DBT impacts Comcast's relocated facilities the cost of the redesign and relocation shall be 100% the DBT's responsibility.

3.15.01.06.04.01 Description

Comcast shall prepare the designs and perform relocation of all its impacted facilities within the project limits and within the utility corridor as shown on the SHA conceptual plans. The project is subdivided into four (4) quadrants, NE, SE, NW and SW. Stage 1 refers to the activities on the northbound side of MD 210, Stage 2 is the southbound side and Stage 3 being all work within the MD 210 median. The north-south dividing marker is the Kerby Hill Road/Livingston Road

intersection. SHA is actively pursuing the Erosion and Sediment Control permit along MD 210 NB to allow for clearing and grubbing to commence once Notice to Proceed (NTP) has been issued to the DBT.

3.15.01.06.04.02 Timeframes

a) The DBT shall provide Comcast with a minimum of thirty (30) days advance notice. Comcast estimates Thirty (30) days to complete the relocation and tie-ins of their utilities.

b) Comcast's relocation efforts are contingent upon completion of Pepco and Verizon's installations on the shared use utility poles. Comcast cannot commence its activities until the aforementioned items have been completed. The key components of Level 3's relocation includes but, are not limited to the following items:

i. Installation of aerial lines on Pepco and/or Verizon utility poles within the NW quadrant – Stage 2.
ii. Installation of underground cable in ductback constructed with Verizon's bores under MD 210.
iii. Make transition from underground to aerial lines upon daylighting in the SW quadrant of MD210 and re-mount on to Pepco's relocated poles.

3.15.01.06.04.03 Coordination with Other Work

The DBT shall coordinate with Comcast to avoid conflicts to their facilities and work by others, including the DBT roadway and drainage design.

3.15.01.06.04.04 Damage to Comcast Facilities

The DBT shall be responsible for the protection of facilities during the construction phase. Any damage to or paving over of Comcast's facilities will be repaired at the Contractor's expense.

3.15.01.06.04.05 Construction

Comcast shall perform all construction activities related to the relocation of its facilities.

The DBT shall ensure continued access by Comcast to its utility poles and manholes during all phases of construction.

3.15.01.06.04.06 Horizontal and Vertical Requirements

The following requirements shall be maintained by the DBT:

- Minimum 5 feet of horizontal separation between all Comcast facilities and any in service utility line.
- Minimum 42 inches of vertical cover is required for all Comcast facilities.

3.15.01.07 Utility Relocations by DBT

3.15.01.07.01 SHA Traffic Control Devices

The DBT shall coordinate the design and construction of any and all utility service connections to existing and proposed Traffic Control Devices with the utility company.
The DBT shall be responsible for all conduits, manholes, cabling, meter cans and disconnect switches as required by the utility to obtain the electric utility connection.

The DBT shall review all existing and proposed traffic signal structures and related equipment to ensure clearance from all existing and proposed utility lines are in compliance with OSHA, MOSH and the High Voltage Line Act. Relocations and/or adjustments may be necessary to obtain the clearance that is required by the 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.

3.15.01.07.02 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 DBT shall notify the Administration immediately after discovery.

3.15.01.07.03 Existing Utility Services

The plans show some existing utility service connections, however, this does not relieve the DBT from identifying all impacted service connections within the limits of the project. No guarantees are made regarding the completeness or accuracy of said connections. The DBT must communicate with the utility companies and use all means necessary to locate existing services and protect as necessary.

Should a service require relocation, the DBT is responsible for the coordination and work required to relocate, reconnect and remove the existing service. 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 SHA.

3.15.01.07.04 Existing Utility Locations

The DBT must notify public service companies of work intentions 48 hours before work is to begin, by calling MISS UTILITY at 1-800-257-7777 or by applying for utility locates online at: http://www.missutility.net/. All notifications to the above utility companies and "MISS UTILITY", at 1-800-257-7777, shall be given 48 hours (two full working days) in advance of working in the area of each specifically affected utility. The notification to "MISS UTILITY" is required whenever any excavating or similar work is performed.

The DBT is responsible for following the MISS UTILITY process prior to any excavation or work associated with this project. Utility locations shown on the plans are for the convenience of the DBT and shall not be considered accurate or complete unless it has been located and verified by a test hole. The cost for this coordination and time consumption is considered incidental to all work performed.

3.15.01.07.04.01 Utility facilities owned by the SHA

Regarding stake out of State Highway Administration owned facilities, please make note of our new notification procedures. SHA is now part of MISS UTILITY, and we also charge fees for our locates. The DBT **must** provide the contract number (PG7005170) when contacting MISS UTILITY for locates. This provision is required whether the DBT contacts MISS UTILITY via the internet or by phone. Failure of the DBT to comply with this requirement may result in a locate fee by SHA for which the DBT **will not** be allowed to recover. When processing online, you shall complete the LOCATE REQUEST FORM. On this form, toward the bottom is the Section – EXCAVATION INFORMATION. Under this section, in the blank space to the right of "Work Being Done For" type – PG7005170. This will allow MISS UTILITY to know what District number and highway agency that you are working for.

Regarding the marking of SHA owned facilities, the DBT shall contact the following (a minimum 72-hour advance notice is required):
Intelligent Transportation System (ITS) devices: SHA OOM Communications 410-747-8590 **AND** ITS Operations 410-787-7662.

SHA Owned Street Lighting: District 3 Maintenance Section, Dave Felton (301) 513-7310

SHA owned traffic signal facilities: Hanover Complex Signal Shop 410-787-7652.

3.15.01.07.05 Protection of Existing Utilities During Construction

The DBT shall maintain a minimum of three (3) feet of cover over all existing utilities that will be left in service during construction. In the event that this requirement cannot be met, the DBT shall immediately contact the impacted utility owner to determine alternative means of protection.

3.15.01.07.06 Surface Utility Frames

The DBT shall make all adjustments to surface utility frame and covers located in pavement and concrete, not limited to manholes, water valves, water meters, gas valves and gas meters. The DBT must coordinate with the utility owner on the specifications and schedule. This work is incidental to the respective LS item.

3.15.01.07.07 Utilities: Guidelines and Technical Requirements

All utilities within the Project area, designed and/or constructed by the Design-Build Team, shall be placed in accordance with applicable Governmental Rules, including the Administration's utility regulations and policies, Utility Policy Manual and Utility Procedure Manual, the

applicable Utility Standards, Maryland Tariff, and other requirements specified in the Contract Documents.

3.15.01.07.07.01 Utility Access Road

The DBT shall ensure continued access to all utility owners' facilities during all phases of construction.

The DBT shall provide the following access by an established road for all utility lines that are to be constructed outside of a paved section of roadway along MD 210:

- Minimum width = 10 feet (unless otherwise noted on the roadway plans)
- Maximum cross slope = 4%
- Capacity for HS 20 vehicle loading
- Turning radius for a Single Unit Truck with a 20' wheelbase and an overall length of 30 feet.
- Access road shall be located beyond the toe or top of slope of the roadway.
- The access road shall be comprised of 4 inches of topsoil over 6 inches of graded aggregate base (GAB).

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3.15.01.07.08 Washington Gas

Washington Gas maintains gas facilities located within the limits of this project that have been found to be in conflict with SHA's conceptual design.

The DBT will be responsible for identifying all impacts to these gas facilities within the limits of this project, perform test pits to verify conflicts, design gas relocation plans; coordinate and receive approvals from SHA and Washington Gas for relocation plans; construct gas relocations. This includes scheduling meetings with Washington Gas and SHA and maintaining ongoing coordination during the entirety of this contract.

Conceptual Washington Gas Relocation plans are being provided in the RFP for informational purposes only. This information is based upon the utility owner's plans and as-built drawings and on SHA's conceptual plans. It is not field verified and SHA makes no representation regarding the accuracy of the information.

The DBT shall identify all potential conflict areas both overhead and underground and perform test pits to verify conflicts. Alternative studies to avoid utility relocations should also be conducted.

Care must be taken when working in the immediate vicinity of any existing Washington Gas facilities. Any damage to existing Washington Gas facilities as a result of the DBT's construction activities will be repaired at the expense of the DBT.

The DBT shall provide relocation design and specifications to Washington Gas for review and approval.

3.15.01.07.08.01 Washington Gas Scope of Work

The limits of work is specified in Section 3.15.01.07.08.04 and shall consist of the design, coordination and construction required for the relocation of existing Washington Gas pipelines impacted by roadway improvements. This document will define the requirements for the protection of Washington Gas facilities within the project limits. These requirements establish the design firms approved for the project, guidelines for conceptual design, submittal requirements, comments from reviews, a project schedule and coordination with the other utility designers. In addition there are requirements for the construction of the relocated facilities, an approved list of contractors, defined methods of construction, materials and suppliers, inspection requirements, construction schedule and estimate, as well as, coordination with the other utility contractors.

The project may impact existing transmission, high pressure, medium pressure, low pressure pipelines and associated services. These facilities may require protection from third party damage and remain in operation or require relocation.

(a) Washington Gas has specific guidelines for the avoidance, protection and/or relocation of facilities which must be followed concurrently with the design and construction of the roadway. These requirements are found in the following Washington Gas Engineering and Operating Standards:

- Design and Construction Standards
- Operations and Maintenance Manual
- Safety Manual

(b) Coordination between the DBT and Washington Gas will be critical to the success of this project. The DBT shall contact Mr. Jeffrey Hicks at 703-750-5972 to begin coordination with Washington Gas.

Washington Gas shall perform all shut downs of existing gas mains and perform all the tie-ins to existing gas mains. The DBT shall construct the tie-ins to the existing gas mains with a Washington Gas Inspector on site. **Tie-ins shall only be performed during the non-heating season (i.e., April 1st – October 1st).**

3.15.01.07.08.02 Adherence to Washington Gas Manuals

The latest edition of all the Washington Gas Engineering and Operating Standards Manuals shall be adhered to with the exclusion of:

- Design and Construction Standards Section 7795 – Paving and Restoration

Upon determination of conflicting requirements between any Washington Gas Engineering and Operating Standard Manuals and the Administration's Standard Specifications for Construction and Materials, the higher standard will be implemented and the conflict will be remanded to the Administration and Washington Gas for resolution.

3.15.01.07.08.03 Definitions

The following definitions apply to both gas main design and construction.

(a) Transmission (TRMN) – Pipelines operating at pressures that produce a hoop stress greater than or equal to 20% of specified minimum yield strength (SMYS) or pipelines classified as transmission lines as established by DOT §192.3..

(b) High Pressure (HP) – Pipelines operating greater than 60 psig and less than 20 percent SMYS.

(c) Medium Pressure (MP) – Pipelines operating between 1.0 psig and 60 psig inclusive, and less than 20 percent SMYS.

(d) Low Pressure (LP) – Pipelines operating below 1.0 psig and at approximately 7.8 inches w.c.

(e) Service Line – A copper, steel or polyethylene line that conveys gas to a customer.

(f) Consolidated Rock – Material that requires hoe ramming, jack hammering or blasting to remove from the trench line.

(g) Carrier Pipe – A pressurized pipe for transmitting natural gas, typically installed through a sleeve or casing.

(h) Normal Soil – Is any type of soil other than consolidated rock.

(i) Casing/sleeve – The water tight, non-pressurized conduit that the gas carrier pipe is inserted into.

(j) Insertion – The method of placing a carrier pipe inside a casing/sleeve.

(k) Horizontal Directional Drilling – The method of installing a pipe by boring a hole below grade by means of a drilling machine and pulling the pipe through.

3.15.01.07.08.04 Relocation Design

The design must meet Washington Gas' design criteria and be suitable for construction.

1. **Impact.** The final list of conflicts shall include utility conflicts and conflicts with existing or proposed underground structures. Washington Gas will review this list prior to design approval.

    a. The 12-inch gas main shall be relocated from STA. 670+50 to Sta. 745+00 along MD 210 (Indian Head Highway). Said limits are in accordance with the agreed upon limits between Washington Gas and the Administration.
    b. The 6-inch gas main shall be relocated from STA 14+30 to STA 16+10 along Kerby Hill Road.

2. **Design Submittal.** The relocation design will include three stages of submittals to Washington Gas. The preliminary concept plan that has been coordinated with the entire Design-Build project. The pre-approved Design Consultant will submit this

design for review and approval/comments. The semi-final design will incorporate changes specified at the preliminary review, as well as, updates to the design-build project. Final design (100%), which will include comments from the semi-final review and update to the design-build project. The semi-final and final submittals will include contract schedule, special provisions and a cost estimate, as well as, three sets of plans.

3. **Review Meetings.** Each design submittal will include a review meeting with Washington Gas to receive the comments.

4. **Coordination.** All three submittals will require coordination with the Design Consultant, as well as, the other utility agencies within the project limits.

3.15.01.07.08.05 Materials

The materials for construction for this project will vary. The DBT shall coordinate with Washington Gas. The contractor shall procure materials that meet the approvals in the Washington Gas Engineering and Operating Standards. Washington Gas shall furnish all pipeline materials to be constructed.

3.15.01.07.08.06 Design Consultants

The design work will include the design of relocated gas mains. The DBT shall procure the services of a pre-approved Design Consultant. The pre-approved Design Consultants include:

1. **EN Engineering** – Keith Johnson, (443) 517-1604, kjohnson@enengineering.com

2. **Pennoni Associates Inc. -** James L. Walker, P.E., (703) 449-6700, jwalker@pennoni.com

3. **GAI Consultants, Inc. –** Justin C. Johnston, AFP, (412) 476-2000, j.johnston@gaiconsultants.com 1

3.15.01.07.08.07 Protection of Existing Facilities

Cover and Separation. The Contractor shall be aware of existing gas mains within the project site. It is important to define the depth of cover while designing and constructing gas pipelines. Table 879A provides guidelines for the required cover based on the type of installation and soil material.

TABLE 879A

A. Type of Installation	Minimum Depth of Cover Normal Soil	Minimum Depth of Cover Consolidated Rock
All new direct burial transmission lines except submerged pipeline in navigable waters	36 in.	36 in.
Navigable rivers, streams, or harbors	48 in. between the top of the pipe and the natural bottom	36 in. between the top of the pipe and the natural bottom
All new direct burial distribution mains	36 in. minimum 36 in. preferred	36 in.
All new direct burial distribution mains on private property	36 in. minimum 36 in. preferred	36 in.
All new direct burial services	36 in.	36 in.
All direct burial replacement mains	36 in. minimum 36 in. preferred	36 in.
All main renewals by insertion except roadway reconstruction	36 in.	36 in.
All main renewals by insertion roadway reconstruction projects	36 in.	N/A
All service renewals by insertion or direct burial replacement services	36 in.	36 in.

Washington Gas shall evaluate exceptions to the minimum depths of cover listed in Table 879A above on a case-by-case basis. This evaluation needs to be performed by Washington Gas personnel listed in the Utility Statement. **All crossings under MSHA roadways shall be at a minimum depth of 5 feet, and shall be sleeved**. Any deviation from the above requirement shall require approval from MSHA District 3 Utility Engineer.

2) Underground Minimum Separation Guidelines. The Contractor shall be aware that the relocated gas mains are required to meet minimum vertical and horizontal separation guidelines. Table 879B summarizes those guidelines.

TABLE 879B

Separation	**Gas Pipe Less than 16 in. in Diameter**	**Gas Pipe 16 in. and Larger in Diameter**
Vertical Clearance	12 in.	24 in.
Horizontal Clearance	12 in.	24 in.

(a) Vertical clearance refers to the vertical separation between the exterior surfaces of gas-carrying pipe and other utility facilities such as pipe, conduit and buried cable, which pass over or under gas-carrying pipe.

(b) Horizontal clearance refers to the horizontal separation between the exterior surface of gas carrying pipe and other facilities running in parallel. This term also applies to the horizontal separation between the exterior surfaces of gas-carrying pipe and man-made objects such as signposts and building foundations.

(c) Where gas piping is found to have or must be installed with less than the desired minimum separation shown in the Table 879B, appropriate insulating and protective measures must be taken as shown in Table 879C.

(i) Septic Tanks and Drain Fields – a gas service must be installed a minimum of 10 feet from a septic tank or any portion of its drain field. This minimum separation has been established by the Health Department Codes of the counties and cities where septic systems may be installed.

(ii) Buried Oil, Gasoline, and Flammable-liquids Tanks – the minimum separation from a buried oil, gasoline, or flammable-liquids tank is 4 feet from any edge of the tank.

(iii) Steam Piping – gas piping must be protected from steam or other high-temperature pipelines. A high temperature pipeline has a surface temperature exceeding 120° F.

3) Insulating and Protective Requirements. The following table lists the insulating and protective requirements for gas piping near other utility pipelines, or other underground structures not associated with the gas facility.

TABLE 879C

Separation	**Insulating/Protective Requirement**
Vertical or horizontal clearance of 6 in. to 12 in.	FRP* plate or clip-on
Vertical or horizontal clearance of less than 6 in.	FRP* plate or clip-on and protective sleeve[1]

*Fiberglass reinforced plastic or approved insulating material, [1]Gray PVC semi-circular sleeve, which comes in 60-inch lengths, or a larger plastic pipe.

3.15.01.07.08.08 Construction

3.15.01.07.08.08.01 Construction in Vicinity of Natural Gas Pipelines and Facilities
Always contact Miss Utility prior to excavating in the vicinity of natural gas facilities at 1(800) 257-7777. In addition, when excavating in close proximity to natural gas facilities it will be necessary to positively locate those facilities by excavating test holes.

Contact Washington Gas Damage Prevention at (703) 750-4205 under the following circumstances:

- Whenever more than five feet of transmission gas main is exposed in an excavation.
- 48 hours in advance of any blasting activity.
- 48 hours prior to excavating over any gas pipeline or in close proximity to any above ground regulating equipment.
- If any exposed gas pipeline is nicked or damaged, contact Washington Gas prior to back-filling the excavation.
- Washington Gas generally requires 3 feet of cover over existing gas mains, should you discover otherwise, please contact Washington Gas with the following information:
  a. Size, material and location of gas main
  b. Length of gas main with less than three feet of cover
  c. Type of loads anticipated over gas main

3.15.01.07.08.08.02 Construction Contractors
In conjunction with this project the contractor shall construct the relocation/adjustment of Washington Gas facilities. Similar to the design, the construction of the gas mains must be

performed by a contractor procured by the DBT and pre-approved by Washington Gas. The pre-approved construction contractors include:

Contractor	Name	Phone No.	E-mail
Dynamic Concepts, Inc	Pedro Alfonso	202-944-8787	palfonso@dcihq.com
Miller Pipeline, Inc	Greg Lindholm	717-825-9221	Greg.Lindholm@millerpipeline.com
Northern Pipeline Construction Company	Marc Porterfield	571-921-0792	MPorterfield@gonpl.com
InfraSource Underground Construction, LLC	Norb Iwanski	804-586-5124	Norb.Iwanski@infrasourceinc.com
Willbros Engineers (U.S.), LLC	Brad Leonard	412-432-6882	brad.leonard@willbros.com
Ferguson Trenching	Kevin Ferguson	410-320-2228	KevinF@FergusonTrenching.com
Danella Atlantic Corporation	Paul Nagel	302-723-3525	pnagel@danella.com
The Fishel Company	Charlie Hutchinson	703-967-1463	cwhutchinson@teamfishel.com
Flippo Construction Company, Inc	Roger Shunnarah	202-345-5037	rshunnarah@flippo.com

3.15.01.07.08.08.03 Excavation Parallel to Gas Main

When excavating for the purpose of installing a utility or structure parallel to a segment of gas main, care should be taken to ensure that the soil supporting the gas main does not fail, leaving the gas main unsupported or allowing the gas main to shift. See section 7790 of the Washington Gas Design and Construction Standards entitled Back-filling and Pipe Support.

Temporary sheeting or shoring systems may be employed to provide support to the gas main in such circumstances. Support or protection of the gas facilities is required when the existing gas main is within the angle of repose of the adjacent soil being excavated. In addition to these guidelines, the cover over the existing gas main, the cover over the proposed utility or structure, and the soil type should also be taken into account when excavating parallel to a gas main.

3.15.01.07.08.08.04 Backfilling and Pipe Support

Whenever gas main is exposed, the area around the gas main must be properly back-filled. In addition, any locating wire that is damaged must be repaired prior to backfilling. Proper warning tape must also be installed above the gas main during backfilling. The proper methods and materials to be used during backfilling are described in section 7790 of the Washington Gas Design and Construction Standards entitled Back-filling and Pipe Support.

3.15.01.07.08.08.05 Inspection

The DBT shall notify Washington Gas at least 1 week prior to beginning construction of Washington Gas' facilities. An inspector, provided by Washington Gas, will inspect all construction of Washington Gas' facilities.

3.15.01.07.08.08.06 Measurement and Payment

The payment for all costs accrued in designing, constructing, performing the work, working around or protecting gas main facilities, coordinating and cooperating with utility agencies or their contractors, complete and to the satisfaction of Washington Gas and the Administration, shall be included as a separate lump sum item. The DBT shall complete the OOC36 Form (item-by-item cost breakdown of Washington Gas' items that are constructed) for each Washington Gas relocation and submit the form to Washington Gas and SHA within 30 Calendar days of Washington Gas' acceptance of the work. The quantities documented in the OOC36 form must be in agreement with the as-built drawings.

The DBT shall provide an item-by-item breakdown of the lump sum price for Washington Gas facilities upon completion of the final design.

3.15.01.07.09 Washington Suburban Sanitary Commission (WSSC)

WSSC maintains water and sanitary sewer facilities located within the limits of this project that have been found to be in conflict with SHA's conceptual design.

The DBT will be responsible for identifying all impacts to these water and sanitary sewer facilities within the limits of this project, perform test pits to verify conflicts, design water and sanitary sewer relocation plans; coordinate and receive approvals from SHA and WSSC for relocation plans; construct water and sanitary sewer relocations. This includes scheduling meetings with WSSC and SHA and maintaining ongoing coordination during the entirety of this contract.

Conceptual WSSC Relocation plans are being provided in the RFP for informational purposes only. This information is based upon the utility owner's plans and as-built drawings and on SHA's conceptual plans. It is not field verified and SHA makes no representation regarding the accuracy of the information.

The DBT shall identify all potential conflict areas both overhead and underground and perform test pits to verify conflicts. Alternative studies to avoid utility relocations should also be conducted.

Care must be taken when working in the immediate vicinity of any existing WSSC facilities. Any damage to existing WSSC facilities as a result of the DBT's construction activities will be repaired at the expense of the DBT.

The DBT shall provide relocation design and specifications to WSSC for review and approval.

3.15.01.07.09.01 Relocation of WSSC Water and Sewer Facilities Scope

This work will be specified by WSSC and will consist of designing, furnishing and installing all relocations, replacements and/or new installations of existing or proposed water mains, sewer mains and appurtenances owned by WSSC within the project limits. The DBT shall submit to WSSC for review, all locations within the project limits within close proximity to any WSSC facilities.

3.15.01.07.09.02 Adherence to WSSC Manuals

The latest edition of the WSSC General Conditions and Standard Specifications and all special provisions and special conditions shall be adhered to with the exclusion of:

- The following General Condition Articles:
- 3-5, 7-13, 15-18, 22-24, 26, 28-30, 32, 33, 38, 39
- All "Measurement and Payment" sections
- Section 01570 – Temporary Erosion and Sediment Control
- Section 02070 – Geosynthetics
- Section 02230 – Site Clearing
- Section 02370 – Slope and Watercourse Protection
- Section 02820 – Fences and Gates
- Section 02920 – Lawns and Grasses
- Section 02930 – Exterior Plants
- Section 02950 – Pavement Restoration

The latest edition of the WSSC Pipeline Design Manual and the latest edition of the WSSC Standard Details for Construction shall be adhered to. Upon conflicting requirements between any WSSC Manual and the Administration's Standard Specifications for Construction and Materials, the higher standard will be implemented and the conflict will be remanded to the Administration and WSSC for resolution.

3.15.01.07.09.03 Coordination with Other Work

The DBT shall coordinate the work on, and location of the WSSC's facilities to avoid conflicts with work by others, including the DBT roadway and drainage design.

3.15.01.07.09.04 Preliminary Design Phase

As a first order of business involving facilities owned by WSSC, DBT Contractor shall:

1. Consult with WSSC to understand WSSC's requirements for the Project and review available data.
2. Obtain such additional geotechnical and related information that it deems necessary for performance of the Work.

3. On the basis of WSSC's requirements for the Project, prepare Preliminary Design Phase Documents consisting of final design criteria, preliminary plans, and written descriptions of the Project.
4. Furnish the Preliminary Design Phase Documents for review by WSSC. WSSC will respond within 30 calendar days of the Administration's receipt by providing written acceptance or rejection of the Preliminary Design Phase Documents. If the Preliminary Design Phase Documents are rejected WSSC will provide reason for rejection and the DBT Contractor shall address the problems and resubmit the Preliminary Design Phase Documents to WSSC. Every resubmission of the Preliminary Design Phase Documents to WSSC will constitute the beginning of a 30 calendar day review period for WSSC.

Plan submissions to WSSC should be sent to the following:

Ms. Magda El-Khawalka, PE – Relocations Unit Coordinator

Washington Suburban Sanitary Commission

14501 Sweitzer Lane

Laurel, MD 20707

A copy of all submissions to WSSC shall be delivered to the Administration concurrently.

3.15.01.07.09.05 Final Design Phase

After written acceptance by WSSC of the Preliminary Design Phase Documents DBT Contractor shall:

1. On the basis of the accepted Preliminary Design Phase documents, prepare Final Plans showing the scope, extent, and character of the Construction to be performed and furnished by DBT Contractor.
2. On the basis of the Final Plans prepare an item-by-item breakdown of the lump sum price for the proposed work. The item-by-item breakdown will be used to determine cost responsibilities between the Administration and WSSC.
3. Furnish the Final Plans and the item-by-item breakdown for review by WSSC. WSSC will respond within 30 calendar days of the Administration's receipt by providing written acceptance or rejection of the Final Plans. If the Final Plans are rejected WSSC will provide reason for rejection and the DBT Contractor shall address the problems and resubmit the Final Plans to WSSC. Every resubmission of the Final Plans to WSSC will constitute the beginning of a 30 calendar day review period for WSSC.

Plan submissions to WSSC should be sent to the following:

Ms. Magda El-Khawalka, PE – Relocations Unit Coordinator
Washington Suburban Sanitary Commission
14501 Sweitzer Lane
Laurel, MD 20707

A copy of all submissions to WSSC shall be delivered to the Administration concurrently.

3.15.01.07.09.06 Anticipated Impacted Water and Sanitary Sewer

3

The following water main and sanitary sewer main and appurtenances owned by WSSC are known to be within the project limits and shall be relocated or replaced unless the Design-Builder can demonstrate to WSSC's satisfaction that the work is not necessary based on the final design.:

- 20" Water – STA. 684+18, LT.
- 10" Water – STA. 687+60, LT./RT.
- 20" Water – STA. 694+73, LT.
- 10" Sewer – STA. 698+75, LT.
- 8" Water – STA. 706+31, LT./RT.
- 8" Water – STA. 706+31, RT. TO STA. 713+75
- 8" Sewer – STA. 713+75, LT./RT.
- 4" WHC – STA. 716+80, RT.
- Water Meter Vault – STA. 716+89, RT.
- 3" WHC – STA. 719+75, RT.
- Water Meter Vault – STA. 719+75, RT.
- 8" Sewer – STA. 724+52, LT./RT.
- 12" Water – STA. 727+35, LT./RT.
- 21" Sewer – STA. 741+58, LT./RT.
- 12" Water – STA. 13+30, RT. TO STA. 16+42
- 8" Sewer – STA 13+84, LT. TO STA. 16+86, RT.

Fire hydrants along the northbound roadway of MD 210. (Fire Department Connections shall be installed through the noise wall at locations of impacted fire hydrants and as deemed necessary as part of the final design process. **Access doors through the noise walls shall be installed adjacent to said fire hydrants** and be equipped with the **Knoxbox 3200 Series Lock Box** in accordance with Prince George's County Fire Department requirements. A minimum 30-inch clear area shall be provided around the fire hydrants.

The DBT Contractor shall be responsible for removal and resetting of all water meters and gate valves that are impacted during the construction of this project. The placement of water meters and gate valves shall be in accordance with WSSC design standards.

3.15.01.07.09.07 Crossings

All crossings shall be made as close to a right angle to the centerline of the highway as possible. The protection guidelines set forth by WSSC shall be adhered to. For sewer lines, see Part Two, Section 10 of the Sewer Design Guidelines (http://www.wsscwater.com/home/jsp/content/pdmpart2.faces). For water lines, see Part One, Section 17 of the water design guidelines (http://www.wsscwater.com/home/jsp/content/pdmpart1.faces). **The DBT shall use Class 54 or higher ductile iron pipe for crossings under MD 210 (Indian head Highway).**
For Common Design Guidelines, See Part Three.

(http://www.wsscwater.com/home/jsp/content/pdmpart3.faces).

3.15.01.07.09.08 Horizontal and Vertical Clearances

The following requirements shall be maintained by the DBT:

- For pipelines 14-inch and smaller in diameter, provide a minimum of ten (10) feet separation centerline to centerline of the two pipelines.
- For pipelines 16-inch to 24-inch in diameter, provide a minimum of ten (10) feet separation OD to OD of the two pipelines.
- For sanitary sewer lines in close proximity to storm water management facilities, provide a minimum of (10) feet separation measured from the centerline of the pipeline to the top of bank.
- Minimum 42 inches of vertical cover is required over WSSC's facilities.
- Sanitary sewer manholes are to be placed a minimum of five (5) feet from the proposed noise wall.
- Casing pipes are to be extended a minimum of five (5) feet beyond the proposed noise wall.

In the event that the minimum separation cannot be provided between sanitary sewer line(s) and the stormwater facilities, the DBT shall seek the approval of WSSC for alternative design considerations to safe guard against infiltration into sewer pipelines. The following options may be considered:

1. **Installation of pond liners, or**
2. **Encasement of sewer pipeline**

For all other clearance requirements, the DBT is referred to Part Three of WSSC's Design Manual.

3.15.01.07.09.09 WSSC Representative

A WSSC Representative from WSSC System Inspection Group will visit the Construction site regularly. After acceptance of the Final Plans all communication with WSSC shall take place through the WSSC System Inspection Contract Representative.

3.15.01.07.09.10 Materials

The DBT shall furnish all material. The DBT will procure materials referred to in WSSC Manuals as "to be furnished by the Commission" from the latest WSSC Approved Manufacturers and Materials List or equals approved by WSSC.

3.15.01.07.09.11 Construction

After written acceptance by WSSC of the Final Plans, the DBT shall supervise and direct the Construction, competently and efficiently, devoting such attention thereto and apply such skills and expertise as may be necessary to provide the construction in accordance with the requirements of WSSC. **The Construction Contractor must have performed satisfactory work on WSSC facilities, as related to the scope of work on this contract within the last five (5) years. The Construction Contractor must have in his possession and on the job site, a copy of the latest edition of the WSSC General Conditions and Standards Specifications and WSSC Standard Details.**

Prior to the start of construction, the Construction Contractor shall arrange a meeting with the WSSC representative to walk the project to determine which manhole frames and covers and water valve boxes are damaged and are to be replaced. The DBT shall be responsible to ensure that the completed construction complies accurately with the Contract Documents and shall keep WSSC advised to the quality and progress of the construction.

3.15.01.07.09.11.01 Insurance

WSSC shall be listed as an additional named insured on the policy acquired to fulfill the requirements in the Administration's Standard Specifications for Construction and Materials section TC-5.01 (Insurance). Evidence of insurance shall be provided to WSSC, prior to performing any work related to WSSC facilities, by the same means as specified in the Administration's Standard Specifications for Construction and Materials section TC-5.01 (Insurance) for providing evidence of insurance to the Administration. The contractor shall provide a waiver of subrogation applicable to WSSC and its employees while such employees are performing work for or on behalf of WSSC.

3.15.01.07.09.11.02 Customer Relations

The DBT shall have an onsite representative to act as a liaison between WSSC and the community. This representative shall be responsible for all customer Notifications, Customer Complaints, and any coordination efforts that may arise throughout the duration of the contract. This person must correspond with the designated WSSC Contract Manager in a timely manner, on all WSSC related issues.

3.15.01.07.09.11.03 Inspection

The DBT shall notify WSSC at least 1 week prior to beginning construction of WSSC facilities. An inspector, provided by WSSC, will inspect all construction of WSSC facilities. The DBT shall pay all costs for such inspection to ensure compliance with the standards and details of WSSC.

3.15.01.07.09.11.04 Testing

The DBT shall be responsible for all testing required by WSSC. Concurrent with the acceptance of the Final Plans, WSSC will provide to the DBT forms and instructions to be used by the Engineer, licensed to practice in the State of Maryland, to perform compaction tests. The location and depth of the tests are to be designated in the WSSSC General Conditions and Specifications. The DBT shall provide WSSC with copies of all test performed. WSSC reserves the right to require additional compaction tests as it may deem necessary.

3.15.01.07.09.11.05 Reports

Documentation of the construction of WSSC facilities shall be computer generated WSSC supplied forms and submitted on a weekly basis via email and in CD format. Documents to be included with the reports shall include, but not limited to photographs, compaction reports, correspondence (emails or letters), field orders, and change orders. The reports must be approved by the WSSC Engineer. Reports that are rejected must be resubmitted with corrections made.

3.15.01.07.09.12 Final Inspection

Within seven calendar days of receiving written notice from DBT Contractor that the entire Construction of WSSC facilities or an agreed upon portion thereof is complete, WSSC will make a final inspection with the DBT Contractor. Within 30 calendar days of the final inspection WSSC will notify DBT Contractor in writing of all particulars in which this inspection reveals that the Construction is incomplete or defective. DBT Contractor shall immediately take such measures as necessary to complete such Construction or remedy such deficiencies.

3.15.01.07.09.13 As-Built Plans

DBT Contractor shall provide WSSC with as-built plans prior to the Acceptance of Work by WSSC. The as-built plans shall be rendered according to the instructions of WSSC.

3.15.01.07.09.14 Acceptance of Work

After DBT Contractor has completed all corrections required by the Final Inspection to the satisfaction of WSSC and has delivered all required submittals to WSSC, DBT Contractor shall inform WSSC in writing that the Work is complete. If WSSC is satisfied that the work has been completed and DBT Contractor's other obligations have been fulfilled, WSSC will inform the Administration that the Work is acceptable. Otherwise, WSSC will indicate in writing to the DBT Contractor the reason for refusing acceptance of the work.

3.15.01.07.09.15 Quality Control

If WSSC objects to the performance of any part of the DBT team, WSSC will communicate this to the Administration and the objection will be addressed by the Administration.

3.15.01.07.09.16 Measurement and Payment

The payment for all costs accrued in designing, furnishing the materials and performing the work, complete and to the satisfaction of WSSC and the Administration, shall be included in the DBT contract as a separate lump sum price for WSSC work as defined in TC 7. The DBT shall complete the OOC36 Form (item-by-item cost breakdown of WSSC items that are constructed) for each WSSC relocation and submit the form to WSSC and SHA within 30 Calendar days of WSSC's acceptance of the work. The quantities documented in the OOC36 form must be in agreement with the as-built drawings

TC 3.16 MAINTENANCE OF TRAFFIC (MOT) PERFORMANCE SPECIFICATION

3.16.01 General

The Design-Builder shall develop and implement a Transportation Management Plan (TMP) in accordance with the requirements of this specification including performance requirements, standards and references, design and construction criteria, maintenance during construction, and required reviews.

This performance specification provides the flexibility to establish a TMP and to adapt maintenance of traffic (MOT) operational changes throughout the Project life to produce benefits or savings to the Administration or the Design-Builder without impairing the essential functions and characteristics of the Project, such as safety, mobility, traffic operations, durability, desired appearance, maintainability, environmental protection, drainage, and other permitted constraints.

Work zone impacts, including impacts on the environment and surrounding communities, shall be kept to a minimum, and shall be considered when developing and implementing the Transportation Management Plan. To that end, a Transportation Management Plan Report shall be developed by the Design-Builder. The TMP Report will lay out transportation management strategies and how these strategies will be implemented to manage work zone impacts.

3.16.02 Guidelines and References

The Design-Builder shall design and implement maintenance of traffic set-ups in accordance with the relevant requirements of the standards listed by priority in Table 1 unless otherwise stipulated in this specification. Standards specifically cited in the body of this specification establish requirements that shall have precedence over all others. Should the requirements in any standard below conflict with those in another, the standard listed with the higher priority shall govern. It shall be the Design-Builder's responsibility to obtain clarification for any unresolved or perceived ambiguity prior to proceeding with design or construction.

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
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
30	SHA	Bicycle Policy & Design Guidelines

3.16.03 Performance Requirements

Administration responsibilities

The Administration's responsibilities include the following activities:

A) Maintaining Quality Assurance (QA) of any MOT analysis, work zone impact management strategies and temporary traffic control plans from the Design-

Builder;

B) Liaising with and monitoring the Design-Builder's performance for compliance with this Contract's requirements;

C) Maintaining documentation for the TMP as developed by the Design-Builder;

D) Providing a trained individual to implement and monitor the TMP during construction;

E) Monitoring implementation of the TMP to verify that strategies are being implemented on schedule and in the manner planned, and that they are effectively managing the work zone impacts.

Design-builder personnel requirements

This project requires the Design-Builder to have a team experienced in Maintenance of Traffic, including work zone design, work zone traffic analysis, and traffic control devices and setups.

Traffic Manager:

The Design-Builder shall provide a Traffic Manager (TM) on-site whose sole responsibility is to supervise and continuously monitor the installation and maintenance of all traffic control devices. The TM shall be equivalent to, meet the requirements of, and perform all duties of Section 104.18 of the Administration's Standard Specifications for Construction and Materials. The Design-Builder shall authorize the TM to direct traffic changes to ensure safe and continuous traffic flow and to direct traffic operations after a traffic incident has occurred. A TM shall be available at all times and be on-site within a ½ hour throughout the duration of the Project. The TM shall document all daily maintenance of the traffic control setup, including but not limited to maximum queue lengths/delays, work zone modifications, incidents, and suggested improvements. Minimum qualifications of the TM include successful completion of the Administration's Temporary Traffic Control Traffic Managers Training Course and five years experience in work zone traffic control.

Flaggers:

The Design-Builder shall provide flaggers with a current American Traffic Safety Services Association (ATSSA) flagging certification.

3.16.03.02 Maintenance of Traffic – General Requirements

All maintenance of traffic design and implementation shall be performed in accordance with the following performance requirements:

A) Provide for the safe and efficient passage of pedestrians (including those with disabilities), bicycles, and vehicular traffic through and around construction zones;

B) Prohibit use of new permanent pavement construction as haul route(s);
C) Minimize negative impacts on residents, commuters, and businesses;
D) Provide convenient and logical rerouting of traffic (by using advance warning systems and directional and informational signing, lighting, and striping) to provide "driver friendly" detours and to maximize the safety of the traveling public;
E) Maintain and provide access at all times to property by owners, customers, visitors, and emergency vehicles;
F) Provide a safe travel corridor while minimizing any unnecessary investment in the existing infrastructure that is being replaced;
G) Develop and coordinate MOT activities with the Maryland State Police, local law enforcement, and other emergency service agencies to ensure public safety and emergency response times are not compromised;
H) Coordinate MOT activities and Traffic Control Plans with other construction projects;
I) Provide Traffic Control Plans (TCPs) for each major phase of construction (see Section 3.16.06 of this performance specification); and
J) Provide for a Public Outreach campaign to be implemented in cooperation with the Administration.
K) 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:

A) Implement Traffic Control Plans for all roadways within the Project limits in a manner that safely and efficiently accommodates traffic at all times.
B) Provide all material, labor, equipment, and personnel to effectively carry out the TMP. All equipment and tools shall be in good operating condition and shall be kept in proper adjustment throughout the duration of the project. All materials and supplies shall be of good quality and suitable for the assigned work.
C) Provide and use all safety equipment including (but not limited to) hard hats, safety vests and clothing required by State and Federal regulations and SHA policies and procedures.
D) Begin maintenance of traffic activities at the start of construction work (including preparatory MOT work), or when first hauling construction materials and/or equipment, whichever is earliest and continue MOT activities until Completion of the Project.
E) Arrange and host a pre-traffic switch meeting with the Administration and all affected agencies at least two weeks prior to switching traffic.
F) Identify desired full roadway closures (for any period of time) to the

Administration for review and concurrence during the design review process.

G) Correct all traffic control deficiencies immediately upon notification or observance of the deficiency.

H) Design all geometric aspects of temporary roadways for the assigned posted speed.

I) Design all active roadways to accommodate drainage such that there are no puddles or icing on the traveled roadway or shoulders.

J) Ensure appropriate MOT and flagging procedures are employed during all phases of construction, including mobilization activities.

3.16.04.02 Public Information and Outreach

Actively assist the Administration in providing advance information to the public regarding construction phasing, detour routes, and expected travel impacts. Actively coordinate these activities through frequent meetings with the Community Outreach Manager. Coordinate with the Administration regarding special events that may affect traffic patterns through and around the Project limits and adjust the TMP and TCPs as needed.

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.

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Detour routes shall be required when complete road or ramp closures or elimination of a particular movement or movements at an intersection approach are necessary. Proposed detour routes shall be included in the Traffic Control Plans and reviewed through the design review process (see Section 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.

The Administration will allow for the closure of the left in and left out movements at the MD 210/Kerby Hill Road/Livingston Road intersection. The duration of the closures must be minimized and the Design-Builder must submit a schedule in writing to the Administration for review and approval outlining the specific duration of the closures prior to implementing the closures. The signed detour routes are anticipated to include the following:

- MD 210 Southbound Left – Detour traffic to Livingston Road from MD 414 and MD 210.
- MD 210 Northbound Left – Detour passenger car traffic to turn left at MD 210/Old Fort Road Road intersection then travel north along Oxon Hill Road. Truck traffic will be detoured to the MD 210/MD 414 interchange to then travel south along MD 414 and Oxon Hill Road.
- Kerby Hill Road Eastbound Left – Detour traffic to Oxon Hill Road northbound to MD 414 and MD 210.
- Livingston Road Westbound Left – Detour traffic to Tucker Road then Palmer Road to MD 210.

If the Design-Builder chooses to implement left turn restrictions at the MD 210/Kerby Hill Road/Livingston Road intersection, the following off-site intersection modifications must be in place prior to implementing the detour plan:

1. If existing then modify, or provide (furnish, install), as required, all traffic control devices to modify the westbound approach of Saint Barnabas Road at Tucker Road to provide an exclusive left turn lane and an exclusive through lane within the existing roadway footprint.
2. If existing then modify, or provide (furnish, install), as required, all traffic control devices (including signals) to modify the westbound approach of Saint Barnabas Road at Bock Road to provide an exclusive left turn lane and a shared through and right turn lane within the existing roadway footprint.
3. If existing then modify, or provide (furnish, install), as required, all traffic control devices to modify the southbound approach of Tucker Road at Palmer Road to provide a free right movement in the westbound direction within the existing roadway footprint.

The Design-Builder must submit calculations in support of the turn lane storage provided and must include the plans associated with the above noted intersection modifications in addition to any signing associated with the detour routes for review and approval as part of the TMP submission. Detour signing must include advanced route turn and route turn signing at key intersections requiring a change in direction and confirmatory signs at major intersections for through movements.

The above noted intersections must be restored to the pre-construction geometrics after the detours are removed. Existing pavement markings to be removed to implement the above noted intersection modifications require milling and overlaying the portion of the roadway affected by the new pavement markings, edge to edge. In addition, all temporary pavement markings for the above noted intersection modifications must be thermoplastic. Markings for the temporary conditions must be removed through milling and overlaying of the impacted roadways, edge to edge. All markings installed to restore the roadways to the pre-construction geometrics must be thermoplastic.

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. Note: The Design-Builder shall, at a minimum, maintain right-in and right-out movements at Kerby Hill and Livingston Road.

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

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Type 1- Planned and acceptable closures of an arterial or local street, partial closure of MD210/Kerby Hill Road/Livingston Road intersection, 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.

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

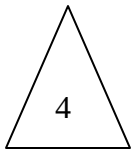
The TMP shall be submitted to the Administration for review at the Definitive Design stage. No construction shall occur until the Administration's comments have been successfully addressed.

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 along with plans for any off-site modifications to local roads to accommodate detoured or diverted traffic including restoration plans to return the site to pre-construction condition;

E) 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 STORMWATER MANAGEMENT

Item	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, 2009".
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"
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", 2010
16	SHA	Maryland State Highway Administration Stormwater NPDES Program dures Manual 1981 or as amended herein and any revisions thereof.
17	MDE	Environmental Site Design Process & Computations, 2010
18	MDE	Environmental Site Design Redevelopment Examples, 2010
19	MDE	Stormwater Design Guidance – Addressing Quantity Control Requirements, 2012
20	MDE	Stormwater Design Guidance – Submerged Gravel Wetland, 2012
21	SHA	Manual for Hydrology and Hydraulic Design, 2011 Revision : Office of Structures
22	SHA	Office of Structures, Policy and Procedure Manual
23	SHA	Office of Structures Standards Manual, Volumes I and II

3.17.1.1 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 references help establish requirements - other publications and reference documents may be relevant.

TABLE 2
REFERENCES FOR STORMWATER MANAGEMENT AND TOTAL MAXIMUM DAILY LOAD

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"

TABLE 2
REFERENCES FOR STORMWATER MANAGEMENT AND TOTAL MAXIMUM DAILY LOAD

Author or Agency	Title
MDE	Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated – Guidance for National Pollutant Discharge Elimination System – June 2011 Draft.

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"
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.
10	MDE	Regulations COMAR 26.17.04 "Construction on Nontidal Water and Floodplains."
11	MDE	"Guidelines for Construction on Nontidal Waters and Floodplains."
12	MDE	Regulation COMAR 26.08.02.10, "Water Quality Certification"
13	SHA	"Stormwater Management, Erosion and Sediment Control and Waterway Construction Permit Issues and Approaches"
14	NRCS	Pond Code MD-378
15	SHA	"SHA Stormwater Site Development Criteria - Review Guidelines"

3.17.02.02 References

Use the references listed in Table 2 as supplementary materials for the design and construction of the drainage system, stormwater management, and erosion and sediment control measures. These publications have no established order of precedence.

TABLE 2
REFERENCES FOR DRAINAGE

Author or Agency	Title
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. The design and construction the drainage system shall include the repair and/or replacement of unstable or deteriorating outfalls, inlets, manholes, cross culverts or pipes, or other drainage structures, clean-out of existing clogged inlets, as well as the replacement of any existing brick structures regardless of condition within the Project Limits. Design also includes the repair 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. The Design-Builder shall provide completed designs for all temporary and permanent pipe systems and obtain Administration approval prior to their construction.

F. Not 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.

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.

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 ½ the culvert height and the culvert outlets onto flat areas with no defined channel.
     Provide flanker inlets – 50ft upgrade from sump inlets
   - Tailwater is less than ½ 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 ½ 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 project; however, if a revised roadway improvement scope is implemented, it is the Design-Build Team's responsibility to provide management acceptable to the SHA and MDE.

3.17.03.03.01 BMP Selection

Submit the proposed SWM facility types for the Administration’s consultation and written comment prior to advancing SWM design. The Administration will use the following criteria in evaluating proposed facilities:

A. The best fit given the site context, the adjacent community, and the local ecology.

B. Non-structural and ESD 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

3

A. Provide Water Quality treatment of stormwater runoff according to the afore-mentioned regulations and guidelines. Account for new impervious area, impervious area removed, redevelopment, loss of existing water quality, and treatment provided. A conceptual Water Quality Summary Sheet (WQSS) for this project is included in

the concept SWM report provided on Projectwise. The final WQSS, using the same format, shall be completed by the Design-Build Team based upon the Final Design. No minimum water quality credit is required as part of the Final Design; however, any net debit will not be allowed. Upon approval and signature by MDE, provide to the Administration's Highway Hydraulics 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 each time MDE issues a modification to 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. Geotextile is not acceptable. Anchor pipes extending into ponds against flotation.

I. Plant SWM embankments with impervious cores and/or cut-off trenches with herbaceous plants or turf grass. Do not plant woody material on such embankments, within 15 feet of the toe of pond embankments, or within 25 feet of pond outfall structures. Allowable material for the SWM embankment clay core and cut-off trench conforms to A-2-7, A-7-2, A-4-7, A-7-4, or A-7. Maximum particle size is three inches.

J. Use filter diaphragms for embankment seepage control. Anti-seep collars are not allowed unless specifically approved.

K. Obtain a BMP number for each structural 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.

3.17.03.04 Erosion and Sediment Control (ESC)

Design, obtain approval from MDE and the Administration, and implement an E & S Plan and Sequence of Construction. Obtain all approvals prior to commencing earth disturbing activities.

3.17.03.04.01 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 $66,918.00 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/or replacement of any and all erosion and sediment control devices damaged by the severe weather event and for all material, labor, equipment, tools, and incidentals necessary to complete the work. The payment for each severe weather event will only be made if a minimum rating of "B" immediately before and within 48 hours following the severe weather events is maintained and upon receipt of official weather records documenting the occurrence of the severe weather events.

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 cut or fill slopes whenever the vertical height of any 2:1 slope exceeds 20 ft; and 30ft for 3:1, and 40 ft for 4:1 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.

The Design-Builder shall 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

The noise wall standards shall include, but may not be limited to, the standards and criteria included in Section VI and IX of the "Specifications for Consulting Engineer's Services, Volume II, April 1986."

The noise wall system shall be based upon standards, criteria and policies established by the Administration, Section VI and IX, of the "Specifications for Consulting Engineering Services, Volume II, April 1986" and shall be in accordance with the following:

- SHA Standard Specifications for Construction and Materials.
- SHA Office of Structures Approved List of Noise Wall Systems.
- AASHTO Guide Specifications for Structural Design of Sound Barriers.
- FHWA Traffic Noise Model, Version 2.5.

Additional details on the aesthetic, structural, and geotechnical requirements for the noise wall can be found in the Structures Performance Specification and the Geotechnical Performance Specification.

3.18.01 Noise Barrier Systems

These factors are in addition to the requirements specified by SHA for its standard noise barrier systems.

1. The Design-Build Team shall design and construct the following noise barrier systems as shown on the Concept Plans:

   - Noise Barrier System 1 (NB01) on the west side of MD 210 between Sta. 672+42 ± RT. and Sta. 743+85 ± RT.
   - Noise Barrier System 3 (NB03) on the east side of MD 210 between Sta. 759+87 ± LT. and Sta. 724+09 ± LT.
   - Noise Barrier System 4 (NB04) on the east side of MD 210 between Sta. 710+04 ± LT. and Sta. 677+36 ± LT.
   - Additionally, a noise barrier will be mounted on the north side of bridge SB01 as shown on the Concept Plans.

   The Design-Build Team may modify the horizontal and/or Top of Wall configuration of the noise barrier systems provided:

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a. The line of sight break provided by the noise barrier system for any benefited residence or benefited outdoor noise sensitive use (ONSU) is not reduced from that provided by the preliminary engineering barrier system, AND

b. The noise reduction provided by the noise barrier system at any benefited residence or benefited outdoor noise sensitive use (ONSU) is not reduced from that provided by the preliminary engineering barrier system.

c. If changes are being proposed along the conceptual design Top of Wall profile, then the analysis of these changes shall be conducted in consultation with and approved by the SHA Office of Planning & Preliminary Engineering (OPPE) Environmental Planning Division (EPLD) Noise Abatement Design & Analysis Team (Noise Team) and, where required, revisions to the barrier design shall be developed so as to satisfy the provisions established under items "a." and 'b." above.

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In order to simplify the optimization process, it is intended that the Design-Build Team's acoustical personnel meet with the SHA OPPE EPLD Noise Team for a time of instruction to discuss the Level-Top barrier analysis methodology, the barrier analysis spreadsheet tools, the noise abatement performance specifications, and the approval process. It is recommended that the TNM Data Files provided be used for any profile optimization and noise barrier horizontal adjustments, because these models have already been validated and approved. Z-elevation changes resulting from refined topographic surveys can be applied to the existing TNM object XY coordinates. Changes to the roadway design elements beyond the Z-elevations may require additional review. The consultation and approval process between the Design-Build Team and the SHA OPPE ELPD Noise Team is defined below for each noise barrier system where changes are being proposed to the roadway geometry, noise barrier horizontal alignment, or Top of Wall profile:

i. The Design-Build Team shall submit a calculated FHWA TNM model containing the proposed changes. At a *minimum* the calculated receptors shall match the receptor locations (X and Y coordinates) provided in the TNM Data Files for the pertinent noise barrier system. Any changes to the Z coordinates of receptors shall be submitted in writing and along with any associated digital terrain models.
ii. The Design-Build Team shall provide the TNM results with a 50-dB(A) background noise level adjustment using SHA's latest barrier analysis spreadsheet tool.
iii. The Design-Build Team shall provide a legible PDF mark-up of the pertinent barrier analysis mapping from the noise report, which shows the revised noise levels and insertion losses, benefited hatching, and noise barrier alignment.

1. Alternatively, the Design-Build Team may elect to produce new barrier analysis PDFs that mimic the format and content of the related noise report mapping; however, any associated CAD files must also be included.

iv. The Design-Build Team shall provide a Minimum Acceptable Noise Reduction Goals table that shows how the new results compare to the minimum acceptable goals contained in the pertinent Appendix E table of the noise report.

v. The Design-Build Team shall provide a Minimum Acceptable Line-of-Sight Elevations table (see examples in Appendix E of the noise report) that shows any revised barrier stationing, ground elevations, and Top of Wall elevations where each barrier segment represents a barrier panel. The columns for critical line-of-sight height, line-of-sight elevations, and governing receptors may remain blank, provided that the calculated TNM Run with the revised Level-Top Single-Drop Top of Wall profile contains a line-of-sight check for each critical sensitive and limit receptor as defined on the mapping and in the noise report Appendix E "noise reduction goals" tables. Generally, each line-of-sight check should prove by the absence of "red stars" that the receptor is adequately blocked. However, if there are instances where the TNM "red stars" are thought to be erroneous or irrelevant to the acoustical design, then those checks must be clearly identified along with a written explanation as to why it is thought that the line-of-sight should still be acceptable at the particular receptor.

1. Alternatively, the Design-Build Team shall provide the line-of-sight check data for each critical sensitive and limit receptor using SHA's latest barrier analysis spreadsheet tool along with the supporting *uncalculated* line-of-sight TNM model. For this approach, the Design-Build Team must fill-in each column of the Minimum Acceptable Line-of-Sight Elevations table.

vi. The Design-Build Team shall submit the noise barrier's revised horizontal alignment design coordinates and CAD line work.

vii. The Design-Build Team shall submit any changes to the roadway geometry (horizontal or vertical) in CAD format (including proposed surfaces, cross-sections, and plan views).

viii. The SHA OPPE EPLD Noise Team shall review the submitted material for the proposed changes and respond within **10** business days for each barrier system, meaning data for two barrier systems that arrive at the same time could necessitate twice the amount of review time. Written approval will be transmitted via e-mail to the Design-Build Team acoustical lead. Proposed changes that are <u>not</u> approved will be accompanied by recommended actions or solutions that will make the acoustical design acceptable.

The Design-Build Team is encouraged to have open communication with the SHA OPPE EPLD Noise Team (beyond the strict approval process outlined here) via e-mail, phone, or meetings to address questions and resolve any issues.

The Design-Build Team will be provided with data related to the preliminary engineering noise barrier systems. Data will include details such as:

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a. The *PG700B21 MD210 at Kerby Hill Road Interchange Type I Technical Noise Analysis Report*, dated May 30, 2014, Revised January 15, 2015 AND

b. Preliminary engineering phase noise barrier acoustical analyses, including FHWA TNM data files.

2. The Design-Build Team shall provide a noise barrier system with a top of barrier profile as smooth and consistent as possible, using the following guidance:

   a. If using stepped rectangular noise wall panels, step panels in a uniform manner. For example, rather than having three level panels followed by a one-foot step, have four panels, each with 3 inch steps.

   b. For rectangular noise wall panels, keep steps at a maximum of 6 inches.

   c. For rectangular noise wall panels, transition uniformly from level sections or between steps of various dimensions. For example …6”step, 6” step, 6” step, 4” step, 2” step, 2” step, 2” step, 2” step, …; or level section, 2” step, 4” step, 6” step, 6”step, 6” step, …

   d. Do not construct noise walls less than seven (7) feet in height above the finished ground elevation.

3. The Design-Build Team shall provide noise walls with aesthetic designs which are compatible with the structural and engineering aspects of the noise barrier system design applying the following guidance:

   a. Any stacking of panels shall insure that the joint(s) between stacked panels is consistent with the specific aesthetic design pattern of the noise barrier system. This consistency applies not just to the panels between two posts but between all panel sections within the noise barrier system. Do not intersperse full height and stacked panels on a continuous section of a noise barrier system. If such consistency cannot be assured, use full height panels.

   b. No form liner joint seams shall be visible in the constructed noise barrier system unless they are an integral part of the noise barrier system’s aesthetic design. This applies to all components of the noise barrier system (panels, posts, caps, etc.) and applies to both full height and stacked panels designs.

c. Keep post spacing consistent. Vary only if dictated by engineering design requirements such as drainage features, utilities, etc.

d. Noise barrier panels and posts are integral parts of the aesthetic design of the noise barrier system. Post type and design shall be compatible with the panel design in terms of texture, color, acoustical profile, and scale.

e. Incidental items such as access doors, fire hose connections, etc. shall be incorporated in a manner consistent as possible with the aesthetic aspects of the noise barrier systems

f. Caulking and coating materials shall be compatible with the aesthetic aspects and acoustical requirements of the noise barrier system

g. On stacked panel systems, provide light-tight horizontal joints that preclude visible warping and acoustical leakage

h. The anticipated appearance of the completed barrier system, in place, will be criteria for acceptability of the proposed design.

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4. The Design-Build Team shall provide noise walls with sound-absorptive treatment on the side facing the highway for all barrier segments between the following limits (Offsets are approximate):

Barrier System 1

672+27.48	81 FT (Right)	Report Barrier Station 101+44
698+03.81	232 FT (Right)	Report Barrier Station 128+32
This will help diminish reflective noise from the ramp along the turn-back.		
697+69.70	74 FT (Right)	Report Barrier Station 200+00
710+14.34	73 FT (Right)	Report Barrier Station 212+48
716+37.09	76 FT (Right)	Report Barrier Station 304+80
This marks the beginning of the median retaining wall.		
724+03.18	84 FT (Right)	Report Barrier Station 312+48
No need to absorb the panels beneath the Kerby Hill overpass.		
724+82.96	82 FT (Right)	Report Barrier Station 313+28
743+85.24	76 FT (Right)	Report Barrier Station 332+32

Barrier System 3

743+87.96	68 FT (Left)	Report Barrier Station 416+00
724+98.75	88 FT (Left)	Report Barrier Station 434+88

Barrier System 4		
710+04.72	76 FT (Left)	Report Barrier Station 500+00
680+72.17	77 FT (Left)	Report Barrier Station 529+28
679+94.08	198 FT (Left)	Report Barrier Station 530+72
672+21.67	199 FT (Left)	Report Barrier Station 538+40

Any adjustment to the noise barrier horizontal alignments will incorporate the same general absorptive finish limits, unless there is an obvious alignment skew of 15 degrees or more.

If a new "parallel" section is created from the revised barrier alignments, either between noise barriers or between noise barriers and retaining walls that is not covered by the limits cited above, then the Design-Build Team shall determine the width-to-height (W:H) ratio, where the width is the distance between the barriers and the height is the average barrier height above the roadway, which may exceed the average barrier height. A section with a W:H Ratio of 10:1 or less will require an absorptive finish on the noise barrier panels. A section with a W:H Ratio between 10:1 and 20:1 will require a parallel barrier analysis be conducted using FHWA TNM. Insertion loss degradations of 2 dB(A) or more will require an absorptive finish on the noise barrier panels. A section with a W:H Ratio in excess of 20:1 will not require an absorptive finish. This specific criteria does not supersede or alter the absorptive finish limits previously outlined.

The Design-Build Team shall submit a CAD file that shows the revised absorptive finish limits along with the revised noise barrier horizontal alignments and the construction baseline. If a TNM parallel barrier analysis was performed, then that model shall be provided along with any supporting files (CAD, spreadsheets). The SHA OPPE EPLD Noise Team will transmit written approval via e-mail to the Design-Build Team acoustical lead. Proposed changes that are not approved will be accompanied by recommended actions or solutions that will make the absorptive finish limits acceptable.

5. The Design-Build Team shall coordinate with the appropriate local fire department officials to determine the need, if any, for fire hose connections and/or access doors along the noise walls. If such access is required by the local fire department, the designated locations shall be noted on the plans

6. The Design-Build Team shall submit shop drawings for each noise wall section of the noise barrier systems, providing the following specific information:

    a. Beginning and ending stations of the noise wall section

    b. Horizontal and vertical alignments of the noise wall section

c. Elevations of the top of panel, bottom of panel, and panel joints (if applicable)

d. Panel locations by station and offset

e. Post locations by station and offset

f. Existing and proposed ground locations

g. Special post and panel details

h. Post, panel, and foundation connection details

i. Lifting devices

j. Fire hose and access door locations and details

k. Special drainage details associated with the noise barrier system

l. Utility locations

m. Certification by the Design-Build Team's acoustical expert that the barrier system design represented by the shop plans meets all of the project's acoustical requirements.

Shop drawings shall be reviewed and approved by SHA. SHA will in no way be responsible for work done without approved shop drawings.

7. Before starting construction of the project noise barrier systems, erect one (1) full size panel and two (2) full size posts for inspection and approval by SHA. Such inspection will be performed by SHA at the location(s) of fabrication of the post and panels approval. This inspection will be solely for the purpose of approving the aesthetic appearance of the post and panel and will not replace any structural and/or material requirements of this contract. The post and panel will be inspected in their ultimate aesthetic condition with all surfaces finished and treatments. If approved, the post and panel may be used as part of the permanent noise barrier system, assuming that they also meet all of the structural and material requirements of this contract. The sample will be incidental to the cost of the noise barrier.

8. Before starting construction of the project noise barrier systems, erect a test wall section composed of a minimum of four (4) posts and three (3) panels at a location directed by SHA. This section, if approved, will become a portion of the permanent noise barrier system. SHA will use the erection of this test wall section to determine if the Design-Build Team's methods and equipment are sufficient to produce a sound barrier system that meets the requirements of the contract documents. The Design-Build Team may revise its methods and equipment at any time during the positioning of the test section in order to satisfactorily meet the

contract requirements. If the test wall does not meet the construction tolerances or the aesthetic and/or acoustical requirements of the contract, the test walls or portions thereof will be removed and disposed of by the Design-Build Team at no additional cost to SHA. The test wall will be rebuilt until determined by SHA to meet the contract requirements. The test wall will be incidental to the cost of the noise barrier.

3.18.02 Wall Design

The wall panels and posts shall be designed and constructed to meet Section 455 and the standard details from the Office of Structures. Any wall that requires drilled shafts for support shall be designed by a Professional Engineer licensed in the State of Maryland. The depth of the drilled shafts shall be designed by a generally accepted theory with the total horizontal movement at the top of less than 1". The diameter and reinforcement of the drilled shafts shall match the details from the Office of Structures standard details, or the pre-approved alternate noise barriers.

TC 3.19 CONSTRUCTION REQUIREMENTS PERFORMANCE SPECIFICATION

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 MD Manual on Uniform Traffic Control Devices (MD 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/IFP. The Design-Build Team shall take into consideration the adjustments and installations by public utilities in areas within the limits of this contract. Existing utilities are located and shown in the utility designation file as they are believed to exist; however, the Administration assumes no responsibility for the accuracy of these locations. The Design-Build Team shall be responsible for determining the location of all existing utilities and incorporating them into the design prior to initiating construction.

The Design-Build Team shall locate all existing utilities and be responsible for their safety and

continuous service. Should any existing utilities be damaged or destroyed due to the operations of the Design-Build Team, the damaged or destroyed components shall be immediately replaced or repaired as necessary to restore the utility to a satisfactory operating condition. These repairs or replacements shall be at no additional expense to the Administration or the owner of the utility.

The Design-Build Team shall inform the respective utility companies at least fourteen days prior to working in any area. In addition, the Design-Build Team shall give sufficient notice to the specific utilities of the Design-Build Team's overall plan for construction and utility relocations. The utility companies will establish the lead time necessary to meet the applicable utility work schedule and coordinate with the Design-Build Team's work operations based upon the Design-Build Team's overall plan.

For a list of the known utility owners have existing facilities within the limits of this contract see TC 3.15 – Utility Design and Relocation, 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 with 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 Proposal.

TC 3.20 ENVIRONMENTAL PERFORMANCE SPECIFICATION

3.20.01 General

The Design-Builder shall conduct its design and construction activities in accordance with these specifications such that no action or inaction on the part of the Design-Builder shall result in non-compliance with the requirements of the necessary permits and approvals required by the Project.

3.20.01.01 General Environmental Philosophy

The MD 210 at Kerby Hill Road / Livingston Road Interchange Project passes through an area of environmental resources. Protection of these resources is of paramount importance. The philosophy followed by the Maryland State Highway Administration (Administration) during the development of the RFP was to incorporate environmental stewardship measures to avoid and minimize impacts to the natural and forest areas and wetlands/waterways to the greatest extent feasible and practical. The Design-Builder shall continue this environmentally sensitive approach and philosophy during the preparation of final design plans and through Project implementation. 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 reduction 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

Priority	*Author or Agency*	*Title*
1		Code of Federal Regulations (CFR)
2		Code of Maryland Regulations (COMAR)
3	MDE/USACE	Joint Federal / State MDSPGP-4 Permit Application and Authorization for the MD 210 at Kerby Hill Road / Livingston Road Interchange Project
4	SHA	Standard Specifications for Construction and Materials
5	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 may provide an Independent Environmental Monitor (IEM), on behalf of the United States Army Core of Engineers (USACE) and Maryland Department of the Environment (MDE), if required by permit condition, who will work with the Design-Builder to confirm that the Design-Builder's plans and construction methods are in compliance and that all regulatory permit conditions and commitments are met. The Independent Environmental Monitor will:

A. Review plans as they are developed;

B. Review the Design-Builder's environmental compliance implementation;

C. Notify the Design-Builder of deficiencies in the compliance with the commitments, considerations, permits and approvals; and

D. Coordinate and attend any meetings involving resource or regulatory agencies.

3.20.04 Design-Builder's Responsibilities

The Design-Builder shall be responsible for compliance with the permit conditions throughout the design and construction of the Project. The Design-Builder shall demonstrate compliance by producing a Compliance Report each quarter, which tracks and confirms compliance with each commitment pertaining to the construction of the Project, and also tracks impacts to wetlands and Waters of the US. The checklist and memorandum shall be submitted to the Administration within one week after the end of each quarter.

3.20.05 Permits and Approvals

The Administration will be relying on the Design-Builder to achieve and maintain commitments and permits through a strong Environmental Compliance Plan and partnering with the Administration. The Design-Builder is encouraged to consider environmental stewardship measures that exceed those in the standards and permits, while considering reasonable cost and practicality.

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

1) Joint Federal / State MDSPGP-4 (from MDE and USACE)

2) Reforestation Site Review Permit (from Maryland Department of Natural Resources [MD DNR])

3) Approval for erosion and sediment control for clearing and grubbing for utility relocations (from MDE)

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 Permit (from MDE)

4) FAA Obstruction Evaluation (from FAA)

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

3.20.06 Permit Modifications and Approvals

The Design-Builder shall obtain approvals from the Administration for any changes in design and/or construction activities that affect any permit conditions and would require a modification approval from the regulatory agencies.

All conditions in the permits shall be adhered to unless modifications are accepted and approved by the Administration and the regulatory agencies.

Delays due to permit modification approval for permits listed in TC Section-3.20.05, requested by the Design-Builder, will not result in additional costs to the Administration nor will the Contract be extended.

The Design-Builder shall not alter the design in such a manner that increases or creates new impacts to forest, cultural resources, parkland, wetland, wetland buffer, waterway, or floodplain compared to those impacts which were authorized by the permits and defined in the Joint Permit Application tables. If the Design-Builder determines that changes to impacts are to be considered through design and/or construction, the Design-Builder shall be responsible for providing the Administration with all necessary information required to request and to obtain the permits, approvals or modifications from the regulatory agencies. Request for modification to the permits listed shall be accompanied by documentation provided by the Design-Builder to demonstrate that there is no practical alternative. Additional mitigation required with approval of

modifications shall be the responsibility of the Design-Builder.

3.20.07 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, 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)

Note:
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 Section 26.23.04, for the impacts.

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 (Section 26.08.02).

To minimize potential for untreated discharge, the Design-Builder shall designate, design and construct, utilize, maintain and upon conclusion of operations, properly close concrete wash-out pits for all concrete production, transport and placement operations. The location of concrete wash-out pits shall be approved by the Administration prior to use. The pits shall be managed such that no concrete waste or wash water is discharged into waters of the U.S. This may include the implementation of drying beds with proper sediment controls and treatment of excess wash water on-site or proper off-site disposal.

If construction discharges exceed water quality standards identified in COMAR, the Design-Builder shall immediately notify the Administration and resolve any Project related deficiencies within 24 hours.

The Administration will request spot-check inspections at any time to verify compliance.

3.20.08.03 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 the COMAR for the protection of aquatic biota.

C. Conduct all in-stream work in compliance with the Maryland mandated stream closure period for the Use I stream (March 1 through June 15, inclusive in any year). Any riprap placed shall be constructed so as not to obstruct the movement of aquatic species, unless the purpose of the activity is to temporarily impound water. Existing riparian vegetation in the area of the stream channel should be preserved as much as possible to maintain aquatic habitat and shading to the stream. Areas designated for the access of equipment and for the removal or disposal of material should avoid impacts to the stream and associated riparian vegetation.

3.20.08.04 Wetlands and Waters of the US

Direct impacts to wetlands and waterways are anticipated to occur under the MD 210 at

Kerby Hill Road / Livingston Road Interchange Project. The Table in the Joint Permit Application presents the total impacts permitted for the Project. All wetlands and waterways were identified, delineated and surveyed within the Project. Surveyed boundaries of waterways and wetlands are depicted in the design. One wetland is located within the project area and it will be permanently impacted by the project. 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 waters of the US. Should additional wetland/buffer resources be encountered during the Design-Build activities the Design-Builder shall be responsible for installing temporary orange safety fence and prohibitive signage in English and Spanish adjacent to non-impacted areas of wetlands and their buffers, identified in the Section 404 Permit, along the limits of disturbance and/or right of way. The orange safety fence shall be installed at a maximum of 25 feet from the proposed toe of cut/fill adjacent to wetlands. The 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 that consisted of alignment shifts where practicable, slope adjustments, avoidance of new stream crossings, and reductions to roadway sections to avoid impacts to whole or portions of wetlands and waterways.

The Design-Builder shall focus its efforts to continue to minimize impacts to wetlands and waterways in all areas of the Project. Engineering designs shall continue to emphasize avoidance and minimization of impacts as the feasibility and effectiveness of using measures such as retaining walls, steeper fill slopes, increased headwall heights, reduced roadway sections and any other feasible minimization efforts are evaluated.

Side slopes shall be 2:1 or steeper wherever the fill material is adjacent to wetlands or waterways. Additional avoidance and minimization efforts such as retaining walls, MSE walls, and Reinforced Earth Slopes are encouraged, especially at wetlands. Refer to the Geotechnical Performance Specification.

3.20.08.04.03 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 USACE/MDE in the initial Joint Federal / State MDSPGP-3 Permit. 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. Prior to performing any Work, the Design-Builder shall be responsible for performing all tree preservation measures in accordance with Section 120-Tree Preservation of the Standard Specifications for Construction and Materials.

Specimen trees (trees greater than 30” in diameter measured at 4.5’ from the ground) were identified, evaluated and are depicted on the Landscape Plates. The Design-Builder shall avoid as many specimen trees as possible without affecting resources with equal or greater regulatory protection. As the design advances, it may be found that specimen trees are located near the outer edge of the required LOD/ROW or just outside the LOD/ROW. If this condition exists, the Design-Builder shall coordinate with the Administration to mark and provide a buffer for any such tree to avoid its removal during clearing and grubbing activities. An adequate buffer is defined as the critical root zone. The critical root zone is the circular area within a radius of 1.5 feet per 1 inch of trunk diameter, as defined by the Maryland State Forest Conservation Manual.

Before reforestation is approved by the MD DNR, every reasonable effort shall be made by the Design-Builder to minimize the cutting or clearing of trees. Only the minimum number of trees may be cut, and sound design practices shall be utilized.

3.20.08.05.02 Forest Impact Reduction Incentive

The Design-Builder is advised upon final acceptance of Work, completion of as-built plans and approval of modifications by the MD DNR, the Design-Builder will be provided additional compensation for any upland forest impact net reduction in increments of 0.25 acre. The additional compensation only pertains to a net reduction of impacts within the limits of disturbance. This determination will be made by comparing the impacts determined in the as-built plans against the impacts approved by the MD DNR. This incentive will be paid at $2,500 per 0.5 acre saved.

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 the MD DNR for the Project, and may include a site search, agency reviews and approvals, design, and obtaining right of way and construction. If available and compensation agreed, the Administration may allow the Design-Builder to use excess mitigation at the approved mitigation sites.

The Administration will pay an incentive bonus of $2,500 per 0.50 acre for additional on-site upland reforestation, which meets MD DNR requirements that is accomplished beyond the approximately 7.23 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

It is not anticipated that cultural resources are present within the area identified in the RFP based on coordination with the Maryland Historic Trust (MHT); however, should such resources be encountered during Design-Build activities, the following requirements will apply:

A. Unauthorized Project Impacts are prohibited;

B. Material changes to the highway alignment that result in impact beyond those identified 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

It is not anticipated that archeological resources are present within the area identified

in the RFP based on coordination with the MHT; 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 Maryland's State Historic Preservation Officer (MD SHPO) of the discovery.

The Administration and MD SHPO, or an archeologist approved by them, shall immediately inspect the work site and determine the area and nature of the archeological resource. Following this inspection, construction may resume in the area outside the archeological resource as defined by the Administration and MD SHPO.

Within no more than three working days of the original notification of discovery, the Administration, in conjunction with MD SHPO, shall determine the National Register eligibility of the resource. If the resource is determined eligible for the National Register, the Administration shall prepare a plan for its avoidance, protection, recovery, or destruction without recovery. Such a plan shall be approved by MD SHPO prior to implementation.

Work in the affected area shall not proceed until either:

- The development and implementation of appropriate data recovery or other recommended mitigation measures, or
- The determination is made that the located remains are not eligible for inclusion on the National Register.

3.20.07.09 Hazardous Materials

A. The Design-Builder shall prepare and implement a plan for management and disposal of controlled hazardous materials and contaminated soil and groundwater that may be encountered during structure demolition, land clearing, or excavation activities.

B. The plan shall address worker safety and health in accordance with applicable federal, state, and local regulations.

C. The plan shall provide procedures for management, handling, transportation, and disposal of demolition debris and contaminated soils and groundwater that contain controlled hazardous substances in accordance with applicable federal, state, and local regulations.

3.20.07.09.01 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.

3.20.10 Submittals

The Design-Builder shall provide the following:

A. Surveyed as-built 22x34 plans of post-construction conditions in the same format as the RFP Plans and 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, and other interest groups within the project area have been kept informed and their engagement in the construction process is critical to the successful completion of the Project. In support of the Administration, the Design-Builder shall commit to significant assistance of the Administration with regard to community participation and interaction activities during the development of the design and throughout the construction of the Project.

The Design-Builder shall provide a Public Relations Coordinator who is responsible for assisting the SHA and Design-Build Team in developing integrated communication plans, including planning, research, implementation and evaluation. The Coordinator must have strong writing skills, excellent communication skills, community outreach skills and experience handling sensitive and/or controversial issues. The Administration reserves the right to request a resume to verify qualifications. Duties include but are not limited to:

- Research, write and edit draft news releases, fact sheets, traffic alerts, briefing memos, advertising copy, speeches, web content, social media content, newsletters and brochures that will be submitted for approval to SHA.
- Collects and provides clips of media coverage of the project for inclusion in SHA’s daily report.
- Gathers information on construction updates and project timelines and works with SHA to input and distribute the data through all applicable communication channels such as mainstream, social media, and website postings.

- Drafts responses to correspondence, emails, and other inquiries, including Customer Care Management System assignments.
- Assists with website content management and development, including writing, editing and potentially uploading content on multiple websites; as well as photographs and video of the project progress.
- Facilitates and coordinates obtaining any aerial or digital photography, graphical maps of traffic patterns and project design, art or other materials needed for public relations
- Coordinates and participates in a variety of community/stakeholder events and meetings. Coordinates with SHA the DBT's development of graphics, presentations, videos, power point, slide shows or other visual presentations for those events and meetings.
- Helps implement/coordinate special events on the project and/or VIP and media events, including materials preparation and logistics.
- Develops and writes copy for marketing materials such as, but not limited to, e-blasts, inserts, newsletters, brochures, fliers, fact sheets, calendars and maps. Manages distribution including zip code mailings, door hanger posting, etc…
- Researches inquiries from the public, elected officials and/or media and develops response to be provided by the Coordinator or other designed project or SHA official.

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	vided 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 publics 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.

TC 3.22 TOPOGRAPHIC SURVEY PERFORMANCE SPECIFICATION

Not applicable to this project

TC 3.23 INTELLIGENT TRANSPORTATION SYSTEMS (ITS) PERFORMANCE SPECIFICATION

3.23.01 General

The Design-Builder shall design, construct and implement the elements of the Intelligent Transportation System (ITS) in accordance with the requirements of this specification, including performance requirements, Standards and References, warranties, design and construction criteria, and required submittals.

ITS is needed to improve the capability to manage and operate the transportation network that includes the MD 210 mainline and the interchanging/intersecting roadways in the Project area. The Design-Builder shall maintain integration of the existing DMS with the existing Administration Authority Operations Center (AOC) and the Administration's Coordinated Highways Action Response Team (CHART) program.

All system elements to be designed and installed within the Project right-of-way will be operated by the Administration and shall be integrated with both the AOC and CHART program. All ITS Work shall be based on a systems engineering analysis meeting the requirements in 23 CFR 940.11.

3.23.02 Standards & References

3.23.02.01 Standards

The Design-Builder shall design and construct the ITS in accordance with the relevant requirements of the standards listed by priority in Table 1, unless otherwise stipulated in this specification. Standards cited within 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 highest 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.

The Design-Builder shall use the most current version of each listed standard as of the initial publication date of this RFP unless modified by addendum or change order. Unless noted below, the most recent version for each standard as of the issue date for this RFP shall apply.

Table 1
Standards for ITS

Priority	***Author or Agency***	***Title***
1	SHA	2008 Standard Specifications for Construction and Materials
2	SHA	Book of Standard for Highways, Incidental Structures
3	AASHTO	A Policy on Geometric Design of Highways and Streets
4	AASHTO	Roadside Design guide
5	SHA	Maryland Manual on Uniform Traffic Control Devices (MD MUTCD), 2011 Edition
6	FHWA	Manual on Uniform Traffic Control Devices (MUTCD), 2009 Edition
7	NEMA	National Electrical Manufacturers Association Standards
8	NFPA 70/NEC	National Electric Code
9	NFPA	National Fire Protection Association
10	NTCIP	National Transportation Communications for ITS Protocol
11	ITS Md	Maryland Statewide ITS Architecture
12	USDOT	National ITS Architecture
13	FHWA	23 CFR 940. 11-ITS Project Implementation
14	IEEE	Guide for Concept of Operations Document
15	IEEE	Guide for Developing System Requirements Specifications
16	IEEE	Independent Verification and Validation

3.23.02.02 References

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

Table 2
References for ITS

Author or Agency	***Title***
SHA	V004-10 Surveyor
SHA	ITS Cabinet Layout: CCTV (Plate ITS-2)
SHA	ITS Cabinet Layout: DMS (Plate ITS-3)
SHA	ITS Cabinet Layout: TRS (Plate ITS-4)

3.23.03 Performance Requirements

The Design-Builder shall design and construct the ITS using the criteria specified within this Section to:

A) Provide a fully functional ITS meeting the Contract requirements.
B) Integrate the Project ITS with the regional and statewide ITS to provide continuous and uninterrupted service of the ITS and associated communications throughout the region.
C) Facilitate system integration by using materials and components that are consistent and compatible with those of the existing system(s).
D) Maintain the operation of all existing ITS components within the Project limits throughout the duration of construction, except as otherwise stated herein.
E) Provide a final product that facilitates and accommodates routine maintenance of ITS components without impacting normal traffic operations.
F) Construct and integrate Project ITS components at the earliest practical time to improve Maintenance of Traffic.

3.23.04 Design and Construction Requirements

For existing ITS components, the maximum outage time shall be 24 hours unless otherwise approved by the Administration. All proposed and existing ITS components within the Project shall be working limits shall be working upon completion of the Project.

Any existing ITS component that is impacted by the construction of this Project shall be disconnected, reconnected, and made fully operational by the Design-Builder as part of this Project. All abandoned cables shall be made safe.

3.23.04.01 Existing Administration Systems

The Design-Builder shall perform design and construction necessary to deliver functional and fully operational ITS elements that are fully compatible with the Administration and CHART communication network. ITS elements shall be compatible and shall comply with existing maintenance requirements. The Contractor may use the existing sign structure truss and end frames if it can be proven to the satisfaction of the Administration that the project requirements are met.

The Design-Builder shall design, provide, install, integrate and test all constructed and interconnected ITS elements, in accordance with procedures presented to the Administration for review and written comment, so as to satisfy requirements and demonstrate compatibility and interoperability with the existing systems and communication networks. Design, construction, installation and integration activities shall include equipment installation, functional integration, and testing at multiple levels and sites, including applicable communications hubs and nodes, and the AOC. Configuration

changes required to the CHART system will be completed by the Administration.

The Design-Builder shall perform design, construction, installation, relocation, integration and testing of existing, relocated, temporary and permanent operational ITS field elements for the Project.

The ITS shall be implemented using a construction sequencing approach maximizing the ability to use temporary or permanent ITS field elements to actively monitor and manage recurring and non-recurring Project traffic congestion, as well as to detect and confirm incidents during construction and post construction activities.

The Design-Builder shall coordinate and provide requested and necessary data to the Administration and CHART for modifications and updates of existing databases to add new ITS field elements. Updated data shall include device identification, interfaces for fiber optic communications network and updates to graphical user interfaces. All software and database modifications, and associated modules, files, and documentation to compile updates to the system shall become the sole property of the Administration, and shall be delivered as a condition of Acceptance for Maintenance.

The Design-Builder shall design and install a grounding system and transient protection devices that are suitable for the specific installation and equipment being supplied for each type of ITS element. The Design-Builder shall ensure that all equipment, devices, interconnect wiring, communication devices, communication lines, power supplies, antennas, operator controls, and power service are protected from external and internal electrical transient surges and line noise sources, including power surges, lightning, induced voltages, and static discharge. Systems and devices shall be designed and installed in accordance with the National Electric Code.

The Design-Builder shall provide operational and maintenance training to Administration personnel for all ITS elements prior to transfer of maintenance responsibilities.

No part or attachment of any equipment shall be substituted or applied contrary to the manufacturers' recommendations and standard practices.

3.23.04.02 Power requirements

The Design-Builder shall provide alternating current (AC) metered power service to every ITS cabinet (including every traffic signal cabinet) and/or Communications Hub within the Project limits, including relocation of any existing cabinet sites, without interruption of existing metered service. The Design- Builder shall be solely responsible for all Work, materials, and costs associated with obtaining power and

maintaining power throughout construction for all ITS devices, including coordination with the power company and obtaining power supply for all ITS devices required for this Project. The Design-Builder shall be responsible for completing all electrical service application materials necessary for obtaining service from the appropriate power company. All materials shall be submitted to the power company.

The Design-Builder shall be responsible for all ongoing monthly electricity costs for any new traffic signals or ITS elements installed under this Project until Partial Acceptance for Maintenance of the traffic signals or ITS elements.

3.23.04.03 Location of ITS Equipment

All ITS elements shall be installed within the Project right-of-way. All ITS elements shall be located in an area where access to equipment will not affect traffic operations or require traffic control unless otherwise identified. Maintenance access to all ITS devices, including cabinets, may be provided by an all-weather maintenance pull-off, or by a widened shoulder with a minimum width of 12 feet, and a minimum length of 100 feet, unless otherwise specified. Where provided, an all-weather maintenance pull-out shall be sufficient to accommodate access and egress of a single unit maintenance vehicle load in all weather conditions. The pullout roadway surface shall consist of a permanent pavement suitable for access vehicle loading conditions. The pullout shall be located behind guardrail or other roadside barrier suitable for protection of maintenance personnel and shall be located downstream of the ITS element.

The Design-Builder may install barrier wall, guardrail, or crash protection devices to protect equipment that is temporarily in the clear zone due to maintenance of traffic *I* construction staging.

The Design-Builder shall locate all underground existing facilities and design all ITS elements to avoid or minimize conflicts with these facilities.

The Design-Builder shall ensure that all equipment, devices, interconnect wiring, communications devices, communications lines, power supplies, antennas, operator controls, and power service are protected to eliminate damage from external and internal sources, including power surges, lightning, induced voltages, and static discharge. The Design-Builder shall design and install a grounding system and protection devices that are suitable for the specific installation procedures and equipment supplied.

3.23.04.04 ITS Work Elements

The Administration will operate/control messages for all electronic displays that are potentially in the public view. The Design-Builder shall not activate any display or ITS component without prior coordination with the Administration.
The Design-Builder shall design, furnish and install all required materials and

equipment for operational elements of the ITS, as listed below. For each of these elements, the Design-Builder shall design and construct all wiring and cabling connections to provide both local and remote operations for a complete and accepted ITS element including the following:

A) Dynamic Message Sign (DMS) relocation along northbound MD 210. It is the intent of the Administration to reuse the existing DMS and associated controller equipment if feasible. Work efforts for the relocation will include complete site design, structural design of sign structures and foundations, design of access walkway along structure, structural connections, exact DMS placement (plan and elevation), equipment layout, and communications. Design-Builder shall determine exact location of relocated DMS (plan and elevation) based on sight line and sign spacing requirements and receive written approval from the Administration prior to completing design.

3.23.04.05 Communications Systems

The Design-Builder shall design, furnish, and install a communication system capable of transporting data to/from field devices. The communications system shall support the following minimum functional requirements:

Provide two-way data communications between the Communication Hubs and field devices to update, poll, monitor, and control traffic management elements.

3.23.04.05.01 Design Criteria

Work to be performed as part of this Project shall include, but is not limited to:

A) Integrate existing and proposed ITS field devices, within the Project limits, into the extended communications network.
B) Provide fiber optic cable to support the DMS device on MD 210.
C) Use a redundant ring topology.

If any telephone circuits are necessary, the Design-Builder shall furnish, install and test telephones and supporting systems.

The Design-Builder shall coordinate with the Administration's AOC and CHART SOC to develop an appropriate IP/Network Plan.

Low speed data devices shall be multi-dropped by function (DMS, etc.) onto distinct low speed RS-232 communication channels. The maximum number of devices to be connected to a single communications channel shall be as follows:

A) DMS – 8 devices per channel; and

The Design-Builder shall be responsible for the design and installation of any modification to the existing/previously installed communications network or cabinet locations along roadways that would tie into the Project network in the project area. These modifications shall serve to support and integrate the existing/previously installed field devices. The Design-Builder shall be responsible for integrating the existing/previously installed and proposed field devices to the proposed IP/Ethernet network.

All fiber optic cable on this Project shall be single mode, non-dispersion shifted optical fiber. The Design-Builder shall ensure compatibility with the existing fiber, and shall make connections with existing/previously installed fiber.

The Design-Builder shall provide documentation for all fiber work performed on this Project.

3.23.04.06 Dynamic Message Signs

The Design-Builder shall design, install, and test all materials and equipment required to provide a complete and accepted Dynamic Message Sign (DMS) at each location, unless otherwise specified. The existing DMS shall be reused. The existing truss and end frames shall be reused, if possible.

3.23.04.06.01 Design Criteria

The Design-Builder shall meet the Maryland Manual on Uniform Traffic Control Devices (MDMUTCD) standards for all existing and proposed fixed sign placement in determining the precise DMS locations. All overhead mounted DMS and housings shall be installed such that they are perpendicular to and centered over the lanes of travel that are to view the message. The Design-Builder shall perform a DMS site survey to identify optimum locations that meet Administration and MDMUTCD sign spacing, visibility, and orientation as per submittal requirements. All DMS shall have an access walkway on both sides of the sign to prevent entrapment of maintenance personnel.

The Design-Builder shall coordinate design of the DMS package with the Administration.

A local DMS control access point (defined as the local DMS controller cabinet) must be provided at the ground level. The local access point shall be placed at the vertical structural component of the sign.

The Design-Builder shall design the DMS installations to minimize glare on the sign face from vehicle headlights and maximize sign visibility.

The vertical supports for the DMS support structure and foundations shall be located in accordance with the AASHTO Roadside Design Guide. The DMS and its support structure shall be located such that the maintenance platform shall be capable of being accessed and the sign maintained without traffic control.

The Design-Builder shall design each DMS support structure to support a sign dead load of 6,500 lbs, live loads to permit two 250 lb. maintenance personnel to access the sign simultaneously, and 100 mph wind loads associated with an overall sign dimension of 11.0 ft (H) by 36.0 ft (W) by 4.0 ft (D). This applies to all DMS support structures. Snow and ice loading shall also be incorporated into the design of the DMS support structure and foundations. Furthermore, design shall account for aerodynamic effects generated by tractor-trailers and other large vehicles traveling beneath the DMS housing in the design of the DMS support structure. The DMS support structure shall be designed to be compatible with vertical Z-bars that are attached to the back of the sign.

The Design-Builder shall design and fabricate and install sign mounting hardware that connects the DMS to the Design-Builder furnished or relocated DMS support structure.

Neither the DMS nor its supporting structure shall be mounted to bridges.

The Design-Builder shall be responsible for coordinating the design, fabrication, and installation of the DMS support structures to provide the maintenance platform as defined for the DMS. The type of DMS panel required shall have an accompanying walkway such that maintenance personnel may perform the required maintenance. An access walkway with safety railing shall be provided as detailed in the Administration's DMS entry/egress platform and catwalk plans. If other signs are to be located on the same structure as the DMS, the access walkway shall be located behind the other sign so as not to obscure the visibility of the adjacent sign. The Design-Builder shall be responsible for the design, fabrication, and installation of the railing and other safety appurtenances necessary to create a safe working environment, as required by OSHA, for maintaining the DMS. It is solely the Design-Builder's responsibility to coordinate the installation of the housing, maintenance platform, and DMS support structure to ensure compatibility during installation, thus allowing safe access to the sign housing.

3.23.04.06.02 Material Requirements

The Design-Builder shall be responsible for all site installation, insurance, interim storage, labor, and transportation costs associated with equipment pickup

and transportation between Design-Builder-provided storage and field sites.

The DMS shall include: LED DMS assemblies, DMS controllers, DMS control cabling and connectors (as specified by the DMS vendor), DMS support structures and foundations, DMS mounting hardware, DMS maintenance platform, DMS equipment cabinet and base, conduit, cabling, connectors, junction boxes, and power service disconnects. All materials shall be provided in accordance with the requirements of this specification.

All anchor bolts and erection bolts, as required in accordance with the Design-Builder supplied designs, shall be furnished with each DMS support structure.

3.23.04.06.03 Construction Requirements

The Design-Builder shall make all power connections to the DMS controller cabinet assembly in accordance with the requirements of the power service provider and the Contract Documents.

The Design-Builder shall make all data connections between the DMS controller and the communications interface devices as described herein.

The Design-Builder shall furnish and install all conduits, cabling, and connectors required to make all data connections between the DMS and its controller assembly to provide a fully operational DMS. The data connection between the DMS and the controller cabinet shall be single mode fiber optic cable with ST style connectors on each end.

The DMS and controller cabinet shall be energized from a 2-pole, I 00 amp, 120/240V circuit.

All installed power service points for DMS shall, at a minimum, utilize a NEMA-3X rated safety switch box containing a service disconnect at that location.

Where 120/240 VAC service is not available from the local power utility for the DMS, a pad-mounted step down transformer shall be installed in a suitable location near the DMS cabinet assembly.

The Design-Builder shall furnish and install all wiring harnesses, cables, connectors, fittings, panels, cable management devices, and other materials required to provide a complete and accepted DMS assembly that is fully functional.

3.23.04.06.04 Location

The Design-Builder shall design and mount DMS over the northbound travel lanes on MD 210.

3.23.04.07 ITS Cabinet Requirements

This work shall consist of design and construction of ITS equipment cabinet bases, electrical power work, junction boxes, conduit, grading, cables and conductors. ITS cabinets shall be required for each of the new ITS device locations and shall be utilized as the device communication connection points. ITS cabinets shall be, at a minimum, NEMA-3X rated. Concrete pads shall be furnished and installed at all cabinet sites to provide level and dry surfaces for a maintenance technician to stand on while servicing the cabinet sites. This work includes excavation, gravel base, backfilling, and treated timber cribbing. Concrete pads shall be provided for all doors on ITS cabinets.

3.23.04.07.01 Design Criteria

Each ITS equipment cabinet shall be located in accordance with the AASHTO Roadside Design Guide and in areas where access to equipment shall not require traffic control. Maintenance access to ITS cabinets may be provided by an all-weather maintenance pull-off, or by a widened shoulder with a minimum width of 12 feet, and a minimum length of 100 feet.

3.23.04.07.02 Material Requirements

The Design-Builder shall be responsible for all site installation, insurance, interim storage, labor, and transportation costs associated with equipment pickup and transportation between Design-Builder- provided storage and field sites. All materials shall be provided in accordance with the requirements of this specification.

3.23.04.07.03 Construction Requirements

The Design-Builder shall locate the base of the ITS equipment cabinet to avoid existing underground utilities, and place the ITS equipment at a site that is flatly graded so the handholes are installed level with the finished grade.

The Design-Builder shall design and install cabinet bases for ITS cabinets.

The Design-Builder shall install two 3 inch diameter conduits for fiber optic communication drop cable from the fiber distribution handhole to the cabinet. The Design-Builder shall provide a "locate wire" or tape that allows future non-destructive identification from the surface grade. The Design-Builder shall provide two (2) empty conduit stubouts to any pad-mounted ITS cabinet. The

conduit stubs from the cabinet shall terminate in the ground for future power and communication usage. Cabinets shall be configured for their specific application (e.g., DMS, etc.) and site location. Each cabinet shall be identified by a specific cabinet ID derived using an approved naming convention.

The Design-Builder shall provide a cabinet heater/thermostat in the cabinet to reduce condensation and enhance the performance of the electronics installed in the cabinet. The cabinets shall not be insulated for heat retention.

3.23.04.08 ITS Electrical Power

The Design-Builder shall provide appropriate power elements to ITS elements as part of this Project. The Design-Builder shall be responsible for all design and construction of elements that are required to provide adequate power to all ITS elements of this Project. The Design-Builder shall comply with the National Electric Code (NEC) for all power work, all enclosures, service disconnects, and transformers. Equipment shall be NEMA-3X rated at a minimum.

Controller/cabinet assemblies shall be energized from a 120 VAC, metered power service.

All installed power service points shall utilize, at a minimum, a NEMA-3X rated safety switch box containing a service disconnect at that location. In addition, a secondary or supplemental 120 V service disconnect pedestal shall be placed not more than 15ft from the controller cabinet assembly. The Design- Builder shall utilize a stepdown transformer where higher than 120 Volt service is available.

The Design-Builder shall provide power service to each cabinet. The Design-Builder shall determine the appropriate load required for each cabinet, performing voltage drop calculations, and sizing the wire for each cabinet and DMS. Each cabinet shall include an additional load allowance of 12 Amps for powering convenience outlets. These calculations shall be part of the design review information.
The voltage drop, as measured between the power service point (at the meter) and the device(s) it is serving, shall not exceed five percent. Conductors shall be sized appropriately to satisfy this requirement.

Power service arrangements shall be reviewed and approved by the power service provider and by the Administration.

3.23.04.09 Cabling and Conductors

The Design-Builder shall furnish and install conductors and cables in accordance with the design standards listed in this performance specification. The minimum gauge for all electrical conductors shall be #12 AWG.

The Design-Builder shall furnish and install all video and control cables and connectors for the DMS location in accordance with the manufacturer's recommendations and signal attenuation requirements, on a per site basis. The maximum conduit fill ratio shall be 25%.

3.23.04.10 Vaults and ITS Handholes

Design of handholes below finish grade shall conform to Administration standards. The Design-Builder shall prepare all necessary drawings and instructions for any handholes and pull boxes that are to be installed above ground, in barriers or walls, or any other unique application not covered by Administration standards.

3.23.04.10.01 Design Criteria

Communication vaults shall be required at certain field locations if there is a need for additional space for splices, coiling or other communication related features. Communication vaults shall not be located within ditches. Communications vaults shall be constructed of concrete.

3.23.04.10.02 Construction Requirements

Communication vaults that connect with fiber optic conduit and cable runs shall be spaced no more than 3000 ft apart. Handholes used for all other conduit and cable runs shall be spaced no more than 300 ft apart. Handholes along fiber optic lines may be placed as needed to facilitate the installation of fiber optic cable. All vaults, manholes, handholes and pull boxes shall be installed with underdrain in accordance with Standard No. MD 811.04. The stone surrounding these structures shall not be considered a suitable outfall. Underdrain shall be connected to a suitable outlet such as underdrain outlet pipe to a slope or drainage structure.

3.23.04.11 ITS Conduits

The Design-Builder shall design and construct all conduits, including all necessary hardware, fasteners, and accessories, in accordance with the requirements of this document. Longitudinal conduits for the communications network shall not be installed under the paved surface or in the MD 210 median.

3.23.04.11.01 Material Requirements

The Design-Builder shall design and construct all buried conduit to meet the material requirements of the Contract Documents.

The ITS communications network shall include multi-duct conduits, multi-cell conduits, fiber optic cable, vaults, handholes, fiber optic drop cables, fiber optic

connectors, fiber optic splice closures, fiber optic data transceivers, fiber optic video transceivers, fiber optic patch panels, and fiber optic jumpers.

All vertical run conduit located from two feet below ground to ten feet above ground shall be galvanized rigid steel, unless otherwise specified.

All materials used in the installation of conduit, such as bends, adapters, couplings, and fittings, shall meet or exceed all of the recommendations of the conduit manufacturer for suitable installation.

The Design-Builder shall use complete conduit sections in 20 feet (nominal) sections when PVC conduit is used and include mid-body gasket to provide watertight integrity. The Design-Builder shall used complete conduit rigid bend sections complete with bell and spigot. When used, PVC and HDPE shall be minimum schedule 80.

The Design-Builder shall provide flat profile, low stretch polyester, sequential footage marked, 2500 lb tensile strength Mule Tape or approved equivalent in each empty conduit or cell.

The mounting rail for the locator wire connection device shall be zinc bichromate plated steel.

All ITS fiber optic backbone and distribution cable shall be housed in a multi-duct conduit. The appropriate naming convention to be used in any Project Plans and other documents for multi-duct conduit shall be as follows:

A) ID = one multi-duct conduit cluster = four conduit;
B) 2D = two multi-duct conduit cluster = eight conduit;
C) 4D = four multi-duct conduit cluster = sixteen conduit.

Trenched ITS multi-duct conduit shall contain a multi-celled conduit system consisting of four assembled 1.25 inch Schedule 40 PVC conduits. The Design-Builder shall transition to an innerduct system for use in structural walls, barriers or parapets as needed.

Spacers for trenched conduit shall be molded from high impact polypropylene and be factory-certified to handle all handling pressures and stresses associated with conduit installation.

All multi-duct fiber optic conduit shall be labeled by the manufacturer as "fiber optic communications." Conduit labels shall be placed on the outside of each of the four conduits in black letters at intervals no greater than 6 ft. The height of the marking shall be a minimum of ½ inch. Each conduit or cell shall be uniquely color-coded.

3.23.04.11.02 Construction Requirements

The Design-Builder shall locate ITS multi-duct conduit to assure correct alignment of the individual cells. Conduit shall not be placed directly above parallel utilities. If an existing signal or ITS conduit parallels new conduit, the new conduit shall be located within one foot of the existing parallel conduit run. All conduit bends shall have a radius of not less than 12 times the inside diameter of the conduit or equivalent to the minimum bend radius of the fiber optic cable, whichever is greater.

When crossing finished curbs and gutters, sidewalks, concrete flatwork, and textured or decorated surfaces, conduit shall be installed so as not to damage these sections. Any section damaged by the operations of the Design-Builder shall be replaced entirely at no additional cost to the Administration.

The Design-Builder shall place all conduits in the same trench before surfacing. Galvanized rigid steel shall be used in all above ground conduit installations, unless otherwise specified; and PVC or high density polyethylene (HDPE) shall be used in all underground conduit installations. The Design-Builder shall install plugs on all empty conduits inside all handholes.

Any installation of buried conduit shall be located away from potential guardrail installations.

In all empty conduits, including all cells of multi-duct conduit, Mule Tape shall be installed. The Design- Builder shall leave 2 ft of Mule Tape outside of the end cap and fasten it securely.

Conduits shall be installed in a manner that allows the backfill to completely surround all exterior surfaces of the conduit. Multi-duct conduits shall be separated by use of a commercially available conduit spacer or Administration-approved equivalent.

Non-metallic conduit that contains a conductor shall conform to the abrasion requirements per Section 346-8 of the NEC. Grounded bushings shall be installed on the ends of metal conduits per Section 347-12 of the NEC.

The Design-Builder shall construct all conduits into structures. Installation of multi-duct conduit on structures shall require additional Design-Builder prepared details specific to each particular structure and situation. The Design-Builder shall prepare any necessary details and instructions for multi-duct conduit on structures, including all materials, location of assembly relative to other structural features, expansion/contraction fittings, and the method used for passing conduit through diaphragms and abutments.

Conduit expansion fittings shall be installed at locations where the conduit crosses structural expansion joints.

The Design-Builder shall install the following cables and conductors in separate conduit runs and junction boxes:

A) Power service conductors (120 V and above);
B) Communication cables;
C) DMS cables; and
D) CCTV coaxial and control cables.

The Design-Builder shall not install any combination of the above categories of cables and conductors in a common conduit or junction box, unless within the junction box that is installed immediately adjacent to the cabinet, which can accommodate any cables or conductors that are less than 120 V. Power service conductors shall enter the cabinet through a separate junction box with no other cables or conductors. Only fiber optic cable shall be installed in multi-duct conduit.

3.23.04.12 Integration and Testing

The Design-Builder shall integrate the following devices under this Contract:

A) DMS System;
B) TTl System; and
C) Fiber Optic Communication System.

For all devices connected to the proposed fiber optic cable installed under this Project, integration shall include field site integration and subsystem integration. The Design-Builder shall develop an ITS test plan for conducting all required tests. This test plan shall be submitted to the Administration for review and written comment. The Design-Builder shall not be allowed to conduct any testing until the Administration has approved the test plan. The Design-Builder shall permit the Administration to adjust the proposed schedule of the test by up to seven days, at no cost to the Administration, to allow for availability of personnel. Administration personnel or an authorized Administration representative will witness and sign off on all tests. This person is the only person who can sign off that each test is complete.

3.23.04.13 Tests Applicable To All Devices

The Design-Builder shall conduct, pass, and document a subsystem communication throughput test over the communication path between each field device and the EOF.

The Design-Builder shall document that the bit error rate (BER) over the path, for each cabinet, is zero over a five-minute period. The Design- Builder shall supply the bit error rate test equipment.

The test shall occur after all communication installation for a particular site has been completed, the communication paths between the device and the EOF have been functional for at least 48 hours, and all fiber tests have been successfully passed. The Design-Builder shall notify the Administration a minimum of 72 hours prior to the commencement of testing.

After successful completion of all subsystem test procedures, and after all mainline lanes as well as ramps are open, each site shall be tested for proper communication operation for 30 consecutive days. During the testing period, all Design-Builder provided, installed or relocated equipment at the site shall operate without failures of any type.

If any component malfunctions or fails to provide the capabilities specified herein during the 30-day test period, the Design-Builder shall troubleshoot to find the exact cause of the failure. If the failed equipment is Administration-furnished, the equipment shall be removed and replaced by the Design-Builder with replacement equipment from the Administration. This troubleshooting shall occur within 48 hours of notification by the Administration.

After the component malfunction has been corrected to the satisfaction of the Administration, the Design- Builder may be required to restart the 30-day test period. In the event of a failure in equipment furnished by the Administration, the 30-day test will be suspended until failures with the Administration provided hardware are corrected, at which time the test will resume.

3.23.04.14 Cable Conductor Test, Field Operation Test, and 30 Day Burn In Tests

The Design-Builder shall conduct, pass, and document a local field operations test for CCTV, HAR, and DMS device testing to demonstrate that all hardware, cables, and connections furnished and installed by the Design-Builder operate correctly and that all functions are in conformance with the requirements described herein. The Design-Builder shall verify the power supply voltages and the functionality of the cabinet fans and heaters. A five (5) day pretest notification shall be required and a completion notice shall also be required.

A 30-Day Device Burn in test is also required.

The Design-Builder shall submit documentation indicating successful passing of each test to the Administration for approval prior to final acceptance. The Design-

Builder shall not perform any testing until the Administration has approved the testing Plans prepared by the Design-Builder.

3.23.04.15 Maintenance During Construction

The Design-Builder shall maintain the existing/previously installed and new ITS until Acceptance for Maintenance.

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
Jason A. Ridgway, 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 ADEQUATELY MAINTAIN PROJECT

98 **ADD:** To the second 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 $1000 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.

10-31-08

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:

Steven Marciszewski, Director, Office of Construction
State Highway Administration
7450 Traffic Drive
Hanover, MD 21076

Evidence of insurance shall be provided to the Administration prior to the award of the Contract by means of a Certificate of Insurance with copies of all endorsements attached or, in the event insurance is provided by a policy form other than a CGL form, by certified copy of the complete policy with all endorsements.

Any policy exclusions shall be shown on the face of the Certificate of Insurance.

The Certificate of Insurance shall be accompanied by a document (a copy of State License or letter from insurer) which indicates that the agent signing the certificate is an authorized agent of the insurer.

When specified in the Contract Documents, the Contractor shall carry the type and amounts of insurance in addition to any other forms of insurance or bonds required under the terms of the Contract and these Specifications.

The cost of the insurance will not be measured but the cost will be incidental to the Contract lump sum price.

Contractor and Railroad Public Liability and Property Damage Insurance shall be provided as specified in TC-6.03.

.02 Indemnification

The Design-Build Team shall indemnify, defend and hold the Administration and its officers, directors, employees, agents and consultants from and against all claims, actions, torts, costs, losses, and damages for bodily injury (including sickness, disease or death) and/or tangible property damage (other than to the Work itself) arising out of or resulting from the performance of the Work by the Design-Build Team, any subcontractor, subconsultant, engineer, supplier, any individual or entity directly or indirectly employed by any of them or anyone for whose acts any of them may be liable. Damages covered by the preceding sentence include, but are not limited to, all fees and charges of engineers, attorneys and all other professionals and all mediation, arbitration, court or other dispute resolution costs.

The indemnity obligation set forth in the preceding paragraph shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the Design-Build Team or any subcontractor, subconsultant, engineer, supplier, or other individual or entity under Workers' Compensation acts, disability benefit acts, or other employee benefit acts.

.03 Additional Insurance Requirements

.03.1 Professional Liability Insurance

Professional Liability Insurance Policy, which covers the Indemnification Clause of this contract (paragraph .02 above), as it relates to errors, omissions, negligent acts or negligent performance in the work performance under this contract by the Designer, its subcontractors, employees and agents. The limitation of the Courts and Judical Proceedings Article states Annotated Code of Maryland Section 5-108(b) shall apply.

.03.2 Workers' Compensation Insurance

Workers' compensation, as required by the laws of the State of Maryland, including Employer's Liability Coverage and coverage for the benefits set forth under the U.S. Longshoremen and Harbor Workers' Compensation Act, the Jones Act, and other federal laws where applicable.

.03.3 Comprehensive Automobile Liability Insurance

Comprehensive Business Automobile Liability covering use of any motor vehicle to be used in conjunction with this contract, including hired automobiles and non-owned automobiles. Loading and unloading of any motor vehicle must be covered by endorsement to the automobile liability policy or policies.

.03.4 Administrative & General Provisions

a. Each policy, with the exception of Workers' Compensation and Professional Liability Insurance, shall name the State Highway Administration.

b. Defense of Claims

Each insurance policy shall include a provision requiring the carrier to investigate and defend all named insured against any and all claims for death, bodily injury or property damage, even if groundless.

c. Compliance

The Design-Build Team shall be in compliance with this Section provided it procures either one policy or insurance covering all work under the contract or separate insurance policies for all segments constituting the entire project. In either case, a certificate of insurance must be filed for each policy with the Administration indicating that all required insurance has been obtained.

The Design-Build Team is responsible for assuring that insurance policies required by this Contract comply with all the requirements. The Design-Build Team is also responsible to determine that all subconsultants, subcontractors, suppliers, and all other individuals or entities performing Work for the Project carry all applicable insurance coverages set forth in this section, including, in all cases, Workers' Compensation, Automobile, and Commercial General Liability Insurance. The Design-Build Team shall indemnify and hold harmless the Administration from any claims arising from the failure to fulfill said responsibilities.

d. Reporting Provisions

Any failure to comply with reporting provisions of the policies shall not affect coverage provided to the Administration, its officers, agents and employees.

e. Separate Application

The insurance provided by the Design-Build Team shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

.03.5 Notice of Cancellation or Modification

All policies of insurance provided in this Section shall be endorsed to provide that the insurance company shall notify the Administration, the Design-Build Team, and each named insured at least thirty (30) days prior to the effective date of any cancellation or modification of such policies.

TC-5.03 SUBCONTRACTING AND SUBCONTRACTORS

102 **INSERT**: The following before the paragraph titled '**Subcontractors Prompt Payment**.'

Percentage of Own Workforce Required. The Design-Build Team must perform at least fifty percent of the value of the on-site construction work with its own workforce, not including the percent goal required in the contract proposal to be performed by DBE's. The Designer must perform at least fifty percent (50%) of the value of the design work with its own workforce, not including the work required by DBE's.

106 **ADD**: The following sections at the end of section **'TC-5.05 DETERMINATION AND EXTENSION OF CONTRACT TIME.'**

TC-5.06 OWNERSHIP OF DOCUMENTS

All plans, specifications, inspection records, or other documents ("Documents") generated by the Design-Build Team and all consultants, subcontractors, suppliers, manufacturers performing Work on the Project are the property of the Administration. Upon request by the Administration, the Design-Build Team or any other person or entity performing Work will produce and deliver such Documents as requested, both in hard copy and electronic format.

TC-5.07 ACCESS TO AND RETENTION OF RECORDS

The Design-Build Team and its employees and Subcontractors shall make all project records available for inspection by the Project Manager and all other persons authorized by the Administration, and shall permit such representatives to interview employees during working hours. Project records include daily time reports, records of force account work, quality control or assurance documentation, inspectors reports, employment records, payrolls, equal opportunity records, construction conference records, partnering records, and any other documents in any way related to the Project substantiating payment. These records shall be retained at least three years after final acceptance of the project.

TERMS AND CONDITIONS

TC SECTION 6
RESTRICTIONS AND PERMITS

112 **DELETE:** TC 6.10 – RECYCLED OR REHANDLED MATERIAL in its entirety.

INSERT: The following.

TC 6.10 – RECYCLED OR REHANDLED MATERIAL.

Refer to 900.03 in the Contract Documents.

TERMS AND CONDITIONS

TC SECTION 6
RESTRICTIONS AND PERMITS

TC-6.12 — STRUCTURE UNDERCLEARANCES AND OVERHEAD CLEARANCES

114 **DELETE:** The last paragraph, "Resurfacing" in its entirety.

INSERT: The following.

Resurfacing. The minimum underclearances shall be maintained whenever resurfacing a roadway. This may require grinding the existing pavement prior to placing the resurfacing material. Immediately after completing the resurfacing operation and when the lane closures are still in the effect, the Contractor, in the presence of the Engineer, shall measure the minimum vertical underclearance. The Engineer will submit results to the Office of Structures. The cost of these measurements will be incidental to other pertinent items specified in the Contract Documents. Whenever highway overpass bridges are in the general vicinity of a pedestrian bridge and the grinding is not required to maintain the specified clearances, the roadway under the pedestrian bridge shall be ground to provide a higher undreclearance than the adjacent bridges. This requirement will be waived whenever the Engineer contacts the District Engineer and the Office of Structures and determines that the grinding would have an adverse effect on drainage, utilities, etc.

TERMS AND CONDITIONS

TC SECTION 6
RESTRICTIONS AND PERMITS

115 **DELETE:** TC-6.14 STORING MATERIALS AND EQUIPMENT ON/AGAINST STRUCTURES RESTRICTIONS in its entirety.

INSERT: The following.

TC-6.14 RESTRICTIONS FOR PLACING AND USING EQUIPMENT ON STRUCTURES, OR STORING MATERIALS ON/OR AGAINST STRUCTURES

Materials, and waste shall not be stored on or against any structure or structure element and equipment shall not be placed or used on any structure during the construction phase or finished or final configuration unless the written permission is obtained from the Administration's District Office and the Office of Structures for each type of material or equipment to be stored.

Loads, vehicle or other weight (materials etc.) that exceeds the bridge posted weight limit, if posted, or exceeds Maryland's legal vehicle loads on bridges, (with no posted bridge weight limits), are prohibited on the structure at any time, except as modified by the following. If the Contractor's intended operations will impose loads on the structure that exceed the weights listed above, the Contractor shall submit to the Engineer the type of material, its weight, the area that will be affected by the load, and its location on the structure. No stock pile of material regardless of unit weight shall be more than 4 ft high. If equipment is to be used, submit the maximum gross weight, axle spacing, load per axle, and proposed location on the structure. The maximum gross weight must include the vehicle weights in the most critical load position, i.e. front axle on crane with boom extended and element hanging. A special Hauling Permit is a requirement anytime equipment is moved over a structure that is over legal weight limit.

If any load requires evaluation, then a professional engineer registered in the State of Maryland and experienced in bridge design shall perform a load analysis to ensure that the load on the structure will not create an overstress condition on any bridge element. This analysis also includes effects of legal loads crossing the structure, if applicable. Analyses shall be submitted for review and loading cannot be imposed until written approval is received. Such submission does not guarantee acceptance by the Office of Structures, which reserves the sole right to accept or reject the proposed loading.

For structures under construction or rehabilitation, the Contractor shall also submit information pertaining to the phase of construction, such as which members have been modified or separated from the remainder of the structure, or have been newly constructed.

Any materials or equipment that would have a detrimental affect to the structure such as aluminum products placed against concrete surfaces shall be adequately protected to prohibit them from coming in contact with each other. Any discoloration or damage to the structure as a result of material or equipment being stored on/against the structure shall be removed or repaired.

TERMS AND CONDITIONS

TC SECTION 7
PAYMENT FOR DESIGN-BUILD

TC-7.01 MEASUREMENT OF QUANTITIES

DELETE: This section in its entirety.

INSERT: The following:

Unless specifically noted herein, payment for all work within the Scope of Work shall be included in the Lump Sum Price shown on the Proposal Form. The Design-Build Team shall disregard all references in the Standard Specifications to actual quantities, Contract items, Contract unit prices, and any measurement or payment method other than inclusion in the Lump Sum Price.

Payments to the Design-Build Team shall be full compensation for furnishing all materials and for performing all work under the contract in a complete and acceptable manner and for all risk, loss, damage, or expense of whatever character arising out of the nature of the work or the prosecution thereof.

TC-7.02 PAYMENT ALLOWANCES FOR STORED MATERIALS

DELETE: The opening statement:

INSERT: The following statement:

When the Contractor requests payment allowance for stored materials, those materials must be identified as an Item within the Progress Payment Breakdown described in TC-7.11. The following terms and conditions shall apply:

TC-7.05 PROGRESS PAYMENTS

(a) Current Estimate.

127 **DELETE:** **(2) Variable Retainage** in its entirety**.**

INSERT: The following:

(3) Variable Retainage. The Contract will be subject to a variable retainage based upon the Administration's performance evaluations of the successful proposer and a minimum retainage for the landscaping items of work. Those qualifying may have retainage reduced upon request of the Contractor with consent of surety. This request shall be processed through the District Engineer. Landscaping items of work are not eligible to have a reduction in retainage below the minimum percentage outlined below. If at any time during the performance of the work, the evaluation of the Contractor changes, retainage reduction may be reconsidered.

Except for landscaping items of work, after 15 percent project completion and upon request, Contractors with 'A' evaluations for the last two years may be reduced from 5 percent to zero percent. Project completion percentage will be based upon actual work completed (excluding monies paid for stored materials). An interim evaluation of the current project would need to be completed and would need to be an 'A'.

Except for landscaping items of work, at 50 percent project completion and upon request, Contractors with 'B' evaluations or any combination of 'A' and 'B' evaluations for the last two years may be reduced from 5 percent to 2.5 percent, and remain at that level until released upon final payment. Project completion percentage will be based upon actual work completed (excluding monies paid for stored materials). An interim evaluation of the current project would need to be completed and would need to be an 'A' or 'B'.

Contractors with 'C' evaluations or any combination of 'C' and 'D' evaluation for the past two years will begin and remain at 5 percent for the life of the project, except for landscaping items.

Contractors with a 'D' evaluation for the last two years will begin at 5 percent, except for landscaping items. Project performance will be evaluated monthly with the retainage being raised to 10 percent, except for landscaping items, for continued 'D' performance.

New Proposer. Contractors who have not been previously rated by the Administration may be eligible for a reduction in retainage. To be eligible, their past performance on highway and bridge work shall be documented by the government agency with 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

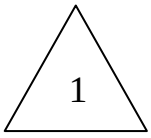
TC-7.10 COST BREAKDOWN AND SCHEDULE OF PAYMENTS

.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 Price Proposals and as a basis of payment. This breakdown shall present a realistic and documentable presentation of the costs for the major elements of work that comprise the lump sum price for the work. At a minimum, the following Lump Sum Items shall be included:

Clearing & Grubbing
Mobilization (refer to TC-705,e.)
Design Engineering
As-Built Drawings
Engineer's Office
Maintenance of Traffic
Construction Stakeout
Removal and Disposal of Existing Buildings

Earthwork - Excavation & Embankment
Drainage
Erosion & Sediment Control
Bridge Structures
Retaining Walls
Noise Walls
Paving Items – hot mix asphalt, concrete pavement, and graded aggregate base
Concrete
Fencing
Seed & Mulch
Landscaping
Lighting & Electrical
Pavement Markings
Permanent Signing
Signals
Utility costs for each utility – engineering and construction
W-beam and concrete barrier

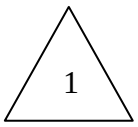


The Design-Build Team shall also submit to the Administration a Cost Breakdown of the Design Engineering item. This cost breakdown shall include the name and fee for each consultant and subconsultant firm that is included in this item.

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 109- Critical Path Method Project Schedule Design-Build.

.02 Review and Approval

Within 14 working days after Execution of the Contract, the Administration shall approve the Cost Breakdown or return it to the Design-Build Team with deficiencies noted. The Administration will not approve a Contract Cost Breakdown that is unbalanced. The Design-Build Team shall then submit the Cost Breakdown until an acceptable Cost Breakdown is approved. The Design-Build Team is responsible for incorporating time for submission and approval of the Cost Breakdown in its Schedule of Work.

.03 Projected Schedule of Payments

Within 7 working days after approval of the Cost Breakdown, the Design-Build Team shall provide the Administration with a Projected Schedule of Payments for the Project. This schedule will provide the Administration with an estimate of monthly cash flow requirements by forecasting the Design-Build Team's monthly Applications for Progress Payments for the duration of the Project. The Projected Schedule of Payments must be in accordance with the Contract, the approved Cost Breakdown.

.04 Justification of Cost Breakdown or Projected Schedule of Payments

The Administration may require the Design-Build Team to provide explanations and supporting documentation if the Cost Breakdown or Projected Schedule of Payments indicate unbalancing or do not reasonably reflect the actual cost of performing the work or the value of work received by the Administration.

TC-7.11 CONSTRUCTION PROGRESS PAYMENT BREAKDOWN

.01 Submittal of Progress Payment Breakdown

The successful Design-Build Team shall submit to the Administration an itemized Progress Payment Breakdown and supporting documentation to be used as a basis for payment. This breakdown shall be a realistic and documentable presentation of the costs for the major elements that comprise the Contract Lump Sum price for the work. The breakdown shall be sent to the District Engineer. No progress payment will be made until such time that this breakdown has been accepted by the Administration. The Design-Build Team shall submit additional updates to the Payment Breakdown as the design and construction progresses and as directed by the Administration. The Administration reserves the right to request additional detail from the Design-Build Team in order to process progress payments. The breakdown shall be in MS Excel format and include at a minimum, the following items.

Section 1000

LS for Design Costs
LS for Mobilization (refer to TC-7.05, e.)
LS for As-Builts
LS for Clearing & Grubbing
LS for Engineer's Office
LS for Maintenance of Traffic
LF of Temporary Barrier
LF of Temporary Striping
SF of Temporary Signs
EA of Drums
EA of Arrow Panels
EA of VMS

Section 2000

CY of Excavation

Section 3000

LF of RCCP
LF of CMP
LF of HDPE Pipe
EA of Drainage Structures
LF of Underdrain Pipe
LS for Erosion & Sediment Control
LS for Stormwater Management

Section 4000 (if applicable)

CY of Structure Excavation
LF of Piling
LF of Caissons
CY of Substructure Concrete
CY of Superstructure Concrete
LS for Reinforcing Steel
LS for Fabricated Structural Steel
LS for Cleaning & Painting New Structural Steel
LS for Pre-stressed Concrete Beams & Panels
LS for Retaining Walls
LS for Noise Barrier
LS for Retaining Walls

Section 5000

SY of Graded Aggregate Base
Tons of HMA Surface
Tons of HMA Base
Tons of HMA Modified
SY of Grinding Existing Pavement
SY of Portland Cement Concrete Pavement (if applicable)
LF of Pavement Markings

Section 6000

LF of Curb & Gutter
SF of Sidewalk
LF of Traffic Barrier
EA of Traffic Barrier End Treatments
LF of Concrete Traffic Barrier
LF of Chain Link Fencing

Section 7000

SY of Topsoil
SY of Permanent Seeding
SY of Temporary Seeding
SY of Soil Stabilization Matting
LS for Tree, Shrub, Perennial Establishment
LS for Care & Replacement, Warranty of Plantings

Section 8000

CY of Concrete for Foundations
LS for Sign Structures
SF of Permanent Signing
EA of Lighting Structures
EA of Signal Structures
LF of Wire, Conduit for Lighting and Signals

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 D will apply to this Contract.

The PA will be calculated when the index for the current month increases or decreases more than 5 percent of the base index. The total dollar amount of fuel adjustment will be limited to 5 percent of the Contract Total Amount as bid. If an increase or decrease in costs exceeds 5 percent of the Contract Total Amount as bid, no further adjustment will be made.

Computations for adjustment will be as follows:

Percent Change = [(E – B)/B] x 100

PA= [E – (B x D)] x F x Q

Where:

PA = Amount of the price adjustment

E = Current monthly index price

B = Prevailing base index price

D = 1.05 when increase is over 5%; 0.95 when decrease is over 5%

F = Applicable fuel adjustment factor from Table TC-7.09

Q = Quantity of individual units of work

TABLE TC-7.09

COST ADJUSTMENT FACTORS FOR DIESEL FUEL			
CATEGORY	**DESCRIPTION**	**UNITS**	**FACTOR**
A	Sum of Cubic Yards of Excavation in Category 200	Gallons/Cubic Yard	0.29
B	Sum of Structure Concrete in Category 400	Gallons/Cubic Yard	1.892
C	Sum of Aggregate Base in Category 500	Gallons per ton	0.60
D	Sum of HMA in Category 500	Gallons per ton	3.50
E	Sum of Rigid Concrete Pavement in Category 500	Gallons/Cubic Yard	0.95

Any difference between the checked final quantity and the sum of quantities shown on the monthly estimates for any item will be adjusted by the following formula:

$$FPA = [(FCQ \div PRQ) - 1] \times EA$$

Where:

FPA = Final PA for the item that increased or decreased

FCQ = Final Checked Quantity of the item

PRQ = Total Quantity of the item reported on the most recent estimate

EA = Total PA of the item shown on most recent estimate

(b) Price Adjustment Criteria and Conditions. The following criteria and conditions will be considered in determining the PA.

(1) Payment. The PA will be computed on a monthly basis. PA resulting in increased payment to the contractor will be paid under the item Price Adjustment for Diesel Fuel. The item amount will be established by the Administration, and shall not be revised by the Contractor. PA resulting in a decreased payment will be deducted from monies owed the Contractor.

The monthly base price for determining a PA for all work performed after the Contract

completion date, as revised by an approved time extensions, will be the monthly base price at the time of the Contract completion date (as extended) or at the time the work was performed, whichever is less.

(2) Expiration of Contract Time. When eligible items of work are performed after the expiration of Contract time with assessable liquidated damages, no PA will be made.

(3) Final Quantities. Upon completion of the work and determination of final pay quantities, an adjusting Change Order will be prepared to reconcile any difference between estimated quantities previously paid and the final quantities.

(4) Inspection of Records. The Administration reserves the right to inspect the records of the Contractor to ascertain actual pricing and cost information for the diesel fuel used in the performance of the applicable items of work..

(5) Additional Work. When applicable items of work, as specified herein, are added to the Contract as additional work, in accordance with the Contract provisions, no PA will be made for the fluctuations in the cost of diesel fuel unless otherwise approved by the Engineer. The Contractor shall use current fuel costs when preparing required backup data for work to be performed at a negotiated price.

(6) Force Account. Additional work performed on a force account basis, reimbursement for material, equipment, and man-hours as well as overhead and profit markups will be considered to include full compensation for the current cost of diesel fuel.

CATEGORY 100
PRELIMINARY

SECTION 101 — CLEARING AND GRUBBING

101.01 DESCRIPTION.

101.01.01 Definitions.

137 **DELETE:** (e) Grading Unit in its entirety.

INSERT: The following.

(e) Grading Unit. The maximum contiguous area allowed to be graded at a given time, not to exceed 20 acres.

101.03 CONSTRUCTION.

101.03.01 Erosion and Sediment Control.

138 **DELETE:** The third sentence of the second paragraph, "A grading unit need not be 20 contiguous acres", in its entirety.

CATEGORY 100
PRELIMINARY

SECTION 103 – ENGINEERS OFFICE

144 **DELETE:** 103.01 to 103.04 in its entirety.

INSERT: The following.

103.01 DESCRIPTION. Furnish, clean, and maintain in good condition an Engineers office at an approved location within the immediate vicinity of the project. The office shall be separate from any offices used by the Contractor, and it and all items therein shall be for the exclusive use of the Administration's Engineers and Inspectors. Rented properties that conform to the type of office specified in the Contract Documents will be acceptable.

103.02 MATERIALS. Not applicable.

103.03 CONSTRUCTION. Set up, equip, and make the office ready for use at least five days prior to commencement of construction work on the project. Progress payments for professional services may be made prior to the commencement of construction work. Leave the office and appurtenances in place until all field records are complete. Upon removal of the office, restore the location to a condition acceptable to the Engineer.

Unless otherwise specified, the office and all furnished equipment and accessories shall become the property of the Contractor at the completion of the project.

103.03.01 Mobile Housing Unit. Provide a mobile housing unit having floor space of at least 100 ft^2 and window area of at least 10 ft^2. Ensure it is entirely enclosed and waterproofed and has a door that locks. Provide a table 36 x 48 x 40 in. high and one closet equipped with a lock. Furnish two keys for each lock. Provide satisfactory heating and cooling. Relocate the unit as directed.

103.03.02 Handicap Accessibility. When handicap accessibility is necessary, comply with the Federal Register-Volume 56 No. 144-Americans with Disability Act (ADA) Accessibility Guidelines for Buildings and Facilities.

103.03.03 Mobile Office Trailers. Anchor in accordance with the manufacturer's recommendations. Office trailers, as defined under the Industrial Building and Mobile Act of Maryland, shall be approved by the Maryland Department of Housing and Community Development and bear the Maryland Certification Insignia in the interior of the office.

103.03.04 Quality Control Laboratory. Section 915.

103.03.05 Requirements for all Offices.

(a) Entirely enclosed, waterproofed, and completely insulated to at least an R11 rating.

(b) Double thick floor with building paper placed in between the floor layers.

(c) Finished inside and outside as approved.

(d) A ceiling height of at least 7 ft, a pitched roof, and a ventilating louver in each gable.

(e) A 4 x 1 ft sign with the message "ENGINEERS OFFICE - STATE HIGHWAY ADMINISTRATION" attached to or mounted in front of the office. The sign shall have a black background and have white lettering at least 3 in. high.

(f) A 5 x 7 in. no smoking sign posted on the outside of each entrance to the office, plant laboratory, and mobile housing unit.

(g) Interior and exterior doors equipped with different key locks. Interior doors keyed alike. Exterior doors keyed alike. An additional dead bolt lock for each exterior door. Four keys for each interior and exterior lock.

(h) Windows capable of being opened and closed. Equip with latches, screens, and venetian blinds or shades.

(i) Electrified in accordance with national and State electrical codes with satisfactory artificial lighting and lighting services. Ensure an illumination level of at least 75 ft-c.

(j) Equipment capable of heating the office to at least 70 F and cooling to at least 78 F.

(k) A restroom facility in accordance with the State Department of Health and Mental Hygiene or other authorities having jurisdiction. Connect to water and sewage or a well and septic system. Provide a pressurized water system capable of maintaining at least 20 psi. Furnish a wash basin, water closet, soap holder, paper towel holder, and mirror.

(l) Maintain the facilities in a clean and sanitary condition. Sweep the floor and remove the trash daily. Damp mop and wax the floor biweekly. Clean the interior and exterior of all windows monthly. Perform all work on an as needed basis and when requested.

(m) Protect the Administration and Administration employees from any loss or damage to their property stored in the Engineers Office. Provide protection in the amount of twenty thousand dollars ($20 000), nondeductible, per each occurrence, for any loss or damage due to fire, theft, vandalism, storms, or floods. Complete the reimbursement, replacement, or repair within 30 days from the date the Engineer reports the loss.

(n) A parking area for the exclusive use of Administration employees. Provide the specified number of spaces. Post signs to designate the assigned parking areas. Stabilize the parking area as directed.

(o) Fire extinguishers of a dry chemical or multi-purpose ABC type (at least 10 lb), equipped with a visual air pressure gauge, and maintained in accordance with OSHA standards.

(p) A 24 unit first aid kit furnished and maintained as described in the Code of Federal Regulations, Title 29 Subpart D, Section 1926.50(d)2.

(q) A 4 x 8 ft waterproof bulletin board. Place in an easily accessible area within the project limits and conspicuously displayed to all employees. Post and maintain all pertinent and required notices for the duration of the project.

(r) Touch-tone telephones equipped with an answering device capable of answering, recording, storing, and playing back incoming messages at least 30 minutes in length and recording outgoing messages up to 15 seconds in length. The device shall be voice activated, beeperless, record as long as the speaker speaks, and play back recorded messages without dial tone or pauses.

Replace stolen equipment and equipment that becomes defective or for any other reason does not function as intended. Provide an equal or better unit within eight hours after notification. Replacement shall be at no additional cost to the Administration. Post emergency telephone numbers at a conspicuous location.

(s) One 12 ft^3 electric refrigerator.

(t) An approved cassette player/recorder with cassettes or digital recording device.

(u) One paper copier machine, with automatic document feed capable of printing at least 15 copies per minute and documents of up to 11 x 17 in. Supply paper and provide service as needed.

(v) One sanitary electric water cooler, including bottled water and disposable cups.

(w) One paper shredder capable of shredding at least 10 sheets (20 lb bond) at a time. Throat width of at least 12 in. Speed of at least 20 feet per minute. Auto reverse or auto stop for paper jams. Power of at least 115 v.

103.03.06 Computer System. Furnish 1 desktop computer and 0 laptop computers, printers and or multifunction printers and other equipment as specified herein.

General Requirements.

(a) IBM compatible with an Intel Core i5 processor.

(b) Minimum hard drive storage of 500 GB (gigabyte).

(c) One CD-RW drive (re-writable CD-ROM). 16X Minimum speed.

(d) Operating System. Minimum Microsoft® Windows 7 Professional Edition. The computer system will not be acceptable unless all Microsoft Windows Critical Updates are installed.

(e) Printer. When an Engineers Office is specified, furnish a color all-in-one laser printer/scanner/copier/fax with at least 64 MB of RAM and meeting the following minimum requirements:

(1) Input paper capacity of 150 sheets.

(2) Automatic document feed of 35 page capacity.

(3) Printer resolution up to 600 X 2400 dpi, and a print speed (color) of at least 15 ppm.

(4) Scanner resolution must be capable of 1200 x 2400 dpi optical. Built in Copier resolution must be capable of up to 600 X 600 dpi. Copier speed of at least 15 ppm.

(5) Fax speed of at least 2 sec / page.

(6) For security reasons a printer with an internal hard drive installed is not allowed.

(f) Software. Supply all manuals, license numbers, software key numbers, and/or software on original disks for retention in the Engineers Office or Administration facility for the duration of the Contract.

(1) Microsoft® Office 2007 Professional (32-Bit version only), for Windows™ or later. The computer system will not be acceptable unless all available Microsoft Office Professional critical updates and service packs are installed.

(2) Install and configure antivirus/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 ft^2 of floor area under one roof.

Type B Engineers Office – Standard office trailer with at least 400 ft^2 of floor area under one roof.

Type C Engineers Office – Standard office trailer with at least 700 ft^2 of floor area under one roof.

Type D Engineers Office – One-story structure containing at least 1300 ft^2 of floor area under one roof. Modular construction is acceptable. Office trailers are not acceptable.

Table 103 Specific Requirements

ENGINEERS OFFICE				ITEM
A	**B**	**C**	**D**	
–	1	2	–	Inner Offices–100 ft^2 each
–	1	1	–	General office area
–	–	–	4	Inner Offices–120 ft^2 each
–	–	–	1	Conference room–240 ft^2
–	–	–	1	Storeroom with shelves–120 ft^2
1	1	1	2	Restroom, 30 ft^2
–	1	1	1	Inner office ingress and egress to the other rooms
3	4	4	5	32 x 60 in. Executive type desks with center drawers
3	4	4	5	Swivel chairs, padded with arm rests
1	1	1	1	30 x 72 in. slant top drafting table and stool, approximately 40 in. high at the front edge

1	2	3	6	30 x 72 in. folding utility table, 30 in. high
–	–	–	1	12-person conference table with padded chairs
2	6	10	12	Additional padded chairs
1	2	2	3	Plan racks
1	1	1	2	Coat racks
1	1	1	1	3 x 6 ft blackboard or whiteboard
1	2	3	3	Electronic desk calculators with memory and tape readout (including manuals, and tapes as needed)
1	1	2	6	Legal size steel filing cabinets, 4 drawer fire resistant (D label) with locks
–	2	2	2	Standard size steel filing cabinets, 4 drawer with locks
1	1	1	5	Bookcases having four shelves 36 x 12 in.
1	2	2	2	Closets, full height, measuring at least 24 x 30 in., equipped with locks, and at least two shelves in each
1	1	1	–	Utility cabinet with 3 adjustable shelves
1	1	1	–	Overhead cabinet at least 8 ft long, 15 in. deep, and 18 in. high
1	1	1	2	Fire extinguisher as specified in 103.03.05
1	2	2	4	Telephones with separate lines, as specified in 103.03.05
2	2	2	2	Battery-operated smoke detectors
4	8	10	15	Designated parking spaces

103.03.09 Recycling. Recycling of recyclable paper (bond, newsprint, cardboard, mixed paper, packaging material and packaging), bottles (glass and plastic), and aluminum cans will be required at the Engineer's Office and the Contractor's facilities for the project.

Furnish approved containers, and remove the material from the site on an approved schedule or as directed. All material shall be taken to an authorized recycling facility. Maintain a log for the duration of the project documenting the type of materials recycled. The log shall include the types of material, date, time, location of facility, and signature line. Furnish a copy of the log at the completion of the project and upon request.

The Contractor shall be considered the owner of any profit and be responsible for all incurred costs.

103.04 MEASUREMENT AND PAYMENT. Engineer's office will not be measured but will be paid for at the Contract lump sum price for the pertinent Engineers Office specified.

Payment of 50 percent of the Contract lump sum price will be payable on the first estimate subsequent to complete installation of the Engineers office. The remaining 50 percent will be prorated and paid in equal amounts on each subsequent monthly estimate. The number of months used for prorating will be the number estimated to complete the work. The final month's prorata amount will not be paid until the office is removed and the area is restored. The payment will be full compensation for site preparation, utility costs, all specified furnishings, to provide, equip, clean, maintain, insure, remove and dispose of the office, restore the site, recycling, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

10-15-14

The only exception to the all-inclusive Contract lump sum price is the stabilization of the parking area, which will be measured and paid for using the pertinent items as directed.

Computer. The computer system will not be measured but the cost will be incidental to the Contract price for the Engineers Office item. If an item for Engineers Office is not specified, the cost of the computer system will be incidental to the payment for Mobilization. In absence of either item, payment will be incidental to the other items specified in the Contract Documents

`CATEGORY 100
PRELIMINARY

SECTION 104 — MAINTENANCE OF TRAFFIC

104.01 TRAFFIC CONTROL PLAN (TCP)

104.01.01 DESCRIPTION.

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 Friday nights, Saturdays (all day), and Sundays. However, work is permitted on Sunday nights.

Work is not permitted on the holidays, or work day preceding and following holidays indicated below with an "X":

☒ New Year's Day, January 1
☐ Martin Luther King's Birthday, the third Monday in January
☐ President's Day, the third Monday in February
☒ Good Friday
☒ Easter Weekend
☒ Memorial Day, the last Monday in May
☒ Independence Day, July 4
☒ Labor Day, the first Monday in September
☐ Columbus Day, the second Monday in October
☐ Veteran's Day, November 11
☒ Thanksgiving Day, the fourth Thursday in November
☒ Christmas Day, December 25

TEMPORARY LANE OR SHOULDER CLOSURE SCHEDULE			
ROADWAY	**# LANE(S) / SHOULDER CAN BE CLOSED**	**DAY OF THE WEEK**	**CLOSURE PERIOD (TIME OF DAY)**
MD 210 from 2500 ft. south of Livingston Road to 3000 ft. north of Livingston Road[1]	0/0 1/1 0/0 1/1 2/1	Mon. – Fri. Mon. – Fri. Mon. – Fri. Mon. – Fri. Sun. – Thur.	5:00 AM – 9:00 AM 9:00 AM – 3:00 PM 3:00 PM – 8:00 PM 8:00 PM – 10:00 PM 10:00 PM – 5:00 AM (next day)

149 **ADD:** The following after the last paragraph, "Any monetary savings...and the Administration."

When closing or opening a lane on freeways, expressways, and roadways with posted speed ≥ 55 mph, a work vehicle shall be closely followed by a protection vehicle (PV) during installation and removal of temporary traffic control devices. The PV shall consist of a work vehicle with approved flashing lights, either a truck-mounted attenuator (TMA) with support structure designed for attaching the system to the work vehicle or a trailer truck-mounted attenuator (TTMA) designed for attaching the system to the work vehicle by a pintle hook and an arrow panel (arrow mode for multilane roadways and caution mode on two-lane, two-way roadways).

The work vehicle size and method of attachment shall be as specified in the TMA/TTMA manufacturer's specification as tested under NCHRP and/or MASH Test Level 3.

When a temporary lane or shoulder closure is in effect, work shall begin within one hour after the lane is closed. Any delay greater than one hour with no work in progress shall require the Contractor to remove the lane/shoulder closure at no additional cost to the Administration. The Contractor's Traffic Manager shall attend Pre-Construction and Pre-Paving Meetings and shall discuss traffic control and the Traffic Control Plan including procedures to be implemented for lane closures.

All closures shall be in conformance with the approved TCP and under the direction of the Contractor's Traffic Manager and the Engineer.

Workers and equipment, including temporary traffic control devices needed for setting up a lane closure or restriction, are prohibited in the lane/shoulder to be closed or restricted before the time permitted in the Contract work restrictions, unless otherwise noted below or as approved by the Engineer.

Temporary traffic control devices to be used for lane/shoulder closure may be placed on the shoulder of the roadway by workers no earlier than 30 minutes prior to actual time lane/shoulder closure or restriction is permitted. When temporary traffic control devices are being installed, all work vehicles involved in the installation shall display flashing lights that provide a 360-degree visibility of the vehicles. These lights shall remain on until the full installation of TTC devices is complete. Temporary traffic signs may be displayed to traffic at this time.

Workers shall not enter a lane open to traffic. Workers may be present on shoulders to prepare for lane closure setup no earlier than 30 minutes prior to actual time lane/shoulder closure or restriction is permitted. During preparation for the lane closure, all work vehicles present at the site and involved in the installation of the lane closure or restriction shall display flashing lights that provide 360-degree visibility of the vehicles. These lights shall remain on until the full implementation of the road closure or restriction is complete.

All temporary lane or shoulder closures shall be restored at the end of the closure period and no travel lane shall be reduced to less than 11 ft on expressways, freeways and 10 ft on other roadways. Prior to opening the closed lane or shoulder, the Contractor shall clear the lane or shoulder of all material, equipment, and debris.

Failure to restore full traffic capacity within the time specified will result in a deduction being assessed on the next progress estimate in conformance with the following.

This is in addition to the requirements specified in TC-4.02.

The designer shall identify the District (for freeways) or determine the Level of Service of the roadway (for other roads) and include the assessed deduction tables accordingly. All unnecessary tables should be deleted.

Level of Service may be determined by using the Congestion Assessment Maps obtained online at http://shavmhisdwma/congestionassessmentintroduction/Default.aspx

The lane closure penalties for 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**
For 1 Lane Closures	
1 – 10	$ 100.00
Over 10	$50.00 per minute (In addition to the original 10 minute deduction)
For 2 or more Lane Closures	
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**
For 1 Lane Closures	
1 – 10	$ 1,000.00
Over 10	$500.00 per minute (In addition to the original 10 minute deduction)
For 2 or more Lane Closures	
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**
For 1 Lane Closures	
1 – 10	$ 150.00
Over 10	$75.00 per minute (In addition to the original 10 minute deduction)
For 2 or more Lane Closures	
1 – 10	$ 300.00
Over 10	$150.00 per minute (In addition to the original 10 minute deduction)

For Level of Service D, E or F, the following fee structure will be followed:

ASSESSED DEDUCTIONS FOR OTHER ROADS	
ELAPSED TIME, (MINUTES)	**DEDUCTION**
For 1 Lane Closures	
1 – 10	$ 300.00
Over 10	$150.00 per minute (In addition to the original 10 minute deduction)
For 2 or more Lane Closures	
1 – 10	$ 600.00
Over 10	$300.00 per minute (In addition to the original 10 minute deduction)

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 both ……dimmer 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".

10-05-10

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.

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.

(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 **2.** 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

104.25 DRONE RADAR

104.25.01 DESCRIPTION. Furnish, install, and relocate drone radar as specified in the Contract Documents or as directed by the Engineer. A drone radar consists of an electronic device that activates all types of on-board radar detectors without causing interference to normal police radar operations.

104.25.02 MATERIALS.

Drone Radar	As approved by the Office of Traffic and Safety

General. The electronic device shall be capable of being securely mounted to a vertical or horizontal surface. The unit shall be of weatherproof and waterproof construction and operate efficiently from -20 to +160 F.

FCC Equipment Authorization. The device shall bear an FCC Equipment Authorization for unlicensed use by the general public under FCC Title 47, Part 15. All applicable FCC equipment regulations shall be met without any additional licensing required of the Administration or the Contractor.

Range. The drone radar shall have an effective linear range of at least 2600 ft.

Power Source. 12 volts DC or 120 volts AC compatible/convertible.

Current Consumption. 1/2 amp maximum.

Frequency. 24.150 ± 0.100 GHz.

104.25.03 CONSTRUCTION. The drone radar shall be furnished, positioned, repositioned, operated, maintained, and removed, as needed or as directed by the Engineer. The unit may be truck or trailer mounted, fixed to a special lighting unit, portable changeable message sign, arrow panel, traffic sign, or traffic barrier W beam, as directed by the Engineer.

104.25.04 MEASUREMENT AND PAYMENT. Drone Radar will be measured and paid for at the Contract unit price per day. A unit day shall consist of any approved usage within a 24 hour calendar day. If a unit is used for part of a day, it will be measured as a unit day.

The payment will be full compensation for drone radar unit, installation, power supply, wiring, supports, relocating as required by the Traffic Control Plan or as directed by the Engineer, removal, and for all material, labor, equipment, tools, and incidentals necessary to complete the work. Each Drone Radar device will be paid for only once per unit day, which will include any work necessary to maintain, re-align, or relocate the device; or replace damaged, missing or stolen devices.

CATEGORY 100
PRELIMINARY

SECTION 104 — MAINTENANCE OF TRAFFIC

104.31 ACCESSIBLE PEDESTRIAN MAINTENANCE OF TRAFFIC.

104.31.01 DESCRIPTION. Provide and maintain an accessible pedestrian route, to the "maximum extent feasible", throughout the project's limits. When an existing pedestrian access route within the public right of way is blocked by construction, alteration, or maintenance activity, an alternate accessible pedestrian route shall be provided.

The phrase to the "maximum extent feasible" applies in areas where the nature of an existing facility or site conditions makes it virtually impossible to comply fully with applicable accessibility standards through a planned alteration. In these circumstances, the alternate accessible pedestrian route shall provide the maximum physical accessibility that is feasible, or a design waiver must be approved by SHA's Office of Highway Development.

104.31.02 MATERIALS. Not applicable.

104.31.03 CONSTRUCTION. The following considerations shall be taken into account when addressing accessible pedestrian maintenance of traffic:

(a) All pedestrians, including persons with disabilities, shall be provided with a reasonably safe, convenient and accessible path that replicates as much as practicable the existing pedestrian facilities.

(b) The width of the existing pedestrian facility should be maintained if practical. When it is not possible to maintain a minimum width of 60 in. throughout the entire length of the pedestrian route, a minimum width of 36 in. shall be provided with 60 x 60 in. passing zones at least every 200 ft, to allow individuals in wheelchairs to pass.

(c) Traffic control devices and other construction materials and features shall not intrude into the usable width of the sidewalk, temporary pathway or other pedestrian facility.

(d) Signs and other devices mounted lower than 7 ft above the temporary pedestrian pathway shall not project more than 4 in. into accessible pedestrian route.

(e) A smooth, continuous hard surface shall be provided throughout the entire length and width of the pedestrian route throughout construction. There shall be no curbs or vertical elevation changes greater than 1/4 in. in grade or terrain that could cause tripping or be a barrier to wheelchair use. Vertical elevation differences between 1/4 in. and 1/2 in. shall be beveled at a maximum 2:1 slope.

(f) When channelization is used to delineate a pedestrian pathway, a continuous detectable edging should be provided throughout the length of the facility such that pedestrians using a white cane can follow it. Edging should protrude at least 6 in. above the surface of the sidewalk or pathway with the bottom of the edging a maximum of 2.5 in. above the surface

(g) Temporary ramps shall be provided when an alternate pedestrian route crosses a curb and no permanent ramps are in place. The width of the ramp shall be a minimum of 36 in. and the slope of the ramp shall not exceed 12:1. Temporary detectable warning mats must be installed at street crossings and signalized entrances.

(h) When possible, an accessible pedestrian route shall be provided on the same side of the street as the disrupted route. When it is not feasible to provide a same-side accessible pedestrian route an accessible pedestrian detour route shall be provided.

(i) Information regarding closed pedestrian routes, alternate crossings, and sign and signal information shall be communicated to pedestrians with visual disabilities by providing devices such as audible information devices, accessible pedestrian signals or barriers and channelizing devices that are detectable to the pedestrians traveling with the aid of a white cane or who have low vision.

(j) It is desirable that pedestrians cross to the opposite side of the roadway at intersections rather than mid-block. Appropriate signing shall be placed at the intersections.

(k) Access to transit stops shall be provided and maintained at all times.

104.31.04 MEASUREMENT AND PAYMENT. Unless otherwise specified, Accessible Pedestrian Maintenance of Traffic will not be measured but the cost will be incidental to the Lump Sum item for Maintenance of Traffic. The payment will be full compensation for all materials, labor, equipment, tools, and incidentals necessary to complete the work.

CATEGORY 100
PRELIMINARY

184 **DELETE:** SECTION 107 – CONSTRUCTION STAKEOUT in the Standard Specifications in its entirety.

INSERT: The following.

SECTION 107 — CONSTRUCTION STAKEOUT FOR DESIGN-BUILD PROJECTS

107.01 DESCRIPTION. This work shall consist of furnishing, placing and maintaining construction layout stakes as specified in the Contract Documents or as directed by the Engineer.

The Design-Builder shall, as part of the construction stakeout operation, before any clearing operation commences, demarcate any wetlands and the limit of clearing throughout the entire project as shown in the Contract Documents and labeled as Limit of Clearing or Wetlands to the satisfaction of the Engineer.

Where limits of clearing are not shown in the Contract Documents, the limit of clearing will be the top of cut, toe of slope or limit of ditch excavation.

107.02 MATERIALS. The material for flagging the clearing limits shall be a 3 in. international orange vinyl material with "CLEARING LIMIT" printed on it with 2 in. letters. The material for flagging wetlands shall be the Administration's standard 1-1/2 in. pink and white striped vinyl flagging with "SHA WETLAND" printed on it with blue letters.

107.03 CONSTRUCTION.

107.03.01 Line and Grade.

The Design-Build Engineer will provide the Design-Builder with the following:

(a) Control Points.

(1) Control Points for horizontal and vertical control shall be as shown on the Preliminary Plans.

(b) Structure Stakeout.

(1) A staked out center line or working line, whichever applies, with stations not over 100 ft apart and extending at least 100 ft beyond ends of the structure.

(2) When the structure is on a curve, the Design-Build Engineer will furnish a staked out center line or working line, whichever applies, consisting of stations not over 100 ft apart and including the P.C., P.T., and at least one point on the tangents beyond each end of the curve.

(3) At least two bench marks, one on each end of the structure, will be established by the Design-Build Engineer.

The Design-Builder will provide the following:

(a) Roadway Stakeout.

(1) A staked center line of the roadway with the maximum spacing of stations (stakes, nails, crosses, etc.) of 100 ft.

(2) Establish appropriately spaced bench marks and the necessary references including all points of curvature (P.C.), and points of tangency (P.T.) for the preservation and control of the center line.

Horizontal Referencing:

- The Design-Builder will establish references to all Base Line of Construction Controls. This will include all Points of Curvature (P.C.s) and Points of Tangency (P.T.s).
- Reference points shall be positioned in pairs with the closest point placed Twenty (20) feet outside the limit of construction. Should these points fall beyond the Right of Way Line, approval from the property owner or tenant must be obtained prior to setting. Right angle and radial ties to Baselines are preferred but not required.
- Reference points, typically, shall be Number #5 (five) 5/8”Rebar two (2)feet long with a State Highway Administration(SHA) Yellow Cap affixed to the top. SHA Caps will be supplied by the SHA Plats and Surveys Division. In areas unsuitable for Rebars, markers of a stable, permanent nature shall be used,(crosses in concrete, PK nails, Railroad spikes, etc.) NOTE: Wooden hubs are not to be used for any referencing purpose.
- References, when positioned, shall be hand referenced to local points of permanency (trees, structure corners, utility poles, etc).measured to a 100^{th} of a foot.

Vertical Referencing:

- The Design-Builder will place and establish permanent Bench Marks on structures along the project Baseline. These marks will be pre-stamped Brass Discs supplied by the S.H.A. Plats and Surveys Division and are to be placed in a suitable surface at time of pour and finish. In non-structure areas, permanent points in stable positions (Square cuts in existing concrete, Boat spikes in Power poles / large trees etc.) are acceptable.
- Benches shall be referenced to the Base Line of Construction by Station plus and offset distance.
- Spacing of Vertical Control shall be a minimum of Five (5) per mile.
- Elevations on all Benches shall be established by differential leveling and return Loop check.

NOTE: In the Horizontal and Vertical Referencing process, all work shall be shown and documented in SHA Field Survey book/s supplied by the S.H.A. Plats and Surveys Division. Upon project completion, all books shall be returned to the S.H.A. Plats and Surveys Division for archiving.

For questions regarding the S.H.A'.s specifications for Baseline Referencing or examples of S.H.A. Construction Stakeout bookwork, contact the S.HA.s Plats and Surveys Division in Baltimore, Maryland at 410-545-8940.

107.03.02 Equipment and Personnel. The Design-Builder shall engage a Registered Professional Land Surveyor, licensed in the State of Maryland, to determine all lines and elevations for various parts of the Work. The Surveyor shall have 3 to 5 years experience as a party chief or higher and have demonstrated experience working with the Maryland Plane Coordinate System – NAD 83/91 and NAVD 88, or similar. The surveyor shall use competent personnel and state of the art equipment for all engineering work required to set and maintain the elevations and dimensions as specified in the Contract Documents.

107.03.03 Control Markers. The Design-Builder shall be responsible for preserving the centerline and benchmarks set by the Design-Build Engineer. When the centerline and benchmarks are disturbed or destroyed, they shall be replaced by the Design-Builder at no additional cost to the Administration.

107.03.04 Control Stakes. For roadways as specified in 107.03.01, the Design-Builder shall furnish, set and preserve stakes at each station along each side of the project on the right-of-way or easement line, whichever is furthest from the center line of construction. Where only part of an ultimate dual highway is to be constructed, the stakes on the side of the future improvement shall be set 10 ft beyond the construction limits. On each of these stakes shall be marked its offset distance from the center line and its top elevation or the cut or fill to the profile grade line. Additional stakes as needed for horizontal and

vertical controls necessary for the correct layout of the work shall be set by the Design-Builder.

107.03.05 Layout. For structures as specified in 107.03.01, the Design-Builder shall proceed with the layout work. However, before any actual construction begins, the Design-Builder shall rerun and check the Design-Build Engineer's lines and grades and then establish all center line or working line intersections with the center line or center of bearing of all piers, bents and abutments. From these field layouts, the Design-Builder shall check the proposed span lengths by electronic distance measurement or chaining. When chaining is used, the measurements shall be compensated for temperature, sag, and horizontal alignment. The Design-Builder shall also check the location of the structure to affirm its correct location with relation to existing structures, roads, and existing conditions that are to remain in their original positions. If any discrepancies are found, the Design-Builder shall notify the Design-Build Engineer at once in writing, otherwise, it will be assumed that all planned dimensions, grades and field measurements are correct. All lines established on the ground shall be preserved or referenced, marked, and kept available at all times.

The Design-Builder shall establish the field elevations for all bridge seats and assume responsibility for finishing to proper grade. If any steel beams or girders are incorporated in the project, the Design-Builder shall run elevations over the tops of the beams or girders after they are in place, before any forms are attached to them, to determine the deflection of each member. This information shall then be applied to the deflection diagram to determine the corrected elevation of bottom slab forms and screed supports. After the Design-Builder has assembled this information, it will be checked by the Engineer before final adjustments are made and the placing of any concrete in the forms.

107.03.06 Utilities. The Design-Builder shall furnish to the utility companies or agencies working within the limits of the project, promptly upon request, reference to control points, alignment and grade data, so that they may properly locate and coordinate their work and improvements in relation to the project.

Intersection Utility Stakeout. The Design-Builder shall notify the appropriate agencies listed below a minimum of 72 hours (excluding weekends and holidays) prior to the Design-Builder's anticipated beginning of any underground work.

(a) Request a MISS UTILITY stakeout and possess a valid MISS UTILITY clearance ticket number for any underground work.

(b) Contact all utilities within the limits of the project who are not a member of MISS UTILITY and obtain a stakeout of their respective facilities.

(c) Request the Office of Traffic & Safety's Signal Operations Section to stakeout Administration maintained traffic signal facilities.

(d) Request the District Engineer to stakeout their lighting facilities.

The Design-Builder shall stakeout the proposed construction as indicated in the Contract Documents and allow the Design-Build Engineer to verify location of the proposed facilities.

107.03.07 Right-of-Way and Easement Lines. The Design-Builder shall define only right-of-way and easement lines of the project for adjacent property owners, promptly upon request.

107.03.08 Subgrade, Subbase and Base Controls. The Design-Builder shall furnish for subgrade, subbase and base courses, a string line and grade with fixed controls having a maximum longitudinal and transverse spacing of 25 ft.

The Design-Builder shall place along each form line for cement concrete pavement line and grade with fixed controls not to exceed 25 ft.

107.03.09 Flagging. The flagging shall be placed continuously through wetland areas. In areas where trees are not to be disturbed, the Design-Builder shall individually flag those trees in a line along the clearing limits that are not to be moved or destroyed. If the clearing or wetland flagging has been destroyed and the Engineer determines that its use is still required, the Design-Builder shall reflag the areas

If the Design-Builder does not replace destroyed flagging within 48 hours after notification by the Engineer that replacement flagging is needed, the Engineer may proceed to have the area reflagged. The cost of the reflagging by the Engineer will be charged to the Design-Builder and deducted from any monies due under the Contract.

At the completion of construction, the Design-Builder shall remove all flagging.

107.04 MEASUREMENT AND PAYMENT. Payment for all work for Construction Stakeout FOR Design-Build Projects shall be included in the Lump Sum Price shown on the Schedule of Prices for the all-inclusive Project Lump Sum. The payment will be full compensation for furnishing, placing and maintaining construction layout stakes, flagging of clearing limits and wetlands, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

CATEGORY 100
PRELIMINARY

DELETE: SECTION 109 — CRITICAL PATH METHOD PROJECT SCHEDULE in the Standard Specifications in its entirety.

INSERT: The following.

SECTION 109 — CRITICAL PATH METHOD PROJECT SCHEDULE DESIGN-BUILD

109.01 DESCRIPTION. Plan, schedule, and construct the project by using a Critical Path Method Project Schedule (CPM). Use the CPM for coordinating and monitoring the work specified in the Contract Documents including all activities of subcontractors, vendors, suppliers, utilities, railroads, the Administration, and all other parties associated with the construction of the Contract. The CPM schedule shall be used for coordinating activities for both design and construction tasks by incorporating all activities into one CPM schedule. All work including but not limited to activities associated with design elements, milestones, permits, utility relocations, and submittals shall be represented by schedule activities. All work including but not limited to submittals, major procurement, delivery, and construction activities shall be included. All appropriate schedule logic relationships between the design element activities and the corresponding construction activities shall be shown. Base the CPM upon the entirety of the Contract Documents. Utilize CPM software that generates files compatible with Primavera Project Planner.

Float. The CPM utilizes float. Float is defined as the amount of time between when an activity "can start or finish" and when an activity "must start or finish". Float is a shared commodity for the use of the Administration and the Design-Build Team and is not for the exclusive use or benefit of either party. Both parties have the full use of the float until depleted.

Scheduling Representative. Designate a scheduling representative prior to submission of the Initial Critical Path Method Project Schedule (ICPM). The scheduling representative is the person primarily responsible for development and maintenance of the CPM schedule, the Design-Build Team's representative in all matters regarding the schedule, and the designated attendee for all schedule related meetings. Replacement of the scheduling representative will require written approval from the Administration.

Submit the qualifications of the scheduling representative to the Administration for approval. This approval is required before the ICPM will be accepted. The scheduling representative shall have at least three years of verifiable experience for preparing and maintaining CPM project schedules on Contracts of similar size and complexity.

Initial Critical Path Method Project Schedule (ICPM). The ICPM shall consist of:

(a) A time scaled diagram of acceptable scale and format that is acceptable to the Engineer. Clearly label and identify each activity. Show all relationships between activities.

(b) Tabular reports with activities sorted as follows:

(1) Activity ID. Provide predecessors and successors for each activity with leads and lags shown.

(2) Activity ID. Provide and clearly define the resources assigned to each activity.

(3) Early Start, Total Float.

(4) Total Float, Early Start.

(5) Project Area (if applicable).

(6) Project Phase (if applicable).

(7) Responsibility, e.g., Design-Build Firm, Designer, Constructor, specific subcontractor, specific supplier, the Administration, etc.

Provide in the header of each tabular report: the project name, Contract number, data date, run date and number, and report type.

Provide in the body of each report: the activity identification, activity description, original and remaining duration, early/late start and finish dates, percent complete, actual start/finish dates, total float, and calendar designation for every activity.

(c) Written Narrative (WN). Comply with the requirements described hereinafter.

(d) Printed Calendars. Include a listing, description, and calendar form tabulation of all calendars used. Include the total number of anticipated work days required to complete the Contract work.

Delineate holidays and anticipated nonwork days or periods. Explain in the WN the basis for determining each nonwork day or period.

(e) A data disc containing all of the information contained in the ICPM and in a format compatible with Primavera Project Planner software. All construction activities shall have durations not exceeding 10 working days, unless otherwise approved. Activities representing review and approval of construction submittals by the Administration shall be given a duration of not less than 30 calendar days. Activities representing review and approval of design submittals by the Administration shall be given a duration of not less than 45 calendar days. A short list of highly critical approval activities may be submitted. The Engineer will make every effort to expedite the approval of these submittals; however, this will not alter the requirement to include 30 calendar days for construction submittal approvals and 45 calendar days for construction submittal approvals. Schedule the duration for activities such as curing and pre-load in calendar days. Durations for procurement activities will be evaluated on a case-by-case basis.

The latest calculated early finish date in the ICPM shall equal the calendar date for completion specified in the Contract Documents. If an earlier completion date is submitted, the Administration, upon approval of the ICPM, will issue a change order to adjust the Contract time to the completion date shown on the ICPM.

Resource load all construction activities in the schedule with the material, equipment, and manpower planned to be utilized in accomplishing each activity. Provide a full explanation of the resource loading in the WN.

The Engineer reserves the right to specify the number of activities and to require an additional breakdown of the activities at any time.

Utilize activity codes to categorize activities by at least the following: project area; construction phase; design phase; and responsibility, e.g. Design-Build Firm or specific subcontractors.

Provide a WN as part of the ICPM. Explain the sequence of work, the critical path, interim completion dates, project phasing, nonwork days or periods, maintenance of traffic, and labor and equipment resources. Explain how the ICPM provides for permit requirements, environmental requirements, coordination with other public Contractors, milestone dates (for the Contract or other related contracts), coordination with other entities, coordination with all utility companies, special nonwork days or periods, and weather. Explain the specific scope of each activity and the basis used to determine the original duration of each activity, i.e. production rates and anticipated quantities. Address all activities quantified in the Contract Documents. Explain the following in the WN.

(a) Relationships between activities not obviously identified.

(b) Equipment usage and limitations.

(c) Manpower usage and limitations.

(d) Use of additional shifts and overtime.

(e) Activity codes, abbreviations, and activity identification system.

(f) All calendars utilized in the CPM.

(g) Date or time constraints.

(h) All abbreviations.

(i) Use of calendars.

(j) Scheduling of weather and temperature sensitive activities.

(k) Design Phase/milestone dates.

Complete and submit the proposed ICPM within 30 calendar days after receiving the Notice of Award. Submit five sets of all required information for review and acceptance. Do not start any work until the ICPM is accepted. Upon issuance of the Notice to Proceed, the start date utilized in the ICPM will be adjusted to comply with the Notice to Proceed.

The Engineer will complete the review of the ICPM within 30 calendar days after submittal. If required, a Joint Review Conference will be convened at which time the Engineer and Design-Build Firm may make corrections and adjustments to the proposed ICPM. If a revision is necessary due to the Engineer's review or the Joint Review Conference, submit the proposed revision within seven calendar days after receiving the Engineer's review comments or within seven calendar days after the date of the

Joint Review Conference, whichever is the latest. Make revisions in accordance with the requirements for the ICPM. The Engineer will respond to the revised ICPM within seven calendar days after receipt.

Any delay in starting work caused by the acceptance of the ICPM by the Engineer will not be considered as a basis for any adjustment in the Contract amount or time.

Upon notification that the ICPM has been accepted, that document will become the CPM of record. The CPM of record shall be the Design-Build Firm's work plan for completing the entire Contract as specified in the Contract Documents.

Failure to adhere to the CPM of record will be cause for the Administration to deny requests for additional compensation or extensions of the Contract duration and may result in the withholding of pay estimates.

CPM Updates. Provide monthly updates of the CPM of record. Update submissions shall include the activity data as specified in (a) through (e) of the ICPM. Use the update to describe the progress to date. The WN shall include a description of the work performed during the update periods, current critical path, the amount of float on the critical path, any delays or disruptions experienced during the period of the update, any change in manpower or equipment, and any potential delays or disruptions.

The scheduling representative and the Engineer will meet to review, mutually agree to, and sign-off on the information required to update the schedule (actual start and finish dates, remaining durations, and percentages complete). Use an acceptable update form. The data date for each update shall be seven days prior to the cut-off date of the pay estimate for that month. Submit the update within seven calendar days from the data date. Failure to submit the update on a timely basis may result in the withholding of pay estimates. Upon acceptance by the Engineer, the update shall become the CPM of record for the period between its data date and the data date of the next approved update or revision.

Do not include any revisions to the CPM without prior approval.

Revisions to the Schedule of Record. Revisions are defined as one or more of the following:

(a) A change in the original duration of an activity.

(b) A change in the logic of the schedule.

(c) A change in the calendars or to the calendar to which an activity is assigned.

(d) A change to resources.

(e) A change to any actual date, previously established.

(f) The deletion or addition of an activity.

(g) A change to, addition of, or deletion of a date or time constraint.

(h) A change to, addition of, or deletion of an activity code.

(i) A change to an activity description.

(j) Any change other than updating an activity.

Discuss any proposed revision to the CPM verbally with the Engineer. If the revision is minor in nature, the Engineer may allow the revision to be included on the next Update of the CPM. If the Engineer determines that the revision is not minor in nature, submit the proposed revision for review and approval prior to deviating from the approved CPM.

When a revision to the CPM is required due to changes in the Contract initiated by the Engineer, immediately contact the Engineer to discuss the changes. If the revision is minor in nature, the Engineer may allow the revision to be included on the next Update of the CPM. If the Engineer determines that the revision is not minor in nature, submit the proposed revision for review and approval prior to deviating from the approved CPM.

The Engineer may allow a deviation from the approved CPM for specific mitigating activities.

Submit the proposed revision in the same format and with the same requirements used for the ICPM. The proposed revision shall be made to the CPM of record at the time the revision is made, i.e. the revision shall include all update information and revisions previously approved and the additional progress to the date of the revision. The WN accompanying the proposed revision shall describe the reason for the revision, the resulting critical path, and all particulars of the revision. These shall include but not be limited to changes in the method or manner of the work, changes in specifications, changes in resources, addition or deletion of work, increased or decreased quantities, defective work, and acceleration of the work.

The Engineer will review and respond to the proposed revision within 14 calendar days after receipt. Resubmit, if required, within seven calendar days after receipt of the Engineer's review comments. The Administration reserves the right to reject any proposed revision that adversely impacts the Administration, utilities, or other concerned parties.

Extensions of Contract Time or Incentive/Disincentive Date. Make requests for extension of Contract time in writing and subject to the notice and timeliness of submission provisions as provided for elsewhere in the Contract. Requests for an extension of Contract time or change in an incentive/disincentive date will be evaluated by the Engineer's analysis of the CPM of record and any proposed revision submitted. The request shall include a WN of the events, which would require an extension of the Contract time or incentive/disincentive date.

Only delays to activities that affect the Contract completion date or incentive/disincentive date will be considered for an extension of Contract time. The extension of the specified Contract completion date or incentive/disincentive date will be based upon the number of calendar days the Contract completion date or incentive/disincentive date is impacted as determined by the Engineer's analysis.

When an acceptable Update or Revision is not submitted within the time limits prescribed above, pay estimates may be withheld until an acceptable Update or Revision is submitted.

109.02 MATERIALS. Not Applicable.

109.03 CONSTRUCTION. Not Applicable.

109.04 MEASUREMENT AND PAYMENT. Payment for the accepted Initial Critical Path Method Project Schedule, Critical Path Method Project Schedule Revisions, and all accepted Critical Path Method Project Schedule Updates shall be included in the Contract Lump Sum Price for the Design-Build item.

CATEGORY 100
PRELIMINARY

209 **DELETE:** SECTION 111 — SAMPLING DEVICES AND TESTING EQUIPMENT in it 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.

(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 yd^2.

(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.

(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.

(7) Masonry nails or equivalent.

(8) Thermometers (50 to 550ºF).

(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).

(15) 3 x 6 in. cylinder molds for latex concrete.

(16) 6 x 12 in. cylinder molds for density (unit wt) of lightweight concrete and when otherwise specified.

(17) Isopropyl alcohol for light weight concrete.

(18) Protective gloves.

(i) Other Measuring Devices.

(1) Hand held pile driving monitoring device (as approved by the Engineer).

111.03.02 Safety Equipment. Approved Safety Equipment.

(a) Fall Protection Devices for SHA Inspection Personnel.

(b) Life vests where applicable.

111.04 MEASUREMENT AND PAYMENT. Sampling devices, testing equipment, and safety equipment will not be measured but the cost will be incidental to items of work for which they are required.

CATEGORY 100
PRELIMINARY

SECTION 113 — DIGITAL CAMERA

113.01 DESCRIPTION. Furnish and maintain new or like new digital cameras for use by Administration personnel. For projects that do not include an Engineer's Office, furnish one color printer. The digital cameras and printer shall be delivered to the Engineer at the time of the Notice to Proceed. They shall remain operational and not be returned to the Contractor until final acceptance of the entire project, in conformance with GP-5.13.

113.02 MATERIALS.

(a) Digital Camera. Each digital camera shall meet the following minimum requirements and be furnished with the specified accessories:

(1) Photo Managing Software.

(2) 4.0 megapixel image resolution and 3X optical zoom

(3) AC adapter, 2 sets of rechargeable batteries, and battery charger.

(4) 2 GB SmartMedia Card or memory stick with all items required for downloading

(5) Lens Cover, Shoulder Strap, and Carrying Case.

(b) Color Printer. The printer shall have at least 8 MB RAM, 2400 x 1200 dpi resolution, a color print speed of 13 ppm, and a duty cycle of 5000 pages/month.

113.03 CONSTRUCTION. Not applicable.

113.04 MEASUREMENT AND PAYMENT. The number of digital cameras required for this project is **1**. The digital cameras and printer will not be measured but the cost will be incidental to the Contract price for the Engineers Office item. If an item for Engineers Office is not specified, payment will be incidental to the payment for Mobilization. In the absence of either item, payment will be incidental to the other items specified in the Contract Documents. If a digital camera or printer becomes defective, is stolen, or for any other reason does not function as intended, it shall be replaced with an approved camera or printer at no additional cost to the Administration. A nonfunctioning or stolen camera or printer shall be replaced within 5 days after the Engineer notifies the Contractor.

Ownership of the cameras and printer will remain with the Contractor. The Administration assumes neither responsibility nor liability for the condition of the camera when returned.

CATEGORY 100
PRELIMINARY

SECTION 114 — TRUCK STAGING AREAS AND IDLING REQUIREMENTS

114.01 DESCRIPTION. Locate truck staging areas and avoid unnecessary idling of construction equipment in order to reduce engine emissions and to provide air quality benefits to those who live or work in or adjacent to the construction site.

114.02 MATERIALS. Not applicable.

114.03 CONSTRUCTION. Establish truck staging areas for all vehicles waiting to load or unload materials at the job site. Subject to review and approval by the Administration, locate staging areas where emissions will have the least impact on sensitive areas and the public.

Sensitive areas include, but are not limited to, hospitals, schools, residences, motels, hotels, daycare facilities, and elderly housing and convalescent facilities. All sources of emissions shall be located as far away as possible from fresh air intakes, air conditioners, and windows.

Idling of all mobile construction equipment, including delivery trucks, shall be limited to five minutes except under any of the following circumstances:

(a) When forced to remain motionless because of traffic conditions or mechanical difficulties over which the operator has no control.

(b) When necessary to operate defrosting, heating, or cooling equipment to ensure the safety or health of the driver or passenger.

(c) When necessary to operate auxiliary equipment that is located in or on the mobile source to accomplish the intended use of the mobile source.

(d) To attain the recommended operating temperature.

(e) When the outdoor temperature is below 32 F.

(f) When undergoing maintenance that requires operation for more than five consecutive minutes.

The above requirements do not prohibit the operation of an auxiliary power unit or generator set as an alternative to idle the main engine of a motor vehicle operating on diesel fuel.

114.04 MEASUREMENT AND PAYMENT. All methods and procedures required to comply with these requirements will not be measured for payment but will be incidental to the pertinent Contract items.

CATEGORY 200
GRADING

SECTION 203 — BORROW EXCAVATION

203.01.02 Notice to Contractor —Borrow Pits.

225 **ADD:** After the first paragraph.

This project is located in Prince George's County. The following conditions applicable to the county or city shall be complied with and documented.

DISTRICT 1

Dorchester (DO) County
Site plan approved by Soil Conservation District.
Grading permit from County Highway Department (except City of Cambridge).
Planning and Zoning approval for use.
Critical Areas approval (if applicable).
Inspection by County.

Somerset (SO) County
Site plan approved by Soil Conservation District.
Grading Permit from the County.
Land Use permit.
Critical Areas approval by Planning and Zoning (if applicable).
Inspection by SHA.

Wicomico (WI) County
Site plan approved by Soil Conservation District.
Certificate of compliance with Planning and Zoning if located in Critical Area.
Inspection by SHA.

Worcester (WO) County
Site plan approved by Soil Conservation District.
Critical areas approved by Planning and Zoning (if applicable).
Inspection by SHA.

DISTRICT 2

Caroline (CO), Cecil (CE), Queen Anne's (QA) and
Talbot (TA) Counties
Site plan approved by Soil Conservation District.
Planning and Zoning approval.
Critical Areas approval (if applicable).
Inspection by SHA.

Kent (KE) County
Site plan approved by Soil Conservation District.
Grading permit.
Planning and Zoning approval.
Critical Areas approval (if applicable).
Inspection by SHA.

DISTRICT 3

Montgomery (MO) County
Sediment control permit and plan approval by County Department of Environmental Protection, Division of Water Resources Management, Storm Water Management Section/Sediment Control.
Approval by Maryland National Capital Park and Planning Commission (if applicable).
Inspection by County.

Prince Georges (PG) County
Site Plan approved by Soil Conservation District.
County Grading Permit.
Tree conservation plan approval by Maryland National Capital Park and Planning Commission (if applicable).
Critical Areas approval (if applicable).
Payment of all pertinent county fees and/or securing of county required bonding.
Inspection by SHA with oversight by County.

DISTRICT 4

Baltimore (BA) County
Site Plan approved by the Department of Environmental Protection and the Soil Conservation District.
County Grading Permit.
Critical Areas approval by the Department of Environmental Protection and Resource Management (if applicable).
Inspection by County.

Harford (HA) County
Site Plan approved by Soil Conservation District.
County Grading Permit.
Critical Areas approval (if applicable).
Inspection by County.

DISTRICT 5

Anne Arundel (AA) County
Site Plan approved by Soil Conservation District.
Planning and zoning approval - special exception required.
Grading plan issued by the County Department of Inspections and Permits.
Critical Areas approval (if applicable).
Inspection by County and SHA.

Calvert (CA) County
Site Plan approved by Soil Conservation District.
Grading plan issued by the County after a mining permit or exemption is issued.
Critical Areas approval (if applicable).
Inspection by SHA.

Charles (CH) County
Site Plan approved by Soil Conservation District.
Special exception granted by the County.
Critical Areas approval (if applicable).
Inspection by SHA.

St. Marys (SM) County
Site Plan approved by Soil Conservation District.
County Grading Permit.
Critical Areas approval (if applicable).
Inspection by SHA.

DISTRICT 6

Allegany (AL) County
Site plan approved by Soil Conservation District.
Informational copy of plans to County Planning and Zoning Commission.
Inspection by SHA.

Garrett (GA) and Washington (WA) Counties
Site plan approval by Soil Conservation District.
Inspection by SHA.

DISTRICT 7

Carroll (CL) County
Site plan approved by County Planning Commission.
Sediment control plan approval by Soil Conservation District.
County Grading Permit.
Inspection by County.

Frederick (FR) County
Site plan approved by Soil Conservation District.
County Grading Permit.
Inspection by SHA.

Howard (HO) County
Site Plan approved by Soil Conservation District.
County Grading Permit.
Inspection by County.

BALTIMORE CITY (BC)

Site plan approved Baltimore City Department of Public Works (BCDPW).
Inspection by BCDPW.

STATE AND FEDERAL PROPERTY

Borrow pits located on state and federal property are subject to Maryland Department of the Environment approval.
Inspection by SHA.

CATEGORY 200
GRADING

SECTION 204 — EMBANKMENT AND SUBGRADE

204.03 CONSTRUCTION.

204.03.01 Embankment Foundation

227 **ADD:** The following

(d) Test Rolling. All embankment foundation on this project shall be test rolled in conformance with Section 204.03.01(c) of the "2008 Standard Specification for Construction and Materials". Unstable embankment areas shall be treated by undercutting and backfilling with Geosynthetic Stabilized Subgrade using Graded Aggregate Base; bridging with a thick embankment lift; providing drainage; or other suitable treatment as determined by the Engineer at the time of construction.

CATEGORY 300
DRAINAGE

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 intregal 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.

308.01.02 Standards and Specifications.

253 **DELETE:** The last sentence, "Where details differ … from the Field Guide."

308.01.03 Quality Assurance Ratings.

INSERT: The following paragraph at the end of **Shutdowns.**

No Claims against the Administration will be considered due to a shutdown of the grading operations or the entire project for any non-compliance.

INSERT: The following paragraph at the end of the section.

Individual Sites. Where specified, sites within the project may be designated as individual sites for Quality Assurance Rating purposes. If an individual site is in non-compliance, shutdowns apply to only that site.

308.02 MATERIALS.

256 **ADD:** The following.

Compost	920.02.05, Type B

DELETE: The following paragraph. "Soil Stabilization Matting…for Soil Erosion and Sediment Control", in its entirety.

ADD: The following paragraph.

Where woven geotextile is specified use woven geotextile Class E. Where nonwoven geotextile is specified use nonwoven geotextile Class E. Where woven slit film geotextile is specified use geotextile Class F.

318.03 CONSTRUCTION.

308.03.08 Stabilization Requirements.

259 **DELETE:** The first paragraph, "Permanently or temporarily…fourteen day time frame." in its entirety.

INSERT: The following.

Following initial soil disturbance, complete permanent or temporary stabilization within:

(a) Three calendar days as to the surface of all perimeter dikes, swales, ditches, perimeter slopes, and all slopes steeper than 3 horizontal to 1 vertical (3:1); and

(b) Seven calendar days as to all other disturbed or graded areas on the project site not under active grading.

260 **DELETE:** The third paragraph, "Stabilization requirements may…ensure continued stabilization."

INSERT: The following.

Sensitive areas may require less than three or seven day stabilization. Maintain as necessary to ensure continued stabilization.

308.03.11 Waste Areas.

DELETE: The last sentence, "All waste areas…stabilization requirement."

INSERT: The following.

Protect all waste areas and stockpile areas with erosion and sediment control measures within the three or seven day stabilization requirement.

308.03.21 Riprap Inflow Protection.

262 **DELETE:** In its entirety.

308.03.23 Stone Check Dam.

DELETE: In its entirety.

308.03.24 Sediment Traps.

DELETE: The second sentence, "In areas of limited right-of-way…conditions will allow."

308.03.29 Silt Fence.

DELETE: The last paragraph, "Remove and reset… the original placement."

308.03.30 Inlet Protection.

263 **DELETE:** In its entirety.

308.03.31 Stabilized Construction Entrance.

ADD: The following.

Place wash racks as directed to prevent tracking of mud and sediment from the Limit of Disturbance.

308.03.32 Super Silt Fence.

DELETE: The last paragraph, "Remove and reset… the original placement.

308.03.37 Diversion Fence.

265 **DELETE:** In its entirety.

308.03.39 Dewatering Bag.

DELETE: In its entirety.

ADD: The following.

308.03.39 Filter Bag. Determine the bag dimensions necessary to provide the required storage volume. Determine pump and hose sizes.

308.03.40 Heavy Use Areas. Locate and size Heavy Use Areas used for activities such as staging and storage. Obtain any necessary permits or modifications for non-specified areas.

308.03.41 Stockpile Areas. Locate and size Stockpile Areas. Obtain any necessary permits or modifications for non-specified stockpile areas.

308.03.42 Rock Outlet Protection. Construct according to Section 312.

308.03.43 Plunge Pool. Construct according to Section 312.

308.03.44 Gabion Outlet Protection. Construct according to Section 313.

308.03.45 Filter Berms. Construct berms of wood chips and up to 50 percent Type B Compost.

308.03.46 Filter Log. Construct using Type B Compost for the filter media.

308.04 MEASUREMENT AND PAYMENT.

308.04.12.

266 **ADD:** The following after **(e)**.

(f) Temporary risers will be measured and paid for at the Contract unit price per each.

(g) Anti-seep collars will be measured and paid for at the Contract unit price per each.

(h) Geotextile will not be measured but the cost will be incidental to the stone.

267 **DELETE:** In its entirety.

308.04.18 Remove and Reset Silt Fence….per linear foot.

DELETE: In its entirety.

308.04.20 Stabilized Construction Entrances…….the Contract price.

INSERT: The following.

308.04.20 Stabilized Construction Entrance will be measured and paid for per each and includes all excavation, geotextile, aggregate, pipe, rehabilitation, relocation and incidentals to complete the work.

Wash racks will be measured and paid for per each and includes racks, excavation, wash water and incidentals to complete the work

DELETE: In its entirety.

304.04.22 Remove and Reset Super Silt Fence……per linear foot.

303.04.35.

268 **DELETE:** Dewatering Bags in its entirety.

INSERT: The following.

308.04.35 Filter Bags will be measured and paid for at the Contract unit price per each and will include pump, hoses, connections, straw bales, sizing, locating, relocating, disposal and any other incidentals necessary. No adjustments will be made for resizing or relocating to meet Permit conditions or turbidity requirements.

269 **ADD:** The following after 308.04.35.

308.04.36 Heavy use areas will not be measured but will be incidental to the pertinent items.

308.04.37 Stockpile areas will not be measured but will be incidental to the pertinent items in the Contract.

308.04.38 Temporary storm drain diversions will be measured and paid for at the Contract unit price per linear foot of the size specified and will include all grading, pipe, connections and any incidentals necessary to complete the work.

308.04.39 Clear Water Diversions will be measured and paid for at the Contract unit price per linear foot of the size specified and will include all pipe, connections, anchors, sandbags, sheeting, dewatering and any incidentals necessary to complete the work.

308.04.40 Temporary Barrier Diversions will be measured and paid for at the Contract unit price per linear foot and will include all barrier, sandbags, sheeting, dewatering and any incidentals necessary to complete the work.

308.04.41 Mountable Berms will be measured and paid for at the Contract unit price per each and will include all earthwork, stone, geotextile, and any incidentals necessary to complete the work.

308.04.42 Rock Outlet Protection will be measured and paid for at the Contract unit price per square yard of Riprap Slope and Channel Protection.

308.04.43 Plunge Pool will be measured and paid for at the Contract unit price per square yard of Riprap Slope and Channel Protection.

308.04.44 Silt Fence on Pavement will be measured and paid for at the Contract unit price per linear foot of Silt Fence.

308.04.45 Clearwater Pipes through Silt Fence or Super Silt Fence will not be measured but will be incidental to the pipe and silt fence items.

308.04.46 Filter Berms will be measured and paid for at the Contract unit price per linear foot.

308.04.47 Filter Logs will be measured and paid for at the Contract unit price per linear foot.

308.04.48 Sediment Basins will be measured and paid for at the Contract unit price for one or more of the items listed below:

(a) Earthwork as specified in 201.04.

(b) Pipe as specified in 303.04.

(c) Stone as specified in 308.04.25.

(d) Baffle board and stakes will not be measured but the cost will be incidental to the other items.

(e) Temporary risers will be measured and paid for at the Contract unit price per each and include trash racks, draw down devices, concrete bases, projection collars, riser connectors and any other incidentals.

(f) Modifying Stormwater Management Riser Structures and installing dewatering pipe systems will be measured and paid for at the Contract unit price per each for Convert Stormwater Management Riser for Sediment Control. Converting the risers back to their permanent state will be incidental.

(g) Anti-seep collars will be measured and paid for at the Contract unit price per each.

(h) Geotextile will not be measured but the cost will be incidental to the stone.

308.04.49 Temporary Access Bridge will be measured and paid for at the Contract Lump Sum price.

308.04.50 Temporary Access Culvert will be measured and paid for at the Contract unit price per linear foot.

308.04.51 Onsite Concrete Washout Structures will not be measured but will be incidental to the various concrete mixes.

CATEGORY 300
DRAINAGE

SECTION 308 — EROSION AND SEDIMENT CONTROL

308.01 DESCRIPTION.

256 **DELETE: 308.01.04 Incentive Payments and Liquidated Damages.** in its entirety.

INSERT: The following.

308.01.04 Incentive/Liquidated Damages Payments.

The total incentive awarded for this Contract will not exceed $369,600.00. The rating quarter incentive payment for this contract is $13,200.00. A final incentive payment for this contract is $184,800.00 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 $11,006.00 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 $11,512.00 per day.

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

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

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 cm^2/m to 21 cm^2/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.

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 in^2. 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 course 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 course 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.

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.

(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.

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.

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 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.

Perform Dynamic Pile Monitoring when required as specified.

410.03 CONSTRUCTION.

289 **DELETE:** 410.03.05 Test Piling in its entirety.

INSERT: The following.

410.03.05 Test Piling. Furnish a Wave Equation Analysis Program (WEAP) of pile driveability for each test pile. The analysis shall be sealed and signed by a professional engineer registered in the State of Maryland and experienced in such work. The analysis shall demonstrate that the pile hammer proposed for use has sufficient power to drive the piles to the Driving Load and Estimated Minimum Penetration as shown ~~on the plans~~ without overstressing or damaging the piles. The analysis shall 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.

Submit to the Director, Office of Structures, the hammer name, model, and manufacturer's data for each pile hammer proposed for use at least one month prior to the start of pile driving operations Include the Manufacturer's Catalog Information and a completed Pile and Driving Equipment Data Form provided elsewhere in this Request for Proposals.

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, 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.

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 of 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 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.

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 440 — PRESTRESSED CONCRETE BEAMS AND SLAB PANELS

440.02 MATERIALS.

410 **DELETE: 440.02.01 Portland Cement Concrete** in its entirety.

INSERT: The following.

440.02.01 Portland Cement Concrete. Ensure that the composition, proportioning, and mixing of concrete produces a homogeneous concrete mixture of a quality that meets the specified material and design requirements.

The required cylinder strength of the concrete at transfer of the tensioning load and the minimum required cylinder strength of the concrete at 28 days will be specified. Include an air entraining admixture in the concrete mix.

Type G high range water reducing admixtures may only be used if the Engineer determines that the producer can design and show by trial mix that the concrete meets the specified strength requirements and the following:

(a) Slump is not to exceed the admixture manufacturer's recommendation or a maximum of 8 in.

(b) Air content of 5-1/2 ± 1-1/2 percent.

(c) Cement factor of at least 700 lb/yd^3.

(d) Maximum WCM ratio of 0.45.

Testing. The Engineer will take six test cylinders from each member or members cast and cured with the beam as a unit for the purpose of checking the quality of the concrete being produced; for determining the time when the forms may be removed, and for determining the time when prestressing forces may be applied to a member.

The manufacturer shall provide metal or plastic molds for all test cylinders. The manufacturer's quality control technician shall make at least three cylinder specimens to be cured under laboratory conditions as specified in R 39 to determine the 28-day compressive strengths. The technician shall make and test the cylinders at the manufacturing site according to T 22 and in the presence of the Engineer. A test is defined as the average strength of three companion cylinders.

420 **INSERT:** The following at the bottom of table 440.03.17A.

PRESTRESSED CONCRETE BEAM	TOLERANCE
Camber deviation from plan camber, as measured at release or at beginning of beam storage at the fabricating plant	±50% of plan camber or ±1/2 in. whichever is greater

421 **INSERT:** The following at the bottom of table 440.03.17B.

PRESTRESSED CONCRETE SLAB PANEL	TOLERANCE
Camber deviation from plan camber, as measured at release or at beginning of beam storage at the fabricating plant	±50% of plan camber or ±1/2 in. whichever is greater

CATEGORY 400
STRUCTURES

SECTION 455 — NOISE BARRIERS

431 **DELETE:** 455.02 MATERIALS in its entirety.

INSERT: The following.

455.02 MATERIALS.

Reinforcement for Concrete Structure	421.02
Concrete Stain	921.12, Color No. as specified
Concrete	902.10
Pretensioning Strand	908.11, 1/2 in. diameter seven wire
Elastomeric Bearing Pads	910.02.01
Elastomeric Shims	911.12
Fusion Bonded Polyester Powder Coating	917.03, Color as specified for stain on highway side of roadway
Anchor Assembly	
Plate	A 36
Rods	F 1554, Grade 55, S 1 (Chemical Composition and Carbon Equivalent)
Nuts	A 536
Washers	F 436
Steel Posts (Including Plates and Shapes)	A 709, Grade 50W
Organic Zinc Rich Paint	912.05
Galvanizing	A 123
Galvanizing Repair	A 780

DELETE: 455.02.02 Epoxy Zinc Rich Primer in its entirety.

INSERT: The following.

455.02.02 Epoxy Organic Zinc Rich Primer. As specified in 465.03.01(b)

434 **DELETE:** 455.03.01 Galvanizing in its entirety.

INSERT: The following.

455.03.01 Galvanizing. As specified in 465.03. All holes and welding required in the hardware shall be done before galvanizing.

DELETE: Polyester Coated Steel Posts in its entirety.

INSERT: The following.

Polyester Powder Coated Steel Posts. As specified in 465.03.01(b). Steel posts shall be completely fabricated, including base plates and all holes drilled, before application of the polyester coating system.

CATEGORY 400
STRUCTURES

SECTION 456 — ARCHITECTURAL TREATMENT

456.00 GENERAL. Provide architectural treatment on structures such as bridge parapets retaining walls, and noise barriers. The type of architectural treatment shall be as specified. Apply form release agents, form stripping methods, patching materials, and construction procedures that are mutually compatible with the surface finish and concrete stain. Architectural treatments not requiring form liners or stain shall conform to all applicable requirements including sample panels.

Contractor Uniformity Responsibility. When a project specifies that the same architectural treatment be applied to multiple structures and portions of various structures such as parapets, retaining walls, and noise barriers that will be in close proximity of each other, ensure that the same architectural treatment or manufacturer's form liner is used by all subcontractors and that any staining requirements are uniform throughout those structures. The Administration's form liner approval process ensures that the specific form liner produces a product that conforms to the specified results; it does not relieve the Contractor of the responsibility for uniformity throughout the project.

Form Liner. Match the form liner finish to the textured finish as specified.

The form liner shall attach easily to the forming system, and shall not compress more than 0.021 ft when poured vertically at a rate of 10 ft/hr. The liners shall be capable of withstanding anticipated concrete pour pressures without leakage causing physical or visual defects. The liners shall be removable without causing concrete surface deterioration or weakness in the substrate.

Carefully blend form liner butt joints into the approved pattern and finish off the final concrete surface. There shall be no visible vertical or horizontal seams or conspicuous form marks created by butt joining form liners. The finished texture, pattern, and color shall conform to the approved sample panel, and shall be continuous without visual disruption. The Engineer may reject portion of the structure for failure to comply with these requirements. Remove rejected portions of the structure completely from the project at no additional cost to the Administration.

Prior to each pour, clean the form liners to be free of build-up. Visually inspect each liner for blemishes and tears. Make repairs in accordance to the manufacturer's recommendations and at no change in the appearance of the final product.

Securely attach form liners to forms in accordance to the manufacturer's recommendations, and with less than a 1/4 in. seam.

Form or Wall Ties. When form or wall ties are used that result in a portion of the tie permanently embedded in the concrete, submit the type of form ties for approval prior to use in this work.

Form Release Agent. The release agent shall be compatible with the surface finish and concrete stain to be applied. Apply the release agent in accordance to the manufacturer's recommendations.

Concrete Stain. The color of the concrete stain shall conform to Federal Standard 595, for the Color No. specified. The coloring agent shall be a penetrating stain mix, compatible color finish designed for exterior application on new or old concrete with field evidence of resistance to moisture, alkali, acid, mildew, mold and fungus discoloration or degradation. The coloring agent shall be breathable, allowing moisture and vapor transmission. Select concrete stain from a list of prequalified concrete stains that is maintained by the Office of Materials Technology. Unless otherwise specified, apply two coats of concrete stain in accordance to the manufacturer's recommendations and as directed.

When the concrete is at least 28 days old, pressure wash surfaces to be stained with a pressure washer set at 3000 psi to remove laitance. Hold the fan nozzle perpendicular to the surface at a distance of 1 to 2 ft. Abrasive blasting is prohibited. The completed surface shall be free of blemishes, discolorations, surface voids, and conspicuous form marks as approved. Correct any surface problems at no additional cost to the Administration.

Expansion Joint Material. When the Contract Documents include expansion joints, finish the joint material so as to visually continue the simulated stone/brick pattern uninterrupted. Include a sample of the colored expansion joint material in the sample panel for approval.

Sample Panels. Demonstrate workmanship by constructing an approved sample panel for the form liner type specified using approved form lining materials and surface coloring. Use the same formwork including form or wall ties proposed for use and concrete placement for the sample panel as that used for the finished structure.

The form liner used shall produce the same pattern that is intended for use on the finished structure. When the finished structure will contain vertical or horizontal form liner seams/joints, the sample panel shall include the same appropriate seams/joints. The sample panel shall be unreinforced concrete cast in the same position (vertically or horizontally) as will be the finished product to determine the surface texture resulting by use of the form liner. The minimum size of concrete sample panel shall be 6 in. thick, 4 ft wide, and 4 ft high.

Remove rejected samples from the project and submit a new sample at no additional cost to the Administration. The approved sample panel shall remain on the site as a basis for comparison to the structure.

Sample Panel Digital Photograph Inspection. Provide digital photographs of the small sample panel (24 x 24 in. or 4 x 4 ft as specified). Supply the photographs by e-mail or CD Rom at the time the Office of Structures is notified of panel delivery to the project site. The photographs will be used in evaluating the acceptance of the finish, but will not replace or supercede the delivery of sample panels as required in the Specifications. The Administration reserves the right to make an on site inspection at any time, or to request additional photographs.

Use the digital camera with a minimum resolution of 3.1 megapixels, and take all photographs without the use of the camera's zoom features. Take all photographs with the camera's line of sight being approximately perpendicular on the horizontal to the surface of the sample panel. Heed this requirement throughout this procedure regardless of the orientation of the sunlight. Take multiple photographs with variations in the angle of the sunlight shinning on the sample

panel. This may be accomplished by rotating the sample panel so that the sunlight shines from almost directly behind the camera (90 degrees from the sample panel face), to a side lighting view where the sunlight shines on the surface from about 170 degrees from the sample panel face. Take photographs in approximately 15 degree increments, and be free of shadows from the camera and other foreign objects. The camera may be required to be plus or minus perpendicular to accomplish this requirement when the sun is shining on the sample panel at a 90 degree angle.

Submit additional photographs depicting the relief, colors, etc., provided that they conform to these requirements.

Take photographs so that the top and bottom of the sample panel takes up the full top and bottom of the camera's view screen without the use of the zoom feature. Place a card adjacent to the sample panel in each photograph identifying the Administration's Contract Number, the supplier, the casting date for each panel; and a 1 x 6 in. black bar, a ruler, or other means of showing scale that is legible when viewing the photograph.

Take all photographs in the presence and at the direction of the Administration's Inspector, and submit electronic copies made directly from the camera's memory device to them at the time of the inspection (enhancing or modifying the photographs in any way is prohibited). The Inspector will forward the information to the Office of Structures. The certification with the photographs shall contain the following information:

(a) Casting date.

(**b)** Contract Number.

(c) Description of the sample with file names for each sample.

(d) Number of images sent.

(e) Date and time the images were shot.

(f) Panel serial numbers, or other identifying markings.

(g) A certification that the panel has not been used on a previous project, that the panel is uniquely marked, and that the photographs were taken in their presence.

Failure to produce legible electronic photographs in accordance to these requirements will be cause to delay the evaluation of sample panels/posts, which shall be at no additional cost to the Administration or any Contract time extension.

CATEGORY 400
STRUCTURES

450 **DELETE:** SECTION 465 — FUSION BONDED POWDER COATINGS FOR METAL in its entirety.

INSERT: The following.

SECTION 465 — MISCELLANEOUS COATINGS FOR METAL (STEEL)

465.01 DESCRIPTION. Furnish and apply various coatings to metal surfaces as specified. Refer to Sections 435 and 436 for cleaning and painting new and existing bridge structural steel, respectively.

465.02 MATERIALS.

Paint System C	912.05
Fusion Bonded Epoxy Powder Coating for Steel	917.02
Fusion Bonded Polyester Powder	917.03
Hot Dip Galvanized Zinc	A 123, A 153, and 465.03.05(c)
Galvanizing Repair	A 780 and 465.03.05(c)

Use paint and powder coating material selected from the Administration's approved vendors list.

465.03 CONSTRUCTION. Perform cleaning and coating in an approved, environmentally controlled plant. The Administration shall have access to each part of the process and reserves the right to witness or perform any Quality Control testing on a random basis.

Use polyester powder coating when coatings other than paint are specified for steel, or as directed.

The powder coating applicator shall have demonstrated the ability to properly apply and cure the materials of the system and shall be on the Administration's Approved List of Applicators prior to application of any coatings. Galvanizers shall be on the Administration's Approved List of Galvanizers.

465.03.01 Nongalvanized Carbon Steel. Prepare steel metal surfaces as specified in 436.03.10(h). Clean all items to be coated of any oil or grease; and abrasive blast to Near White in accordance with SSPC SP-10. Remove weld spatter, slivers, hackles, or other defects. Protect

cleaned surfaces from high humidity, rainfall, and surface moisture; and do not allow to flash-rust. Ensure that the blast profile is 2 to 3 mils as per D 4417, Method C.

(a) Epoxy Powder Coating System. The system consists of a single coat of epoxy powder coating. Ensure that the thickness of the cured coating is 7 ± 2 mils when measured as specified in SSPC PA2.

(b) Polyester Powder System. The system consists of Coat I of System C and a TGIC (Triglycidyl Isocyanurate) polyester powder finish coat. Apply the polyester powder in accordance with the manufacturer's recommendation and in an operation that immediately applies the powder after the organic zinc rich primer has fully cured. Ensure that the dry film thickness of the organic zinc rich paint is 3 to 5 mils and the thickness of the cured polyester coating is 5 to 9 mils as specified in SSPC PA2.

465.03.02 Hot Dip Galvanized Carbon Steel. Metals that have reactive steel chemistry require the galvanizer to reflect the steps to be taken to ensure proper adhesion in their quality control plan as per B 571.

Ensure that the finished galvanized product is free of excessive zinc areas, weld spatter, slivers, ash, and dross or other detriments. Paint or powder coat hot dip galvanized steel as specified. Use an anti-out-gassing type powder coating material for galvanized items. Galvanized items shall not have been galvanized more than one month prior to coating and shall not have been water or chromate quenched.

Clean and smooth surfaces to be coated by sweep blasting as per D 6386. Store items to be coated in an environment free of moisture and dust for a period of 12 hours maximum, when coating application does not immediately follow the sweep blast surface preparation.

(a) Paint System. Ensure that all paint within the paint system is from the same manufacturer and that intermediate and finish coats conform to Coats II and III of System C, respectively. Apply all coatings using methods and under conditions recommended by the paint manufacturer. Measure the thickness of the coating as specified in SSPC PA2.

(b) Polyester Powder Coating System. Place prepared surfaces in a preheated oven and heat for the necessary amount of time. Out-gas galvanized metal surfaces by preheating the surfaces to a temperature 50 F greater than the cure temperature; but not exceeding a surface temperature of 390 F.

Follow the powder coating manufacturer's' instructions in regards to the metal surface temperature, applying the coating material, and maintaining the cure parameters.

Apply the powder electrostatically and cure at a temperature not to exceed 50 F less than the out-gas temperature immediately after out-gassing, then cool the preheated piece to 50 F less than the out-gas temperature. Galvanized surfaces for items with different

thicknesses shall be allowed to cool to at least 50 F below the out-gas temperature prior to the application of the powder. The thickness of the polyester coating shall be 5 to 9 mils when measured in accordance with SSPC PA2.

465.03.03 Adhesion. Adhesion of the paint or powder coating system to either bare or galvanized metal shall be at least 4 A when tested in accordance with D 3359, Method A.

465.03.04 Testing. MSMT 615. The paint and powder coat finished surfaces shall be holiday and pinhole free when tested with a low voltage holiday detector (minimum 67 1/2 volts) in conformance with D 5162. There shall be no more than one deficiency per 5 square feet. Repair all holidays detected with additional coating.

Visually inspect all items for blisters, sags, and other deficiencies and repair in conformance with 465.03.05, if required. Damaged or deficient areas shall not exceed ½ of 1 percent of the surface area of the item. Items requiring repairs exceeding 1 in. in the narrowest dimension shall be rejected.

465.03.05 Touch Up System. 436.03.24. Provide a compatible touch up system to repair defects, areas damaged during erection, and all visible open areas. Prepare areas to be repaired and apply touch up systems in accordance with the coating manufacturer's recommendations.

(a) Select the **e**poxy powder touch up material to be used from the Administration's Approved List.

(b) Polyester powder touch up system shall be a two component aliphatic polyurethane meeting 912.04.02. The coating thickness of the touch up material for powder coating may be applied in multiple coats and shall be the same thickness as the powder coating. Use Coat I of System C to repair damage to the coating that penetrates to the metal surface; followed by the polyurethane.

(c) Make any necessary repairs to the galvanizing in accordance with A 780, using the hot stick or metalizing method. Use Coat I of System C for repairing the galvanizing if it is to be powder coated.

465.03.06 Color. The color of all coatings and touch up systems shall match Federal Standard 595 and the following as specified:

COLOR	COLOR NO.
Brown	20040
Black	27038
Green	24108

465.03.07 Certification. Paint shall meet 912.01.03, epoxy powder coating shall meet 917.02.02, and polyester powder coating shall meet 917.03.04.

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The acceptance of hot dip galvanized zinc will be based on inspection and shall meet A 123, A 153, and the Contract Documents.

465.04 MEASUREMENT AND PAYMENT. Coatings for metal will not be measured but the cost will be incidental to the pertinent items specified.

CATEGORY 400
STRUCTURES

SECTION 498 – ABSORPTIVE NOISE BARRIER GROUND MOUNTED SYSTEM

DESCRIPTION. The noise barrier system designed for this project shall be absorptive on the side facing the highway for all barrier segments indicated on the Plans.

The absorptive noise barrier system shall conform to all of the noise barrier requirements included in the Request for Proposals.

The absorptive treatment shall be either an integral part of the precast concrete panel or permanently attached by mechanical methods to the panel face.

The Contractor shall submit the proposed design for the absorbing noise barrier with the working drawing submission. The proposed design shall be subject to approval by the Administration.

MATERIALS. The materials, exclusive of the absorptive treatment, shall conform to 455.02. The absorptive treatment shall conform to the requirements set forth in these Specifications.

CONSTRUCTION. The construction methods, exclusive of the absorptive treatment, shall conform to 455.03. Form liner finishes applied to the absorptive treatment shall conform to Section 456.

The absorptive barrier shall conform to the following:

(a) The design shall provide a minimum noise reduction coefficient (NRC) of 0.80 in conformance with C 423, Free Standing, sealed on the bottom. The NRC is the average of the sound absorption coefficients at 250, 500, 1000, and 2000 HZ expressed to the nearest integral multiple of 0.005. The Contractor shall submit evidence of the sound absorbing capabilities of the absorptive noise barrier system for approval with the shop drawings.

(b) The panel design shall reduce transmissions of sound through the barrier a minimum of 25 dBA.

(c) The color of the absorptive treatment of the barrier shall be compatible with the nonabsorbing portion as approved by the Administration's Office of Environmental Design.

(d) The finish on the highway side of the absorptive noise barrier and the residential side shall be as specified in 456.00. The Contractor shall prepare a sample conforming to 456.12 delivered to the construction site that contains the absorptive noise barrier system. The panel shall represent the highway side with the specified finish texture. The Contractor shall notify the Office of Environmental Design, Noise Abatement Team Leader at least one week prior to the delivery of the sample panel. The Administration’s approval of the panel shall be received before full-size panels are manufactured or assembled. Whenever the original sample panel is rejected, additional sample panels shall be submitted until the finish is approved at no additional cost to the Administration. Sample panels containing form liner finishes will not be reviewed until after the working drawings are approved by the Administration.

After the sample panel and working drawings are approved by the Administration, a full size panel shall be prepared with the appropriate treatment on each side. This panel will be used as specified in 455.02.03, Sample Panels.

(e) The panel design shall conform to the requirements outlined in the Request for Proposals.

(f) The absorptive surface shall be fire resistant.

(g) The absorptive material shall conform to the freeze-thaw requirements of C 666, Method B. The bottom 4 ft of the panel shall not include the absorptive treatment.

(h) The absorptive surface shall not contain ground rubber tire material.

(i) The Contractor shall submit the following to the Engineer for approval:

(1) A mix design for the sound absorptive material.

(2) Freeze-thaw test results conducted on specimens molded from that mix design.

(3) The manufacturer's Quality Control Plan.

The absorptive treatment may extend beyond the thickness of the support posts, provided this extension does not exceed 4 in.

The absorptive treatment may extend beyond the thickness of steel support posts, provided this extension does not exceed 4 in.

MEASUREMENT AND PAYMENT. All costs associated with providing an absorptive noise barrier system including sample panels will be incidental to the Contract unit price for the pertinent Noise Barrier System item.

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, Level 2 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/yd^2 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(b). 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 ≤ 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 sublot size should not exceed 1,000 tons.
(3) A sublot size up to 200 tons can be combined with the previous 1,000 ton sublot 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 sublot size should not exceed 1,000 tons. A sublot size up to 200 tons can be combined with the previous 1,000 ton sublot 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. Refer to MSMT 735. 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.

504.03.11 Sampling & Testing for Density Determination. Refer **to** MSMT 457. Random core sampling locations will be selected for each sublot as specified. Sample the QC and QA cores in 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 sublot 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 sublot 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 sublot 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 sublot 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 sublot shall not be greater than 500 tons. When a paving day's production per mix is greater than 2,500 tons, then each sublot 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.

504.03.12 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 sublot 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 ¾" shall be tested and accepted in accordance with this Thin Lift specification. Incentives are not applicable for Thin Lift or Wedge/Level courses.

504.03.13 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.

504.03.14 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 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 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 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.

504.03.15 Curbs, Gutters, Etc. Where permanent curbs, gutters, edges, and other supports are planned, they shall be constructed and backfilled prior to placing the asphalt.

504.03.16 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.

504.03.17 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:

$$\text{Percent Change} = ((Pp - Pb)/ Pb) \times 100$$
$$PA = T \times Q \times ((Pp - (D \times Pb))$$

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
Pp = 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
Pb = 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 sublot 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		
Lot Average % Minimum	*No Individual Sublot Below %**	*Pay Factor (DF)*
94.0	94.0	1.050
93.8	93.7	1.045
93.6	93.4	1.040
93.4	93.1	1.035
93.2	92.8	1.030
93.0	92.5	1.025
92.8	92.2	1.020
92.6	91.9	1.015
92.4	91.6	1.010
92.2	91.3	1.005
92.0	91.0	1.000
91.8	90.8	0.990
91.6	90.6	0.980
91.4	90.4	0.970
91.2	90.2	0.960
91.0	90.0	0.950
90.8	89.8	0.940
90.6	89.6	0.930
90.4	89.4	0.920
90.2	89.2	0.910
90.0	89.0	0.900
89.8	88.8	0.890
89.6	88.6	0.880
89.4	88.4	0.870
89.2	88.2	0.860
89.0	88.0	0.850
88.8	87.8	0.840
88.6	87.6	0.830
88.4	87.4	0.820
88.2	87.2	0.810
88.0	87.0	0.800
Less than 88.0	87.0	0.750 or rejected by Engineer

Note 1: 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 sublot 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 sublot values and lot average value will be used in acceptance decision.
Note 4: The average sublot 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:

Density Lot Payment Adjustment = (DF – 1) x (AP) x (TL)
Mix Design Lot Payment Adjustment = (MF – 1) x (AP) x (TL)

Where:
MF = Mixture pay factor [0.55 + (0.5 x CMPWSL)]
Refer to MSMT 735 for CMPWSL.
DF = Density pay factor from Table 504A.
AP = Adjusted/applicable unit price per 504.04.01.
TL = Applicable tonnage per lot.

(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

SECTION 505–HOT MIX ASPHALT PATCHES

505.03 CONSTRUCTION.

485 **DELETE: 505.03.08 Patch Placement** in its entirety.

INSERT: The following.

505.03.08 Patch Placement. Thoroughly clean and tack coat the exposed vertical surfaces of the adjacent pavement as specified in 504.03.04 prior to placing the HMA patch. Spread the HMA with a shovel, rake, or by other approved methods. Do not place HMA on a frozen base.

Maintain lift thickness in conformance with the following:

HOT MIX ASPHALT LIFT THICKNESS		
MIX DESIGNATION (mm)	**MINIMUM (in.)**	**MAXIMUM (in.)**
9.5	1.0	2.0
12.5	1.5	3.0
19.0	2.0	4.0
25.0	3.0	5.0
37.5	4.0	6.0

CATEGORY 500
PAVING

486 **DELETE:** SECTION 506 — HOT MIX ASPHALT GAP-GRADED in its entirety.

INSERT: The following.

SECTION 506 — GAP-GRADED STONE MATRIX ASPHALT

506.01 DESCRIPTION. Place gap-graded stone matrix asphalt surface (GGSMA) as specified. GGSMA shall conform to Section 504, except as specified herein.

506.02 MATERIALS.

Gap-Graded Stone Matrix Asphalt	904.05
Production Plant	915

506.03 CONSTRUCTION.

506.03.01 Demonstration. Before proceeding with the actual work, the Contractor shall demonstrate to the Engineer that a satisfactory mix can be produced, placed, and the compactive effort determined. A minimum of 100 tons of GGSMA shall be placed outside the project limits for the demonstration. A new strip will be required if a project carries over to a new season. Paver and rollers shall conform to 504.03.01. A material transfer vehicle may be used as part of the demonstration strip.

506.03.02 Hauling Units. Dry soap powder, as approved by the Engineer, may be used with the release agent specified in 915.02(f). Truck beds shall be raised to drain excess water before being loaded with GGSMA.

A light dusting of No. 10 aggregate coated with 1 percent asphalt may be used in lieu of the liquid release agent.

The time between plant mixing and shipment shall not exceed one hour (storage time may vary depending upon gradation, type of binder and/or stabilizer. Storage material shall consistently have results of no less quality than mixtures discharged directly into hauling vehicles). Each load shall be completely covered with a full tarp extending a minimum of 6 in. over each side of the truck body and securely fastened.

506.03.03 Weather Restrictions. Placement of GGSMA will be permitted only when the ambient and surface temperatures are at least 50 F and in accordance with 504.03.02.

506.03.04 Material Transfer Vehicle (MTV). Use a material transfer vehicle to apply the final surface course. The MTV shall perform additional mixing of the Gap-Graded SMA material and then deposit the mixture into the paver at a uniform temperature and consistency.

506.03.05 Mix Temperature. The minimum temperature of the mixture at the time of placement shall be established during the mix design procedure.

506.03.06 Pavement Thickness. The thickness of the pavement shall be as specified in the Contract Documents. Thin Lift specification 504.03.12 is not applicable to GGSMA.

506.03.07 Tack Coat. Refer to 504.03.04 except that, the resulting coating shall be residual asphalt applied at a rate of 0.03 to 0.05 gal/yd^2.

506.03.08 Compaction. Compaction shall be performed using a minimum of three steel-wheeled rollers, each weighing 10 to12 tons. The rollers shall follow the paver within 500 ft. or roll as approved in the QC Plan. Rolling shall start immediately after placement. In place density shall conform to 504.03.11 (c), except that the density shall be 94 to 97 percent of maximum density. Sampling and testing shall be performed as specified in 504.03.11.

The rollers shall be equipped with a watering or soapy watering system that prevents material from sticking to the rollers.

506.03.09 Control Strip. The Contractor may opt to construct a control strip for guidance in determining roller patterns to achieve optimum density. When a control strip is constructed, it shall be placed on the first workday in which SMA is placed and shall be between 400 and 500 ft in length. Based on the Contractor's evaluation of the initial control strip, paving may continue at the Contractor's risk.

The Contractor will not be assessed a density pay adjustment for the amount of material required for construction of the control strips. Should the removal of any control strip be necessary, the Contractor shall remove it at no additional cost to the Administration.

The Engineer may require the Contractor to construct a control strip any time during placement of SMA based on the evaluation of compaction results.

506.03.10 Pavement Profile. Refer to the Pavement Surface Profile requirements specified in the Contract Documents.

506.03.11 Sampling and Testing for Density and Mixture. For sampling and testing for density and mixture refer to 504.03.10 and 11.

506.04 MEASUREMENT AND PAYMENT. Gap-Graded Stone Matrix Asphalt will be measured and paid for at the Contract unit price per ton, complete and in place. The payment will be full compensation for furnishing, hauling, placing all materials, material transfer vehicle, antistripping additive, tack coat, control strips, setting of lines and guides where specified, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Material produced for the demonstration will not be measured but the cost will be incidental to the item GGSMA.

506.04.01 Price Adjustment for Stone Matrix Asphalt Mixture and Pavement Density. Refer to 504.04 except as follows:

GAP GRADED STONE MATRIX ASPHALT MIXES		
PERCENT OF MAXIMUM DENSITY		
LOT AVERAGE MINIMUM (%)	**NO INDIVIDUAL SUBLOT BELOW (%)**	**PAY FACTOR (%)**
95.0	95.0	105.0
94.9	94.8	104.5
94.8	94.6	104.0
94.7	94.4	103.5
94.6	94.2	103.0
94.5	94.0	102.5
94.4	93.8	102.0
94.3	93.6	101.5
94.2	93.4	101.0
94.1	93.2	100.5
94.0	93.0	100.0
93.8	92.7	99.0
93.6	92.4	98.0
93.4	92.1	97.0
93.2	91.8	96.0
93.0	91.5	95.0
92.8	91.2	94.0
92.6	90.9	93.0
92.4	90.6	92.0
92.2	90.3	91.0
92.0	90.0	90.0
91.8	89.7	89.0
91.6	89.4	88.0
91.4	89.1	87.0
91.2	88.8	86.0
91.0	88.5	85.0
Less than 91.0	—	75.0 or rejected per Engineer

Note 1: When any test data is above 97.0, the lot may be rejected per the Engineer. When not rejected, the lot will receive a pay adjustment in accordance with the following:
(a) When the density lot average is above 97.5, the pay factor = 75%.
(b) When 3 sublot densities are above 97.0, the pay factor = 95%.
(c) When 4 or more sublot 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 sublot values and lot average value will be used in acceptance decision.

Note 4: The average sublot values and the lot average will be used in acceptance decision.

506.04.02 Dispute Resolution. Refer to 915.02.01, Responsibilities of the Administration, (e).

CATEGORY 500
PAVING

SECTION 507 — SLURRY SEAL

489 **DELETE:** SECTION 507 — SLURRY SEAL in its entirety.

INSERT: The following.

SECTION 507 — SLURRY SEAL AND MICRO-SURFACING

507.01 DESCRIPTION. Construct an asphalt emulsion seal course using Slurry Seal (SS) or Micro-Surfacing (MS).

507.02 MATERIALS.

Slurry Seal and Micro-Surfacing	923

507.03 CONSTRUCTION.

507.03.01 Weather Restrictions. Place asphalt emulsion seal when the air and surface temperatures are at least 50 F. The morning minimum surface temperature may be 40 F provided the ambient temperature is expected to rise to or above 60 F and is not expected to fall below 32 F within 24 hours after placement. Cease placement when the surface or air temperature falls below the specified limits. Do not place asphalt emulsion seal when it is raining or foggy.

507.03.02 Mixing Equipment. Use a self-propelled, front feed, continuous loading mixing machine. The machine shall proportion and deliver the materials to a revolving, multi-blade, shafted mixer; and discharge it continuously and uniformly.

The mixer shall have devices that control the proportioning of each material. Calibrate the mixer for the mix design in the presence of an Administration representative, or submit certified calibration documents for approval to ensure the SS or MS treatment meets the job mix formula.

Calibrate the equipment using actual project materials and every time there is a change in material source or composition. Submit a source of materials and a mix design for approval in accordance with 923.04 with corresponding test data from an approved lab at least three weeks in advance of the paving operation.

The machine shall have sufficient storage capacity for aggregate, emulsified asphalt, mineral filler, additives, and water to maintain an adequate supply of the materials for the proportioning controls. Add the proper amount of mineral filler to the aggregate before introduction into the

mixer. Use mixing machines equipped with water pressure systems and nozzle spray bars to provide a water spray ahead of and outside the spreader box when required.

Truck mounted machines with positive, non-slipping aggregate delivery systems, but without a front feed continuous loading feature, may be used on project segments of less than 15 000 yd^2 or for spot repairs. Have at least two truck mounted machines on the project prior to construction.

Provide the data for each unit in graphic form indicating the stone gate setting required to obtain the residual asphalt content as determined in the mix design.

Individual volume or weight controls for proportioning each material shall be provided and meters or counters shall be such that the Engineer may determine the amount of each material used at any time. The Contractor shall provide aggregate weigh tickets, a daily delivery summary, and an estimate of aggregate lost or otherwise not used.

507.03.03 Spreading Equipment. Spread the asphalt emulsion seal uniformly by means of a mechanical squeegee box attached to the mixer and equipped with paddles mounted on an adjustable shaft to continuously agitate and distribute the materials. Use equipment that provides sufficient turbulence to prevent the mix from setting in the box or causing excessive side buildup or lumps. Attach flexible seals where the box contacts the road, front and rear, to prevent loss of the mixture. Do not spray additional water into the spreader box. Equip the spreader box with a burlap drag (approximately 18 in. wide), or other approved screed to create a smooth surface.

MS material may be used to fill ruts, utility cuts, depressions in the existing surface, etc, as directed. Fill ruts of 0.5 in or greater in depth with a rut-filling box; 5 or 6 ft in width. Ruts in excess of 1-1/2 in. deep may require multiple applications with the rut-filling box to restore the cross-section. Apply a full width scratch course with the spreader box when rutting or deformation is less than 1/2 in. using a metal or stiff rubber strike-off. Apply the material at a sufficient rate to level the pavement surface. The leveling course may or may not meet the application rate suggested in 507.03.07. Cure all rut-filling and leveling material under traffic for at least 24 hours before additional material is placed.

507.03.04 Quality Control Plan. Submit a Quality Control Plan for approval at least 30 days prior to the placement of any asphalt emulsion seal. The Quality Control Plan shall contain a list of technicians working on the project and their qualifications, the current year equipment calibration data and a statistically based procedure of random sampling.

The Quality Control Plan shall show how the Contractor proposes to control the equipment, materials, production, and asphalt emulsion seal operation to ensure conformance with these Specifications. Discuss the Quality Control Plan requirements in the pre-pave meeting.

507.03.05 Test Strip. Provide **c**alibration data for the equipment before placing the test strip. Construct a test strip for approval prior to beginning the work and when there is a change in materials. Install the test strip at the beginning of a roadway project. The test strip will be

incorporated into the pay quantities if approved. Construct the test strip over one-full lane width; a minimum of 500 ft long. The mixture consistency and application rate for the test strip shall be representative of the mixture consistency and application rate for the project. Contact the Asphalt Technology Division of the Office of Materials Technology one week prior to constructing the test strip to have a representative present. Do not continue the work until the test strip has been approved. If the test strip is not approved, correct all deficiencies and provide another test strip. Work on the roadway will be permitted to continue once the test strip is successfully installed and approved. For each day's paving after the approved test strip, submit a Production Report Form to the Office of Materials Technology at superpave@sha.state.md.us before 1pm, the week day before each day's production. This form can be requested from the preceding e-mail address.

(a) Slurry Seal. Open the test strip to traffic within two hours after placement unless otherwise directed.

(b) Micro-Surfacing. Open the test strip to traffic within one hour after placement unless otherwise directed.

507.03.06 Surface Preparation. Perform surface preparation prior to applying the tack coat and prior to placing asphalt emulsion seal, as directed. Perform roadway patching in accordance with Section 505 and fill cracks in accordance with Section 510. Ensure the crack sealer is a compatible material (i.e., no rejuvenating agents or solvents used), that cracks are not overfilled and proper cure time as per manufacturer's recommendations is allowed prior to placing the asphalt emulsion seal. Remove thermoplastic and waterborne pavement markings per Section 565.

Protect manholes, valve boxes, drop inlets and other service/utility entrances from the asphalt emulsion seal by a suitable method, as approved.

Clean the existing surface and remove all objectionable materials. Ensure the pavement surface is free of standing or pooling water prior to applying tack coat and asphalt emulsion seal.

Apply tack coat consisting of one part asphalt emulsion to two or three parts water to surfaces prepared for MS. Use an emulsion type and grade that is compatible with the asphalt emulsion seal. Apply at a rate of 0.05 to 0.10 gal/yd^2. Do not apply tack coat to surfaces prepared for SS.

507.03.07 Application. Spread the asphalt emulsion seal to repair slight irregularities and to achieve a uniform, skid resistant surface free of skips, lumps, or tears.

Use squeegees and lutes to spread the mixture in areas that are inaccessible to the spreader box and in areas that require hand spreading.

Additives may be used to provide a slower setting time when hand spreading is necessary. Pour the slurry seal in a small windrow along one edge of the surface to be covered, and spread

the material uniformly. Construct a smooth, neat seam where two passes meet. Remove excess material immediately from the ends of each run.

(a) Slurry Seal. Apply at the following target application rates and tolerances, based on the dry aggregate weight, unless otherwise specified:

AGGREGATE TYPE	TARGET APPLICATION RATE AND TOLERANCE
Type II Mix	16 ±2 lb/yd^2
Type III Mix	20 ± 2 lb/yd^2

(b) Micro-Surfacing. Apply in one or two coats as directed at the following target application rates and tolerances, based on the dry aggregate weight, unless otherwise specified:

AGGREGATE TYPE	TARGET APPLICATION RATE AND TOLERANCE	
Type II Mix	16 ±2 lb/yd^2	when one coat is specified
Type III Mix	22 ± 2 lb/yd^2	
Type II Mix	32 ±2 lb/yd^2	when two coats are specified
Type III Mix	36 ±2 lb/yd^2	

Apply MS when specified or directed to fill ruts, utility cuts, depressions in the existing surface, etc., at the following target application rates and tolerances, based on the dry aggregate weight:

AGGREGATE TYPE	RUT DEPTH	TARGET APPLICATION RATE AND TOLERANCE
Type III Mix	0.5 – 0.75 inches	25 ±5 lb/yd^2
	0.75 – 1.00 inches	30 ±5 lb/yd^2
	1.00 – 1.25 inches	33 ±5 lb/yd^2
	1.25 – 1.50 inches	36 ±4 lb/yd^2

Fill ruts using a specially designed rut filling box that will leave the surface crowned 1/8 to 1/4 in. per inch depth to allow for traffic compaction to an approximately level surface. The Contractor shall provide and use a ten-foot straight edge to control the depth and crown.

Furnish certified weigh tickets for all materials in accordance with 507.03.10.

507.03.08 Rolling. Rolling is required for parking facilities only. Roll parking facilities using a self-propelled, 10-ton (maximum) pneumatic-tire roller equipped with a water spray system, as directed. Do not commence rolling until the asphalt emulsion seal has cured sufficiently, as determined.

507.03.09 Defective Work. Correct defective work not meeting the following criteria, unless otherwise directed in writing and as determined; to the satisfaction of the Administration and at no additional cost.

(a) Application Rate. Areas where application rates deviate from the acceptable ranges in 507.03.07 will be considered defective work.

(b) Finished Surface. Provide a finished, uniform surface texture meeting the following requirements**:**

(1) Limit areas of excessive asphalt (flushing) to less than 10 percent of the finished surface area. Areas of excessive asphalt are characterized by a smooth, shiny surface that may be tacky to the touch. Bleeding at joints is not allowed.

(2) No tear and/or drag marks greater than 1 in. wide and 3 in. long.

(3) No more than 12 tear and/or drag marks greater than 1/2 in. wide and 4 in. long per 10 ft of a lane.

(4) No clumps and/or other foreign objects greater than 1-1/2 in. in diameter.

(5) No transverse ripples or joints with greater than a 1/4 in. ridge, bump or depression as measured with a 10 ft straight edge.

(6) No longitudinal streaks with greater than a 1/4 in. ridge, bump or depression, as measured with a 10 ft straight edge.

(c) Longitudinal Joints. Make a neat seam where two longitudinal passes join with no greater than a 1/4 in. bump, ridge or depression as measured with a 10 ft straight edge. Do not overlap longitudinal joints more than 4 in. except on irregular roadway widths as directed.

(d) Longitudinal Edges. Place material to the final widths specified. Make a neat longitudinal edge along the roadway lane, shoulder, and curb lines. Place edges flush with curbs. Place edges with no more than ±3 in. horizontal variance in any 100 ft of roadway.

(e) Transverse Profile. Fill ruts to have no depressions as measured with a 10 ft straightedge.

507.03.10 Certification. Furnish certified weigh tickets daily for the emulsion, residual asphalt content, latex emulsion, aggregate, and mineral filler. The weigh tickets will be used to determine in-place application rates.

507.03.11 Sampling and Testing. Sample the asphalt emulsion seal (mixture) and the asphalt emulsion at least once daily during paving. Provide samples for asphalt content from the completed mix produced by each mixing unit to be tested by the Administration. Asphalt

content will be determined by Ignition Method. Engineer to witness and submit the samples and proper documentation/certification to the Asphalt Technology Division of the Office of Materials Technology. Residual asphalt content and gradation will be determined in accordance T 30 and T 164, or T 308. The residual asphalt content shall be within +/- 1.5 percent of the Job Mix Formula (JMF). When successive tests for a mixing unit fail, or one test fails by more than 2 percent, that unit shall be removed from service until approved.

507.03.12 Tie-Ins for Entrances and Connecting Roads. Make tie-ins at entrances and connecting roads as directed.

507.03.13 Traffic. Maintain active access control at intersections and entrances. When it is necessary to open to traffic early, lightly sand the surface using the same aggregate as in the mix. Remove excess aggregate from the roadway in curb and gutter sections as required. Broadcast clean aggregate used in the seal treatment over the mix at intersections and/or entrances for temporary access as directed. Repair traffic-damaged asphalt emulsion seal at no additional cost. Place temporary paint marking after the mix has cured. Place permanent pavement markings, including thermoplastic pavement markings, at least seven days after curing.

(a) Slurry Seal. Open the test strip to traffic within two hours after placement unless otherwise directed.

(b) Micro-Surfacing. Open the test strip to traffic within one hour after placement unless otherwise directed.

507.04 MEASUREMENT AND PAYMENT. Slurry Seal and Micro-Surfacing will be measured and paid for at the Contract unit price per square yard for one or more of the pertinent items listed below. The accepted quantity of Micro-Surfacing Rutfilling will be paid for at the Contract unit price per ton. Payment will be full compensation for furnishing and placing the aggregate, tack coat, mineral filler, tie-ins to entrances and connecting roads, emulsion, latex emulsion, test strip, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

507.04.01 Slurry Seal Using Type II Mix (One Coat).

507.04.02 Slurry Seal Using Type III Mix (One Coat).

507.04.03 Micro-Surfacing Using Type II Mix (One Coat).

507.04.04 Micro-Surfacing Using Type III Mix (One Coat).

507.04.05 Micro-Surfacing Using Type II Mix (Second Coat).

507.04.06 Micro-Surfacing Using Type III Mix (Second Coat).

507.04.07 Micro-Surfacing Type Rutfilling

507.04.08 Hot Mix Asphalt patches per 505.04.

507.04.09 Removal of Pavement Markings per Section 565.

507.04.10 Filling Cracks in Hot Mix Asphalt Pavement per Section 510.

507.04.11 Price Adjustment. Material not conforming to these Specifications may be accepted at a reduced price if the nonconformance is determined not detrimental to the work. The following price adjustment will apply:

(a) The residual asphalt content of samples will be averaged for each day's production per lift and will be compared to the submitted mix design. The Contract unit price per square yard will be reduced 1 percent for each 0.10 percent the asphalt content is out of tolerance below the approved job mix formula, as per 507.03.12.

(b) The Contract unit price per square yard will be reduced 3 percent for each pound per square yard below the specified rate. This adjustment will be determined by comparing the certified delivery tickets with the project Specifications. No increase in the Contract Unit price will be considered for applications at more than the specified rate.

507.04.12 Price Adjustment for Asphalt Binder. A Price Adjustment (PA) will be made to provide additional compensation, or a credit to the Administration for fluctuations in the cost of asphalt binder.

The prevailing base index price will be the price specified for PG 64-22 Asphalt Binder posted at www.roads.maryland.gov (Business Center / Contracts Bids and Proposals) for adjustment purposes at time of bid opening.

The PA will 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:

Percent Change = ((Pp – Pb) / Pb) x 100

PA = (Q/2000) x AR x (Pp – (D x Pb))

Where:

PA = Price Adjustment for Slurry Seal or Micro-Surfacing
Q = Quantity of Slurry Seal or Micro-Surfacing placed in pounds
D = 1.05 for increases over 5 percent; 0.95 for decreases over 5 percent
Pp = Index price for PG 64-22 Asphalt Binder per ton for the month of placement
Pb = Prevailing base index price for PG 64-22 Asphalt Binder per ton

AR= Asphalt Residue expressed as a decimal

PA resulting in increased payment 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. PA resulting in a decreased payment will be deducted from monies owed.

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 ± 1/8 in. center-to-center. The nominal depth of the tined grooves shall be 1/8 ± 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.

(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.

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 Interstate / Expressway / Freeway VALUES (2013) (in./mile)
Average	138	79
Maximum	600	576
Minimum	48	28
Standard Deviation	116	44

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 then or equal to IRI_a
PF = P_{max} x (IRI_b - IRI_{AVG})/(IRI_b - IRI_a), when IRI_{AVG} is greater than IRI_a and less than IRI_b

INCENTIVE = PF x NS x (25/5280 lane miles per section)
DISINCENTIVE = 0

Full Pay. When IRI_{AVG} is greater than or equal to IRI_b and less than or equal to IRI_c

INCENTIVE = 0
DISINCENTIVE = 0

Disincentive. PF = P_{min} x (IRI_{AVG} - IRI_c)/(IRI_d - IRI_c), when IRI_{AVG} is greater than IRI_c and less than IRI_d,
PF = P_{min}, when IRI_{AVG} is greater than or equal to IRI_d

INCENTIVE = 0
DISINCENTIVE = PF x NS x (25/5280 lane miles per section)

535.04.02 Defect Cost. The IRI for each individual section will be used to calculate any cost to be applied for defects on the project. This pay adjustment applies only to the pavement within the tested sections. The pay adjustment for defects will be calculated based on the factors shown below.

DEFECT COST = Sum of the defect costs ($P_{defect,i)}$ for all defect sections

Where:

	DESCRIPTION	VALUE	UNITS
P_{max}	Maximum Incentive for Overall IRI	$7,350	Dollars per lane-mile
P_{min}	Maximum Disincentive for Overall IRI	$7,350	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	31	Inches per mile

IRI_b	Minimum IRI for Full Pay	48	Inches per mile
IRI_c	Maximum IRI for Full Pay	81	Inches per mile
IRI_d	IRI for Maximum Disincentive	97	Inches per mile
IRI_e	IRI threshold for Defects	140	Inches per mile
IRI_{AVG}	Overall average IRI for the project	*	Inches per mile
IRI_{defect}	IRI for a given 25' defect section	*	Inches per mile
NS	Number of tested 25 foot Sections	*	Sections

* Value to be determined on the project.

The defect cost ($P_{defect,i}$) for each defect section will be computed using the following formula:

$$P_{defect,\,i} = 100 + \left(\frac{270 * (IRI_{defect} - IRI_e)}{(600 - IRI_e)} \right)$$

535.04.03 Total Pay Adjustment. A total pay adjustment (TPA) will be made based on the total of any incentive and disincentive for Overall IRI minus any defects. TPA resulting in increased payment will be paid under the item Pavement Surface Profile Pay Adjustment. This item amount has been established by the Administration and shall not be revised. TPA resulting in decreased payment will be deducted from monies owed. The TPA shall be subject to conditions (a) and (b) below.

Total Pay Adjustment = INCENTIVE - DISINCENTIVE - DEFECT COST

(a) Regardless of the measured profile of any test section, incentive payment will not be permitted for the project when the Contractor's QC data was not submitted on time in conformance with 535.03.02.

Total Pay Adjustment = 0 - DISINCENTIVE - DEFECT COST

(b) The total value of Overall IRI disincentive and Defect Cost shall not be more than the Maximum Disincentive pay adjustment for all of the profiled 25 foot sections.

If DISINCENTIVE + DEFECT COST is greater than P_{min} x NS x (25/5280 lane miles per section) then Total Pay Adjustment = - P_{min} x NS x (25/5280 lane miles per section)

CATEGORY 500
PAVING

SECTION 550 — PAVEMENT MARKING PAINT

550.01 DESCRIPTION. Furnish and apply nontoxic lead free waterborne pavement marking paint to pavement surfaces as specified in the Contract Documents or as directed by the Engineer. These markings includes lines (striping), legends (letters and numbers) and symbols.

550.02 MATERIALS. Paint is a nontoxic lead free waterborne pavement marking and is a non-durable material. All Paint Pavement Marking material shall be selected from the Qualified Products List.

Nontoxic Lead Free Waterborne Pavement Marking Material	951.01

550.03 CONSTRUCTION.

550.03.01 Quality Control / Quality Assurance. Refer to Section 549.

550.03.02 Application. The location, width, and type of marking shall be as specified in the Contract Documents or as directed by the Engineer.

(a) Temperature. The markings shall be applied when the paint, ambient and surface temperature, and relative humidity conform to the manufacturer's recommendations.

(b) Glass Beads. The Contractor shall apply the Maryland Blend gradation of glass beads uniformly across the surface of the stripe, at the rate of 7 to 9 lb/gal of paints.

(c) Thickness. The paint shall be applied at a wet film thickness of 18 ± 1 mils.

(d) Color. The color of the dry markings shall match Federal Standard 595 (38907 - yellow or 37925 - white). The Contractor shall make available the specified color chips for the Engineer's use to visually determine that the waterborne material matches the specified color.

(e) No-Track. The paint shall conform to 60 second no-track requirements. The no-track condition shall be determined by passing over the applied line at approximately 30 degrees with a standard passenger car or pickup truck. When viewed from a distance of 50 ft, the pavement surface shall show no evidence of the paint being picked up and redeposited on the pavement by the vehicle.

(f) Retroreflectance. The minimum retroreflectance shall be 150 millicandelas/lux/square meter for yellow and 250 millicandelas/lux/square meter for white as determined in conformance with MSMT 729.

550.03.03 Application Equipment. The equipment used for application of the paint shall be approved by the Engineer prior to start of work, and shall be capable of applying waterborne traffic paint that has been approved by the Administration. The Contractor shall provide access to the paint application equipment for inspection by the Engineer.

The paint carriage on the left side of the paint truck shall have three paint and bead guns. The paint carriage on the right side of the paint truck shall have two paint and bead guns.

All 10 in. lines shall be applied using two paint and bead guns. Raising the paint carriage in order to paint these lines with one paint gun and bead gun is prohibited.

The footage counters used to measure pavement markings shall be calibrated, and a notarized certification shall be submitted to the Engineer as part of the Quality Control Plan.

Temperature gauges shall be calibrated every six months and a copy of the calibration certification shall be submitted to the Engineer as part of the Quality Control Plan.

The applicator shall apply the surface dressing beads to the wet paint marking by means of a pressurized bead dispenser or other mechanical conveying method not dependent upon gravity for uniform application. The bead dispenser shall be equipped with an automatic cutoff system that will stop the flow of the paint material whenever there is a disruption in the application of the beads so that all markings placed shall be covered with a uniform layer of surface dressing beads.

Application equipment shall be capable of applying the markings at multiple width settings ranging from 4 to 12 in.

The applicator shall provide a method for cleanly cutting off stripe ends and shall be capable of applying all longitudinal pavement markings.

The equipment shall be mobile and maneuverable to the extent that straight lines can be followed and all standard curves can be made in true arcs.

All parts of the equipment shall be thoroughly cleaned of foreign material or different colored material prior to the introduction of a new batch of material.

550.04 MEASUREMENT AND PAYMENT. The payment will be full compensation for all pavement preparation, furnishing and placing of markings, testing, and for all material, labor, equipment, tools, and incidentals necessary to complete the work. Refer to 549.04.

Pavement Marking Paint will be measured and paid for at the Contract unit price for one or more of the following items:

(a) Pavement Marking Paint lines (striping) will be measured and paid for at the Contract unit price per linear foot for the color and width specified.

(b) Pavement Marking Paint Legends (letters and numbers) and Symbols will be measured and paid for at the Contract unit price per square foot. The square foot pay quantity for Legends (letters and numbers) and Symbols will be as specified in the Administrations Standard Details.

CATEGORY 500
PAVING

SECTION 552 — EPOXY PAVEMENT MARKING

552.01 DESCRIPTION. Furnish and apply lead-free two component epoxy white or yellow pavement markings with large and standard glass beads. The locations and patterns shall be as specified in the Contract Documents or as directed by the Engineer.

552.02 MATERIALS.

Lead Free Two Component Epoxy Pavement Marking Materials	951.08

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 ft^2, 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).

(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

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.

556.03.05 Packaging. The material shall be handled for shipping, unloading and storage as recommended by the manufacturer. Each shipping package shall be marked with the following information:

(a) Manufacturer's name.

(b) Description of item.

(c) Date of manufacture.

(d) Contractor's name.

(e) Purchase order number.

(f) Lot number.

(g) Color.

556.04 MEASUREMENT AND PAYMENT. The payment will be full compensation for all pavement preparation, furnishing and placing of markings, testing, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Preformed Thermoplastic Pavement Marking Legends (letters and numbers) and Symbols will be measured and paid for at the Contract unit price per square foot. The square foot pay quantity for Legends (letters and numbers) and Symbols will be as specified in the Administrations Standard Details

Preformed Thermoplastic Pavement Marking lines will be measured and paid for at the Contract unit price per linear foot for the color and width specified.

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 558 – RECESSED PAVEMENT MARKERS

558.01 DESCRIPTION. Furnish and install Recessed Pavement Markers (RPM) as specified in the Contract Documents, and or as directed by the Engineer.

558.02 MATERIALS.

Pavement Marker Reflector Lens	Qualified Products List / 951.05
Epoxy Adhesive	M237 Type II / 951.05

Recessed Pavement Markers are durable materials.

558.03 CONSTRUCTION.

Placement. Recessed Pavement Markers shall be installed and located as directed by 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 Recessed Pavement Markers 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 meet the manufacturers' recommendations for installation of the markers. 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) A 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 cut, including test strip cuts.

(e) At the time of installation, the Recessed Pavement Markers should be free of dirt, dust, oil, grease, rust, moisture, or any foreign matter that will impair adhesion to the pavement. It shall be the contractor's responsibility to clean each contaminated Recessed Pavement Marker to remove all foreign matter without damaging the reflective surface prior to installation.

Pavement Marker Reflectors. Pavement Marker 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.

New Installation.

(a) Recessed Marker Reflector Lenses shall be installed in accordance with D 4383 (the top of the marker shall be 0.06 in. below the pavement surface) or as directed by the Engineer. Lenses used shall be of a type specifically manufactured and approved for use as Recessed Marker Reflector lenses. Lenses that are manufactured exclusively for Snow Plowable Raised Pavement Markers are not permitted as substitutes for recessed lenses.

(b) The groove cut for mono-directional recessed marker reflectors lenses shall be the appropriate dimensions to properly seat one reflector lens in conformance with the manufacturer's recommendations and D 4383.

(c) The groove cut for bi-directional recessed marker reflectors lenses shall be the appropriate dimensions to properly seat two reflectors lenses, one on each end, in conformance with the manufacturer's recommendations and D 4383.

Replacement.

(a) Reflector Lens Replacement. The Contractor shall remove and dispose of any damaged reflector lens and replace with a new lens. The replacement reflector lens shall conform to the same requirements as the original reflector lens unless specified by the Contract Documents or as directed by the Engineer. The replacement lenses shall be installed per manufacturer's recommendations.

(b) Groove Cut. Existing groove cuts may be reused when they are in compliance with D 4383.

(c) Damaged Groove Cut Repair and Accuracy. Damaged groove cuts shall be repaired in accordance with applicable Sections of 504, 505, 522, and as directed by the Engineer. The location of the replacement groove cut shall be within one foot longitudinally in front (with the direction of traffic) and no lateral deviation exceeding 1½ in.

Assurance/Quality Control. Refer to 549.

Observation Period. The Contractor shall replace at no additional cost to the Administration, any 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.

558.04 MEASUREMENT AND PAYMENT. The payment will be full compensation for all pavement preparation, furnishing and placement of pavement markers, testing, removal, groove cutting, repair and all materials, labor, equipment, tools and all incidentals necessary to complete the work.

(a) Pavement Marker Reflector Lenses will be paid for at the Contract unit price per each. Furnishing and installing the Recessed Marker includes the reflector and adhesive.

(b) Groove Cuts will be paid for at the Contract unit price per each.

(c) Repair of damaged existing groove cuts 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

559.03 CONSTRUCTION.

559.03.01 General. PPPRP markings shall be applied in conformance with the manufacturer's recommendations or as directed by the Engineer.

On new hot mix asphalt projects, the PPPRP markings shall be inlaid into the hot surface of the top course of pavement. No top course paving shall be permitted unless the stripping crew and marking materials are at the project site.

When the Contract Documents specifies the use of PPPRP markings on concrete pavements or existing asphalt pavements, the Contractor shall use heat, solvent, or other type of adhesive primer in conformance with the manufacturer's recommendations.

Preformed legends and symbols shall conform to the applicable shape and sizes as specified in the MdMUTCD, and Contract Documents.

PPPRP markings shall conform to pavement contours and be resistant to deformation by traffic and damage from snow removal equipment. Surface preparation, use of solvents and primers and equipment used in the application of PPPRP markings shall conform with the manufacturer's recommendations and be approved by the Engineer. After PPPRP markings are applied, they shall be immediately ready for traffic.

559.03.02 Quality Assurance/Quality Control. Refer to 549.03.01.

559.03.03 Cleaning Pavement Surfaces. Refer to 549.03.02.

553.03.04 Application. Refer to 549.03.03 and the following:

(a) Manufacturer's Recommendations. The Contractor shall provide a copy of the manufacturer's recommendations to the Engineer, and shall follow them for the installation of the line markings.

(b) Adherence. Adherence of PPPRP markings shall be randomly checked by using a paint scraper or another approved tool, which shall be held nearly parallel with the highway surface, so there is no dislodging of the tape.

10-31-08¶

(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/m^2 for white or 220 mcd/L/m^2 for yellow.

(c) Marking is discolored on a visual comparison with the color chips.

10-31-08¶

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 CONSTRUCTION.

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 specificed 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 soil amendments and fertilizer 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. 020700100303

(3) Soil Test Results.

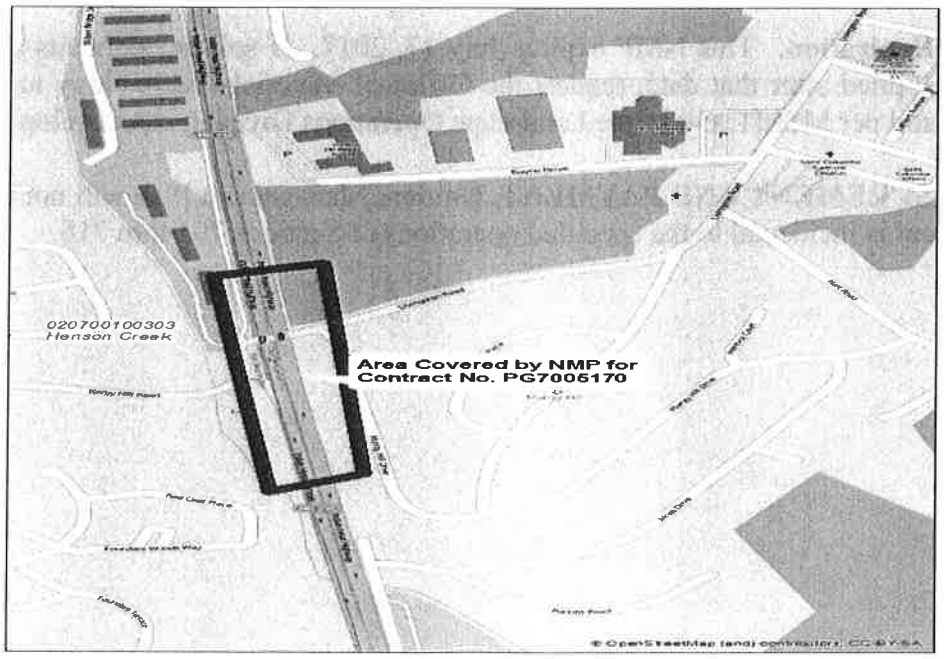
SHA Soil Test No.	PG700B21-PG-17	July 18, 2014
Texture	Sandy Loam	Meets Specifications
Organic Material	3.7%	Meets Specifications
pH	6.9	Meets Specifications
Soluble Salts	168	Meets Specifications

A&L Eastern LaboratoriesTest		July 28, 2014
Phosphorus Index	44 FIVs	Medium
Potassium Index	93 FIVs	Optimum
Harmful Materials	--	

SHA Soil Test No.	PG700B21-PG-18	July 18, 2014
Texture	Sandy Loam	Meets Specifications
Organic Material	5.4%	Meets Specifications
pH	6.8	Meets Specifications
Soluble Salts	416	Meets Specifications

A&L Eastern LaboratoriesTest		July 28, 2014
Phosphorus Index	42 FIVs	Medium
Potassium Index	41 FIVs	Medium
Harmful Materials	--	

(4) Location Map.



(b) Application Rates. Apply soil amendments and fertilizer for the specified operations as listed below.

MATERIAL	LB PER ACRE	LB PER SY	LB PER 1000 FT^2
Soil Amendments			
Limestone	0.00	0.00	0.00
Sulfur	0.00	0.00	0.00
Gypsum	0.00	0.00	0.00
Compost	0.00 yd^3 per 24 yd^3 of soil		
Temporary Seeding			
15-30-15	450	0.09	10.3
Turfgrass and/or Turfgrass Sod Establishment			
20-16-12 (83% UF with MAP & SOP)	200.00	0.04	4.44
38-0-0 (UF)	0.00	0.00	0.00
0-0-50 (SOP)	0.00	0.00	0.00
Refertilization (when included)			
20-16-12 (83% UF with MAP & SOP)	200.00	0.04	4.44
Meadow Establishment			
20-16-12 (83% UF with MAP & SOP)	250.00	0.05	5.56
38-0-0 (UF)	75.00	0.02	2.22
0-0-50 (SOP)	0.00	0.00	0.00
Shrub Seeding			
20-16-12 (83% UF with MAP & SOP)	450.00	0.09	10.00
38-0-0 (UF)	75.00	0.02	2.22
0-0-50 (SOP)	0.00	0.00	0.00

(c) Expiration. This NMP expires July 17, 2017. If soil amendments and 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 permanant 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.

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 permanant 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.

(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.

(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 Mix [1]			
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

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

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

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

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			

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	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.		
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	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.		
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

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.

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 in^2. 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

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

709.03 CONSTRUCTION.

709.03.01 Soil Preparation and Seeding.

583 **DELETE: (a) Type A and B.**

INSERT: The following.

(a) Type A, B and E.

ADD: The following after "Install SSM…….709.03.02 thru .05. "For Type A and Type B SSM, firm the soil with a roller as specified in 708.03.10 after seeding".

709.03.03 Overlapping.

ADD: The following after "Overlap SSM……..…or tenting. "Avoid installation of longitudinal overlaps in channel bottoms".

709.03.04 Keying-in. (a) Trenching.

584 **DELETE:** Table **"**AREAS OF MATTING TO KEYING-IN".

INSERT: The following.

AREAS OF MATTING TO KEYING-IN	
MATTING TYPE	**AREA OF MATTING**
A, B	Upper most or leading-edge.
A, B	Edges adjacent to catch basins and structures.
B	Lowermost or toe-edge.
B	Folds of matting perpendicular to water flow every 40-45 ft.
C, D	All edges
C	Folds of matting perpendicular to water flow every 20-25 ft.

709.03.05 Fastening. (a) Fastener Selection.

584 **DELETE:** Table "FASTENER SELECTION".

INSERT: The following.

FASTENER SELECTION					
MATTING TYPE	**FASTENER SHAPE**	**APPROVED FASTENERS**			
		6 in. Length	**8 in. Length**	**12 in. Length**	**18 in. Length**
A and E	U-Shaped Staple	X	X		
	Circle-Top Pin	X	X		
	Round Head Pin	X	X		
	T-Head Pin	X			
	Wood Peg	X			
B, C, D	U-Shaped Staple		X	X	
	Fabric Pin			X	X

709.03.05 Fastening. (b) Placement of Fasteners.

DELETE: Table "FASTENER PLACEMENT".

INSERT: The following.

FASTENER PLACEMENT		
MATTING TYPE	**AREA OF MATTING**	**MAXIMUM DISTANCE BETWEEN FASTENERS In.**
A, B, C, D	Uppermost or Leading-Edge of Matting	6
A, B, C, D, E	Overlapping Edges of Matting	18
A, B, C, D	Center of channel/ditch	18
A, B, C, D	Lowermost or Toe-Edge of Matting	18
A, B, C, D, E	Throughout Matting	24
B	In Folds Every 40 to 45 ft	12
C	In Folds Every 20 to 25 ft	12

709.03.10 Final acceptance.

586 **CHANGE:** The first sentence of the third paragraph, "....remove Type A, B or D SSM." to read, "….remove Type A, B, D or E SSM".

ADD: The following after 709.04.04.

709.04.05 Type E Soil Stabilization Matting per square yard.

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.

(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

Note:

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.

(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.

(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., spead 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.

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.

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.

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)

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.

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.

ANNUAL AND BULB
TABLE 1 - PLANTING SEASONS

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.

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.

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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.

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.

ANNUAL AND BULB

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.

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 Delimbing. 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

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

DISCONNECT, PULLBACK AND REROUTE EXISTING CABLE

DESCRIPTION. Disconnect existing cable(s) from traffic control device(s), pullback and reroute through new or existing conduit systems, handholes, span wires, mast arms and/or structures for reconnecting the traffic control device(s) as specified in the contract documents, or as directed by the Engineer.

MATERIALS. Not Applicable

CONSTRUCTION. Notify the Engineer and Traffic Operations Division representatives at least 5 working days before intended work is to be completed. Plan the work to minimize interference and/or down time of any existing traffic control device.

Disconnect specified cable(s) from the traffic control device and pullback to the point noted or as directed, reroute the cables through the specified raceway(s) and back to the device specified.

MEASUREMENT AND PAYMENT. Disconnect, Pullback & Reroute Cable will be measured and paid for at the contract price per linear foot and shall apply for one or as many cables as are disconnected from a specified device and rerouted back to a device (not per cable). The payment will be full compensation for all materials, labor, equipment, tools, and incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

IP BASED VIDEO TRAFFIC DETECTION CAMERAS

DESCRIPTION. Furnish and install self contained internet protocol (IP) based video detection cameras that monitor vehicles on a roadway via the machine vision processing of color video images, and provide outputs to a traffic controller or similar device, as well as streaming MPEG-4 video over a common ethernet connection, as specified in the Contract Documents or as directed by the Engineer.

MATERIALS. Provide video traffic detection cameras, cabinets, and all component parts that meet the latest edition of the National Electrical Manufacturers Association (NEMA) Standards and Underwriters Laboratory (UL), as applicable. Provide ISO 9002 and CE certified camera components. Use the advertising date of this Contract to determine the date of the applicable standards.

If available, permanently engrave serial numbers and model numbers on all removable components and hardware. Etch, Stamp or mold the serial number and model number. The use of adhesive backed labels is not acceptable.

CONSTRUCTION. Provide video detection cameras that consist of an IP based video camera and a 3-conductor power cable that carries both power to the camera, and video and data signals back to Administration installed video processing equipment in the controller cabinet. The cabinet equipment permits direct connection to the signal controller via a 10/100 Ethernet connection and the industry standard TCP/IP communications protocol, or to contact-closure hardwired devices.

Features.

(a) Built-in IP based addressing with a unique Ethernet MAC address. No plug-in devices or cards shall be necessary.

(b) Web-server interface and network connection via standard CAT-5 cable.

(c) Easy locking connector that allows technicians/installers to pull power cable either up or down a pole without splicing

(d) Zoom configuration is conducted at the cabinet.

(e) MPEG-4 streaming video via any standard digital video player, with viewing rates of 5 fps to 30 fps, depending on bandwidth.

(f) An access point in the cabinet that provides standard NTSC or PAL full-motion video output to an analog video monitor.

(g) Internet browser interface with common Internet browsers for password-protected access over the internet. The embedded web server capability shall enable access to streaming video, configuration editing, and camera monitoring via the Internet.

(h) Dual core processor with DSP image processing and ARM general-purpose processing.

(i) Direct real-time iris and shutter speed control.

(j) Non-volatile memory data storage.

Camera Hardware. Supply hardware that consists of a color video image processing camera, and a 3-wire control & data transfer cable for signal control and streaming MPEG-4 video image transfer.

Machine Vision Processor (MVP). Provide MVP camera that is an integrated imaging color CCD array with zoom lens optics, high speed, dual-core image processing hardware bundled into a sealed enclosure.

(a) The CCD array shall be directly controlled by a dual-core processor, thus providing high-quality video for detection that has virtually no noise to degrade detection performance.

(b) It shall be possible to zoom the lens as required for setup and operation.

(c) The MVP shall provide JPEG video compression as well as standard MPEG-4 digital streaming video with flashing detector overlay.

(d) The MVP shall provide direct real-time iris and shutter speed control.

(e) The MVP camera shall be equipped with an integrated 22x zoom lens that can be changed using either configuration computer software.

(f) The digital streaming video output and all data communications shall be transmitted over the three-wire power cable.

(g) The MVP camera shall operate on 120/220 VAC, 50/60 Hz, with a maximum wattage of 25 watts.

(1) The camera and processor electronics shall consume 10 watts.
(2) The enclosure heater shall consume 15 watts.

MVP Lens.

(a) Low-power thermostatically-controlled ITO faceplate.

(b) Built-in heater.

(c) Hydrophilic faceplate coating to shed water.

(d) Weatherproof rear connector (IDC rapid termination industrial connector).

(e) The lens shall be available in a standard configuration or wide-angle.

(f) The focal length shall be 4.1mm to 87.8mm.

Detection Zone Programming. Placement of detection zones shall be by means of a portable or desktop computer using the Windows XP, or Vista operating system, a keyboard, and a mouse.

(a) The PC monitor shall be able to show the detection zones superimposed on images of traffic scenes.

(b) The mouse and keyboard shall be used to draw detection zones on the PC monitor. It shall be possible to:

(1) Download detector configurations from the PC to the MVP camera and cabinet interface module.
(2) Retrieve the detector configuration that is currently running in the MVP camera.
(3) Back up detector configurations by saving them to the PC fixed disks or other removable media storage.

(c) The supervisor's mouse and keyboard shall be able to:

(1) Edit previously defined detector configurations.
(2) Adjust the detection zone size and placement.
(3) Add detectors for additional traffic applications.
(4) Reprogram the camera for different traffic applications, changes in installation site geometry, or traffic rerouting.
(5) Perform the above upload, store, and retrieve functions for video snapshots of the MVP cameras view.

Optimal Detection. Provide video detection camera that provides optimal detection of vehicle passage and presence when the:

(a) The MVP camera is mounted 10 m (30 ft) or higher above the roadway.

(b) The image camera is adjacent to the desired coverage area.

(c) The distance to the farthest detection zone locations is not greater than 10 times the mounting height of the MVP camera.

(d) The deployment geometry provides an unobstructed view of each traveled lane where detection is required. Although optimal detection may be obtained when the MVP camera is mounted directly above the traveled lanes, the MVP camera shall not be required to be directly over the roadway.

(e) The MVP camera is able to view either approaching or receding traffic or both in the same field of view. The preferred image camera orientation for optimal detection shall be to view approaching traffic since there are more high contrast features on vehicles as viewed from the front rather than the rear.

(f) The MVP camera, when placed at a mounting height that minimizes vehicle image occlusion and equipped with a lens to match the width of the road, is able to monitor a maximum of 7 traffic lanes when mounted at the roadside, or up to 8 lanes when mounted in the center with four lanes on each side.

18-Gauge Camera-to-Cabinet Cable. The cable between the MVP and the cabinet interface shall consist of three conductors 18 AWG, with an overall UV-resistant low density polyethylene jacket.

(a) Conductors.

(1) Three, 18 AWG, 19 strands of 30 gauge tin-plated copper conductor diameter .046”/.052”.
(2) Extruded polyethylene 200 conductor insulation, with nominal .030” wall thickness.
(3) Black, green, and white colors.

(b) Construction.

(1) Extruded black polyethylene jacket .040”/.050” wall thickness, UV-resistant.
(2) 0 .330” - .354” maximum outside diameter.
(3) 600 volt (rms) rated.
(4) The cable shall be imprinted with the manufacturer’s part number, number of conductors, conductor size, voltage rating, jacket material, and an indication that it is conduit rated.

Count Detection Performance. Using a MVP camera installed within the optimal viewing specifications described above for count station traffic applications; the camera shall be able to accurately count vehicles with:

(a) At least 98 percent accuracy under normal operating conditions (day and night).

(b) At least 93 percent accuracy under artifact conditions. Artifact conditions are combinations of weather and lighting conditions that result from shadows, fog, rain, snow, etc. The volume count shall be:

(1) Accumulated for the entire roadway (all traveled lanes).

(2) Accumulated over time intervals that contain a minimum of one hundred (100) vehicles to ensure statistical significance.

Demand Presence Detection Performance. Using a MVP camera installed within the optimal viewing specifications described above for intersection control traffic applications; the camera shall be able to accurately provide demand presence detection.

(a) The demand presence accuracy shall be based on the ability to enable a protected turning movement on an intersection stop line, when a demand exists.

(b) The probability of not detecting a vehicle for demand presence shall be less than 1- Percent error under all operating conditions.

(c) In the presence of artifact conditions, the MVP camera shall minimize extraneous (false) protected movement calls to less than 7 percent.

(d) To ensure statistical significance, the demand presence accuracy and error shall be calculated over time intervals that contain a minimum of100 protected turning movements performance specifications shall be achieved with a minimum of 2 presence detectors coupled with a single detector function (Type-9) to provide adequate road coverage to sample the random arrival patterns of vehicles at the stop line.

(e) The calculation of the demand presence error shall not include turning movements where vehicles do not pass through the presence detectors, or where they stop short or stop beyond the combined detection zones.

Speed Detection Performance. The MVP shall accurately measure average (arithmetic mean) speed of multiple vehicles with more than 97 percent accuracy under all operating conditions for approaching and receding traffic.

(a) The average speed measurement will include a minimum of 100 vehicles in the sample to ensure statistical significance.

(b) Optimal speed detection performance requires that camera location conform to the specifications described above for count station traffic applications with the exception that the camera must be higher than 13 m (40) ft.

(c) The MVP will accurately measure individual vehicle speeds with more than 94 percent accuracy under all operating conditions for vehicles approaching the camera (viewing the front end of vehicles), and more than 90 percent accuracy for vehicles receding from the camera (viewing the rear end of vehicles).

(d) These specifications will apply to vehicles that travel through both the count and speed detector pair and will not include partial detection situations created by lane-changing maneuvers.

(e) To ensure statistical significance, the average speed accuracy and error will be calculated over time intervals that contain a minimum of one hundred vehicles.

Modular Cabinet Interface Unit (Access Point). The modular cabinet interface unit will be furnished and installed by the Administration. This section is for reference only**.**

The modular cabinet interface unit shall communicate directly with up to eight (8) MVP cameras and shall comply with the form factor and electrical characteristics to plug directly into a NEMA type C or D detector rack providing up to thirty-two (32) inputs and sixty-four (64) outputs or a 170 input file rack providing up to sixteen (16) contact closure inputs and twenty-four (24) contact closure outputs to a traffic signal controller.

(a) Additional Features.

(1) Easy IP addressable Ethernet connectivity using RJ-45 connectors.
(2) USB 2.0 connector for a USB mouse.
(3) Provides PAL or NTSC analog video output for MPEG-4 streaming digital video.
(4) Detector rack or shelf mount installation.
(5) 1500 volts RMS isolation between rack logic ground and street wiring.
(6) Emulates the function of up to 4 TS2 Bus Interface Units (BIU).
(7) Self diagnostics on power-up.
(8) High-energy transient protection.

(b) Power: 12 to 24 VDC, 11W maximum.

(c) Environmental.

(1) Temperature: -34° C to +74° C (-29° F to +165° F).
(2) Relative Humidity: 0 to 95 Percent.

(d) Dimensions and Weight.

(1) 114 mm H x 59 mm W x 175 mm L (4.5 in H x 2.34 in W x 6.9 in L)
(2) Weight: 0.5 lb.

(e) Complies with: CE EN 55022, EN 61000-6-1 FCC Part 15, Class A.

Communications Interface Panel. The communications interface panel will be furnished and installed by the Administration. This section is for reference only. The communications interface panel shall have the following features:

(a) Four (4) sets of three (3) electrical terminations for three-wire cables for powering up to eight (8) MVP cameras.

(b) High-energy transient protection to electrically protect the modular cabinet Interface unit and connected MVP cameras.

(c) Single-point Ethernet connectivity via RJ45 connector for communication to and between the modular cabinet interface module and the MVP cameras.

(d) Predefined wire termination blocks for MVP power connections.

(e) A Broadband-Over-Power-Line (BPL) transceiver that supports up to 10 MB/s inter-device communications.

(f) An interface connector to cable directly to the modular cabinet interface unit.

(g) The option of using either 110/220 VAC 50/60 Hz power.

(h) Fuse protection using SLO-BLO, 1/2 amp fuses.

Installation and Training. The supplier of the video detection camera shall supervise the installation and testing of the video detection camera and any optional computer equipment.

Warranty, Maintenance and Support. The video detection camera shall be warranted by its supplier for a minimum of 2 years.

Documentation. The equipment supplier shall deliver a CD containing operating manuals, service manuals, and maintenance instructions for the video traffic detection camera being supplied to the Administration's Office of Traffic & Safety, Signal Operations Division, located at 7491 Connelley Drive, Hanover, Maryland 21076. The phone number is 410-787-7650.

MEASUREMENT AND PAYMENT. IP Based Video Traffic Detection Cameras will be measured and paid for at the contract unit price per each. The payment will be full compensation for furnishing and installing the video traffic detection camera, equipment specified, all mounting hardware, including camera support to structure, 3 conductor cable from the camera to the controller cabinet, labor, and all incidentals necessary to complete this work.

The communications interface panel, modular cabinet interface unit, and all other cabinet equipment will be furnished and installed by the Administration.

CATEGORY 800
TRAFFIC

LED TRAFFIC SIGNAL MODULES

DESCRIPTION. Furnish and install self-contained LED signal head modules to be used in place of the incandescent lamp, reflector, socket, gasket, and lens assembly of standard vehicle signal sections, as specified in the Contract Documents or as directed by the Engineer.

MATERIALS. Manufacturers of red and green 8 in. and 12 in. LED traffic signal modules are required to file a statement with the Maryland Energy Administration, certifying that each signal to be sold or offered for sale in Maryland is in compliance with the State's energy efficiency standard. Information on this requirement can be found at the Maryland Energy Administration's website.

The modules shall employ a lens assembly that presents an appearance that is similar to those found on standard incandescent signals.

Provide LED signal heads, and all component parts that meet the latest edition of the National Electrical Manufacturers Association (NEMA). In addition, LED signals shall meet the requirements set forth in the most recent, formally-adopted version of the specification titled "Vehicle Traffic Control Signal Heads - Part 2: Light Emitting Diode (LED) Vehicle Traffic Signal Modules," published by the Institute for Transportation Engineers (ITE).

(a) The manufacturer must certify all signals meet or exceed all requirements of that specification over their entire 5-year warranty period.

(b) Permanently identify serial numbers and model numbers, if available, on all removable components and hardware. The serial number and model number shall be etched, stamped, molded, or attached using metallic self-adhesive labels. The use of adhesive backed paper labels is not acceptable.

CONSTRUCTION. LED modules shall fit in standard, incandescent vehicle traffic signal housings without modifications or the need for special tools, and shall be complete with a one-piece, integral lens assembly that is tinted for the appropriate color.

Design. LED traffic signal modules shall have:

(a) A printed circuit board inclusive of all of the LEDs and required circuit components.

(b) Minimum 39 in. wire leads, minimum # 20 AWG, 600 volt, 105 C, with strain relief and spade terminals. Screw-type terminals shall not be allowed.

(c) A rigid housing for protection in shipping, handling and installation.

(d) A one piece neoprene gasket shall be used to seal out water and contaminants.

Assembly Techniques.

(a) The LEDs within the modules shall be mounted and soldered to a printed circuit board.

(b) LED signal modules shall be watertight when properly installed in traffic signal housings.

(c) LED signal modules shall utilize the same mounting hardware used to secure a standard incandescent lens and gasket assembly, and shall only require a screwdriver or basic installation tools to complete the mounting.

(d) LED signal module assemblies shall weigh less than 5 lb.

(e) LED signal modules may not protrude into the signal visor area more than two and three-quarters of an in. in depth.

(f) LED signal modules shall be marked 'TOP' or have an up arrow to designate the proper orientation of the signal module in the traffic signal housing.

(g) LED signal module housings shall utilize an integral metal layer in their design and construction.

(h) LED signal modules shall utilize the latest technology in thermal management.

Lenses. Make lenses for ball type modules of ultraviolet stabilized polycarbonate, and incorporate facets that serve to enhance the optical efficiency of the LED traffic signal module. Individual lenslets or external lens facets shall not be permitted.

(a) The ball type signals shall incorporate a diffuser-type lens system that serves to collimate the light emitted by the LEDs. The lens and diffuser system shall focus the collimated light, to meet ITE intensity and distribution standards.

(b) LED signals shall almost perfectly approximate the appearance of an incandescent traffic signal to the motorist.

(1) The face of the ball LED lamps shall appear to the motorist as uniform in illumination, and have a wide viewing angle that makes it suitable for installation on wide boulevards.

(2) The external lens surface for all vehicle signals shall be smooth, with no raised features, so as to minimize the collection of dirt, diesel smoke, and other particulate contaminates, and to facilitate periodic cleaning.

(3) The lens shall be keyed to the housing of the LED signal module to insure the proper

orientation and to avoid possible rotation during any handling.

(4) Hard coat external lenses to prevent an accumulation of dust and dirt.

(5) For LED turn arrow signals, the LED arrow lens may be a replaceable part without the need to replace the complete LED arrow.

Optical. The light intensity, chromaticity, and distribution from eight and twelve-in. red and green, and eight-in. yellow LED traffic signal modules shall meet all photometric values stated in the most recent, formally-adopted version of the specification titled "Vehicle Traffic Control Signal heads – Part 2: Light Emitting Diode (LED) Vehicle Traffic Signal Modules," published by the Institute for Transportation Engineers (ITE). Twelve-in. Yellow LED traffic signal modules shall meet the chromaticity requirements of the most recently-adopted ITE specification, with a minimum intensity of 1,500 candelas.

(a) Red and Green LED signals shall be certified by the manufacturer to meet or exceed all requirements of that specification over their entire 5-year warranty period.

(b) The light output from twelve-in. Yellow LED signals shall be the peak instantaneous intensity, measured at instant-on and at the highest intensity point.

Design.

(a) Connect the LEDs in series-parallel strings.

(1) No more than 1 percent of the total luminosity of the entire signal module may be lost in the event of a single string failure.

(2) The failure of a single LED shall cause loss of light from only that LED.

(3) No loss of light output from the complete module assembly shall occur as a result of a single LED failure.

(b) The control circuitry shall prevent the current flow through the LEDs in the off state to avoid any false indication as may be perceived by the human eye, during daylight and evening hours.

(1) The LED traffic signal module shall be operationally compatible with NEMA TS – 1 and NEMA TS – 2 conflict monitoring parameters.

(2) The intensity of the LED signal module shall not vary by more than 10 percent over the allowable voltage range as specified in the electrical section below.

Electrical.

(a) The Power factor shall be 0.90 or greater, at nominal rated voltage, at 25°C, after 60 minutes of operation.

(b) Total harmonic distortion (THD) shall be less than 20 percent at rated voltage, at 25°C.

(c) All LED traffic signal modules shall be in compliance with FCC noise regulations and must meet the FCC Title 47, SubPart B Section 15 regulation.

(d) The LED junction technology used in all signal modules shall not exhibit degradation of more than 30 percent of the modules' initial light intensity following accelerated life testing (operating at 85 degrees C and 85 percent humidity, for 1000 hours). Under no circumstances shall AlGaAs technology be acceptable.

(e) The LED signal modules shall be connected directly to line voltage, 120 Volts AC nominal, and shall be able to operate over the voltage range of 80 VAC to 135 VAC.

(f) Red and Green LED traffic signal modules shall consume no more than a nominal 15 watts for either the 8 in. or 12 in. signal. Yellow signal modules shall consume no more than 24 watts.

(g) Transient voltage suppression rated at 1500 watts for 1 millisecond and fusing with a maximum rating of 2 amps shall be provided to minimize the effect and repair cost of an extreme over voltage situation or other failure mode.

(h) Low Voltage Turn OFF: There shall be no visible illumination from the LED signal module when the applied voltage is less than 50 VAC.

(i) Turn-ON and Turn-OFF Time: A module shall reach 90 percent of full illumination (turn-ON) within 75 msec of the application of the nominal operating voltage. The signal shall cease emitting visible illumination (turn-OFF) within 75 msec of the removal of the nominal operating voltage.

Compatibility Testing. The LED module manufacturer shall certify that their modules meet the Load Switch and Signal Conflict Monitor Compatibility testing requirements found in the most recent, formally-adopted version of the specification titled "Vehicle Traffic Control Signal heads - Part 2: Light Emitting Diode (LED) Vehicle Traffic Signal Modules," published by the Institute for Transportation Engineers (ITE).

Electronic Failure Protection. To assure compatibility with NEMA TS1/TS2 controllers for both conflict monitoring and Red Fail, all signal colors (Red, Yellow, and Green) once energized, must turn off prior to 50 VAC, and if the signal fails it shall present a high impedance on the input side of the signal.

Warranty. Manufacturers shall provide a written with the following minimum provisions:

(a) Modules shall be replaced, repaired or purchase value refunded if the module fails to function as intended due to workmanship or material defects within the first 60 months from the date of delivery.

(b) Modules which exhibit luminous intensities less than the minimum specified values within the first 60 months of the date of delivery shall be replaced, repaired or purchase value refunded.

Miscellaneous. The manufacturers part number, date code, and electrical characteristics of the LED signal module shall be visible on the rear of the assembly.

MEASUREMENT AND PAYMENT. LED Traffic Signal Modules will be measured and paid for at the contract unit price per each. The payment will be full compensation for the LED module, hardware, assembly, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

SIGNAL EQUIPMENT TURN ON, PICK UP, REMOVAL AND MAINTENANCE

DESCRIPTION. Pick up of Administration furnished materials, remove existing equipment, and maintain existing equipment as specified in the Contract Documents or as directed by the Engineer.

MATERIALS. Not applicable

CONSTRUCTION.

Equipment Turn On. Notify the Engineer and Traffic Operations Division representatives within 10 working days prior to completion of the project to allow the Administration to install any additional traffic control device.

Notify the Engineer and Traffic Operations Division representative five working days prior to the completion of the project to schedule a final inspection and turn-on.

Stakeout, with the Engineer present, the proposed construction as indicated on the plan.

Pick-Up of Administration Furnished Materials. Notify the appropriate OOTS warehouse a minimum of 72 hours in advance of the anticipated pick up or delivery of materials. The OOTS signal and sign warehouses are located at:

7491 Connelley Drive
Hanover, Maryland 21076
Signal Phone 410-787-7667
Sign Phone 410-787-7670

The Contractor shall be responsible for the transportation, labor, equipment, tools and incidentals necessary to obtain and load any Administration furnished materials.

Materials not furnished by the Administration shall be furnished by the Contractor.

Removal and Disposal of Existing Material and Equipment. Remove concrete foundations specified in 207.03.01. All holes caused by this removal shall be backfilled, compacted and restored to surrounding conditions.

Remove all existing hard rubber detectors and handholes not shown on the Plans. The holes shall be backfilled, compacted and restored to surrounding conditions. The sidewalk where handholes are removed shall be reconstructed to the nearest tooled joint or expansion joint. The roadway where hard rubber detectors are removed shall be reconstructed in conformance with

Administration utility patch repair standards.

Disconnect existing inductive loop detectors and magnetic detectors not shown on the plans.

Dispose of all material not salvaged. Non-galvanized green painted structures may contain lead and the contractor will be responsible for proper disposal of such material.

Storage of Materials. Materials shall be bundled, stored, and protected in conformance with the manufacturers recommendations or as approved by the Engineer.

Maintenance of Materials and Equipment. The maintaining agency will continue maintenance of any existing signals until the Contractor places new equipment into operation.

When the work requires adjustments to the traffic control devices to maintain the minimum Administration standards, the adjustments to the traffic control devices shall be made within 4 hours of verbal notification by the Engineer. Failure to comply with this time period will result in the Administration performing adjustment and deducting the cost of the adjustment from the Contractor's payment.

Existing signals shall remain in their original condition until the new signals have been completed, satisfactorily tested and its operation accepted by the Engineer.

Maintain the continuous operation of all vehicular and pedestrian detectors. If any detector is damaged by the Contractor, it shall be repaired within 72 hours after notification by the Engineer.

All traffic signals and existing interconnect cable shall be operational and actuated as specified in the Contract Documents.

Plan the work to minimize interference with any existing traffic control device.

MEASUREMENT AND PAYMENT. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work for one or more of the items specified in the Contract Documents.

Equipment Turn On. Equipment Turn On will not be measured but the cost will be incidental to other pertinent items specified in the Contract Documents.

Pick-Up of Administration Furnished Materials. Pick-up of Administration Furnished Materials will not be measured but the cost will be incidental to other pertinent items specified in the Contract Documents.

Removal and Disposal of Existing Signal Material and Equipment. Removal and Disposal of Existing Signal Material and Equipment will be measured and paid for at the Contract unit

lump sum price.

Maintenance of Existing Signal Equipment. Materials storage, cable sealing and handling, adjustments to maintain minimum Administration standards on existing signals made necessary by new signal or geometric modifications and Contractor repair of any damaged detector caused as a result of Contractors error will not be measured but the cost will be incidental to other pertinent items specified in the Contract Documents.

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CATEGORY 800
TRAFFIC

UTILITY CONNECTIONS AND UTILITY STAKEOUT

DESCRIPTION. Provide utility connections, and utility stakeout, as specified in the Contract Documents or as directed by the Engineer.

MATERIALS.

Disconnect Switches and Utility Connections 950.13.10

CONSTRUCTION. Arrange a meeting with the utility company representatives, Traffic Operations Division representatives, the Engineer and the District Utility Engineer, as specified in the Contract Documents to establish a schedule for utility connections before any equipment or material is installed.

Do not disconnect, de-energize, reconnect, tamper with, or otherwise handle any of a utility company's facilities. The Contractor shall be responsible for the utility service connections to the utility company's supplied point of service.

Make the necessary arrangements with the utility companies to insure having needed utilities available at the time of turn on. Any utility energization, connection or disconnection delays will not be considered a valid reason for any work time extension claim. Report difficulties in securing utility company services to the Engineer, at the earliest possible time.

Utility Stakeout. Notify the appropriate agencies listed in the Contract Documents, and those listed below a minimum of 72 hours (excluding weekends and holidays) prior to the Contractors anticipated beginning of any underground work.

(a) In Montgomery County, request Montgomery County (240-777-2100) to stakeout their ITS and signal facilities.

(b) Request the Statewide Operations Center (800-543-2515) to stake out SHA fibreoptic and communication cables.

(c) Request the Communications Division (410-747-8590) to stake out ITS devices.

(d) Request appropriate RME to stake out lighting.

(e) Notify the Hanover Complex Signal Shop (410-787-7652) of all requests for signal and ITS stakeouts.

Plan the work to minimize interference with any existing traffic control devices.

Existing equipment shall remain in its original condition until the new equipment has been completed, satisfactorily tested and its operation accepted by the Engineer.

MEASUREMENT AND PAYMENT.

Utility Connection. Utility Service Equipment Connections will be measured and paid for as specified in 807.04.01.

All utility company energization, connection or disconnection costs will be the responsibility of the Administration.

Utility Stakeout. Utility Stakeout will not be measured but the cost will be incidental to other pertinent items specified in the Contract Documents.

CATEGORY 800
TRAFFIC

SECTION 802 — GALVANIZED STEEL BEAM SIGN POSTS

802.02 MATERIALS.

622 **ADD:** The following to the end of the materials list.

Structural Tubing	A500, Grade B

802.04 MEASUREMENT AND PAYMENT.

DELETE: The first sentence in section 802.04.

623 **INSERT:** The following.

Galvanized Steel Beam Sign Posts and Structural Tubing Sign Posts will be measured and paid for at the Contract unit price per linear foot for the various sizes of posts specified in the Contract Documents.

CATEGORY 800
TRAFFIC

SECTION 806 — LUMINAIRES AND LAMPS

806.02 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.

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 808 — LIGHTING STRUCTURES

808.01 DESCRIPTION.

634 **DELETE:** The description paragraph in its entirety.

INSERT: The following.

Furnish and install low level steel and aluminum lighting poles, bracket arms and fittings, and steel high mast lighting structures as specified or as directed. Exclude concrete foundations.

808.02 MATERIALS.

ADD: The following at the end of the list of materials.

High mast shafts	A595 Grade A
Steel base plates and other structural steel	A709 Grade 50 including Charpy V Notch requirements for Zone 2
Galvanization for hardware	A153

Design high mast lighting structures for mounting a head frame and lowering device assemblies. Provide design in accordance with the 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals" and as indicated in contract documents. Structures shall include a reinforced handhole with a hinged handhole cover that shall be padlocked. Padlocks shall be keyed alike and shall be in accordance with the Administration standards.

Contractors and/or fabricators name and logo shall not be placed on the lighting standards. Marked numbers shall appear on surface areas that will not be visible to traffic after erection.

The shaft of high mast lighting structures shall be made of tapered sections that telescope each other. Shaft diameters and tapers shall be as shown in the Contract Documents.

Telescoping sections shall be forced into place and be thoroughly wedged to produce the required engagement as listed on the Contract Documents. Submit erection plans and procedures to the Engineer for approval prior to installation of the high mast lighting structure on location. Structures shall be installed with all internal wiring, attachments,

and hoist cable assemblies in place and erected in accordance with the manufacturers recommendations. Erect the structures plumb. Check plumb using two transits set 90 degrees apart. Plumbing shall not be done in full sun to avoid deflection from radiant heat. Tolerance for plumb shall be 3 in. per 100 ft. Tighten nuts to secure the structure in place.

The loading, transporting and unloading of all parts shall be conducted to avoid injury and deformation of the metal. Repair areas damaged in transport or erection to the satisfaction of the Engineer. During the erection process, handle all materials carefully and store on platform, skids, or other supports to keep parts off of the ground. The steel shall be kept free and clean from all foreign materials, particularly grease, oil, concrete, chock marks and dirt that may affect the natural oxidation of the steel. All structures shall be treated with care given to any product such that the finished surface remains as prepared in the fabrication shop. Any foreign matter that gets on the surface after galvanizing shall be removed as soon as possible and the soiled areas shall be returned to the conditions as listed above.

Luminaire Head Assembly and Lowering Gear. Provide all zinc coated structural and sheet metal parts meeting the same structural requirements as the shaft. All bolts, nuts, washers, and lock washers shall be stainless steel. All luminaires shall be as stated in Section 806.

The luminaire support frame shall be a steel ring integrally welded together and shall serve as a raceway for electrical wiring to the luminaires. The frame shall be suspended from and held in place by three stainless steel suspension cables of 3/16 in. min diameter. These cables shall be permanently affixed through a weight equalizing spring assembly to a single sustaining raising-lowering winch. The three suspension cables securing the frame shall pass over pulleys of non-corrosive material fitted with permanently lubricated ball bearings, cable guides and cable retainers. The suspension cables, weight equalizing spring assembly, and winch shall be installed within the shaft. A means shall be provided within the shaft to prevent the three suspension cables from fouling the power cable when raising and lowering the luminaire frame. The raising-lowering winch shall be suitable for manual as well as power driven operation.

The downward travel of the lowering ring shall be sufficient to lower the lights to a position 5 ft above the base of the standard. Cushioned bumpers, or similar devices, shall be provided to absorb any shock resulting from contact between the lowering ring and pole during the up and down travel of the ring.

The lowering gear shall include a braking mechanism to prevent the luminaires from lowering without intentional operation of the winch.

Latching Mechanism. Each pole shall be provided with a latching mechanism that shall secure the suspension cables and minimize the stress on the winch cable and winch. The

latching mechanism shall be completely accessible through the access door in the pole base. Additionally, a safety chain shall be provided capable of supporting the full weight of the luminaires and lowering equipment in the event of a failure of the latching mechanism.

Electric Drive Assembly. The electric drive assembly shall be a reversible continuous heavy duty electric drill with a 240 volt universal motor, a torque clutch, a remote control station with a 35 ft long extension cord, and a mounting bracket to firmly hold the drive unit in place when it is engaged with the hoisting winch. The electric drive assembly shall be provided with a socket to fit the 1/2 in. square input shaft of the winch. The drill shall produce the necessary torque to raise and lower the lowering ring with six luminaires through 10 successive cycles with no more than one minute between each cycle and without producing excess heating or overloading of the electric drive assembly.

Provide a remote control for the electric drive assembly that allows the operator to control the raising and lowering of the luminaires while standing clear of the luminaire assembly and pole.

The electric drive assembly shall raise or lower the luminaires at a rate of not less than 10 ft per minute. As part of the electric drive assembly a transformer shall be provided to convert from the operating voltage of the luminaires to 240 volts for the electric drive assembly. The transformer shall have a 10 ft long 3/C, 600 volt, heavy duty portable cable with plug to match the drive unit receptacle in the base of the lighting mast, and a grounded weatherproof receptacle on the load side to supply the drive unit motor. All outlets shall be easily accessible from the access door.

Electric drive assemblies shall be turned over to the Engineer at the completion of construction.

Electrical Equipment for High Mast Lighting Structures.

(a) Terminal boards shall be rated 30 amperes, 600 volts, fabricated from non-tracking materials and equipped with covers. They shall be similar and equal to General Electric Company Type EB-5, Square D Class 9080, Type S or Westinghouse Type TBA.

(b) Plugs and receptacles shall be heavy duty, weather resistant, rated 20 amperes, 480 volts AC, grounded type. Receptacles shall have weatherproof cap and mating plug.

(c) Junction boxes shall be galvanized cast iron with hubs and hinged covers.

Testing. All electrical equipment shall be tested and its operation shall be demonstrated to the Engineer. Upon completion of erection and following the installation of the

luminaires and all electrical components, test the lowering device on each standard in the presence of the Engineer. The test shall consist of two complete operations, conducted on two different days, starting with the unlatching or unlocking, lowering the head assembly to its min height, raising the head assembly back to its installed height, and latching or locking. The test shall be considered satisfactory when 80 percent of the operations require no second attempts to complete any function and the remaining 20 percent of the operations require no more than three attempts to complete any function. Should the equipment fail this test, adjust or modify those components causing the failure and repeat the tests from the beginning.

808.03 CONSTRUCTION.

634 **ADD:** The following after the paragraph 'Perform all fabrication…pole is plumb'

Fabrication, welding and non-destructive testing shall conform to the contract documents and AASHTO Highway Signs, Luminaries and Traffic Signals 4th Edition 2001, unless otherwise specified.

808.04 MEASUREMENT AND PAYMENT.

635 **ADD:** The following after 808.04.04.

808.04.05 High Mast Lighting Structures, Luminaires & Lowering Gear will be measured and paid for at the contract unit price per each light pole furnished and installed. The payment will be full compensation for the high mast lighting pole, the luminaire head assembly and lowering gear, all electrical equipment including internal wiring, luminaires, testing and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

808.04.06 Electric Drive Assemblies will be measured at the contract unit price per each. The payment will be full compensation for electric drill, mounting bracket, transformers, remote controls, testing, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

SECTION 810 — ELECTRICAL CABLE, WIRE AND CONNECTORS

810.02 MATERIALS.

636 **ADD:** The following.

Cable Duct End Seals shall consist of a one-piece heat shrinkable device designed to provide a waterproof seal around the cable duct and each individual cable. The cable duct end seal shall have separate entranceways for each cable and shall hold the cables apart when applied.

810.03 CONSTRUCTION.

810.03.03 Preassembled Cable Duct.

637 **DELETE:** The second paragraph beginning "After backfilling…or a rubber device" in its entirety.

INSERT: The following.

After backfilling, demonstrate that the conductors move freely within the duct by pulling the conductors out a minimum of length of 2 ft. Pulling Tension shall conform to 810.03.02. Then, pull the cable back to its original position and install the cable duct end seals. After installation of the cable duct end seals, but prior to installing connector kits or splices, perform electrical circuit testing as specified in 820.03.02 (b) and record the results. Record the length of cable, locations of both ends of the cable duct, and the insulation resistance on a form acceptable to the Engineer, and forward the form to the Engineer.

823.04 MEASUREMENT AND PAYMENT.

810.04.01.

637 **ADD:** The following after the last sentence in 810.04.01.

There will be no measurement and payment for Preassembled Cable Duct that has not had the required electrical tests performed and reported to the engineer.

810.04.04.

638 **ADD:** The following after 810.04.03.

Cable Duct End Seals shall be measured and paid for at the contract unit price per each.

CATEGORY 800
TRAFFIC

SECTION 813 — SIGNS

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 800
TRAFFIC

SECTION 814 — SIGNAL HEADS

814.01 DESCRIPTION.

641 **ADD:** The following after the first paragraph.

Furnish and install Aluminum and Polycarbonate 8 in. and 12 in. vehicle traffic control signal heads and hardware with LED Green, Yellow, and Red indications, as specified in the Contract Documents or as directed by the Engineer. All signal housing shall have a black face and yellow housing.

814.02 MATERIALS.

ADD: The following to the end of the list of materials.

LED Traffic Signal Modules	"Section 800 LED TRAFFIC SIGNAL MODULES"
ALL Red and Green Traffic Signals	COMAR 14.26.03
(LED or Incandescent)	(Certification of compliance with Maryland Energy Efficiency Standards)

814.04 MEASUREMENT AND PAYMENT.

ADD: The following after the first paragraph.

Aluminum and Polycarbonate LED Signal heads will be measured and paid for at the contract unit price per each section of signal head type and size as specified in the Contract Documents. The LED signal heads will have the LED module fitted into the housing assembly. The payment will be full compensation for the housing, LED signal module, and, mounting hardware, assembly, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

CATEGORY 800
TRAFFIC

CATALOG CUTS AND WORKING DRAWINGS

DESCRIPTION. Prepare and transmit submittals to demonstrate the performance of the work in accordance with the Contract Documents. Submittal schedules, catalog cuts, shop drawings, installation methods, manufacturer's certifications, photometric data and working drawings shall be furnished on all Contractor furnished items for highway signing, sign lighting, highway lighting and traffic signals. Submit stakeouts of the sign locations for all sign structure locations, as specified in the Contract Documents.

MATERIALS. Not Applicable.

CONSTRUCTION.

Submittal Requirements. Schedule and Coordinate submittals with the Contractors construction schedule. Submit a complete submittal schedule and list of required submittals with the first submittal, but no later than three days after the pre-construction conference. Arrange the schedule for submission of submittals so that related equipment items are submitted concurrently.

The Engineer may require changes to the submittal schedule to permit concurrent review of related equipment. Submit shop drawings for closely related items such as a sign and ITS support structures together.

Submittal Documents. Provide drawings neat in appearance, legible and explicit to enable proper review. D size plans shall still be legible when reduced to one half size. They shall be complete and detailed to show fabrication, assembly and installation details, wiring and control diagrams, catalog data, pamphlets, descriptive literature, and performance and test data. They shall be accompanied by calculations or other sufficient information to provide a comprehensive description of the structure, machine or system provided and its intended manner of use. If drawings deviate from the Contract Documents, advise the Engineer in writing with the submittal and state the reason for the deviation.

No portion of the work requiring a Contractors drawing shall be started nor shall any materials be fabricated, delivered to the site, or installed prior to the approval or qualified approval of the drawings. Fabrication performed, materials purchased or on-site construction accomplished which does not conform to approved Contractors drawings shall be at the Contractors risk. The Administration will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity.

Shop drawings shall show types, sizes, accessories, layouts including plans, elevations and sectional views, component, assembly and installation details, and all other information required to illustrate how applicable portions of the Contract requirements will be fabricated and

installed. In case of fixed mechanical and electrical equipment, submit layout drawings drawn to scale, to show required clearances for operation, maintenance and replacement of parts. Provide manufacturers certified performance curves, catalog cuts, pamphlets, descriptive literature, installation and application recommendations, and indicate conformance to the Contract Documents. Certifications shall be originals. Certification shall also be sent to the Office of Materials and Technology (OMT) as required in the Contract Documents.

Provide manufacturer's catalog, product and equipment data that includes materials type, performance characteristics, voltage, phase, capacity, and similar data along with wiring diagrams, when applicable. Indicate catalog, model and serial numbers representing specified equipment. Provide complete component information to verify all specified required items. Installation recommendations and instructions shall provide written Manufacturer's detail step by step preparation and installation of the materials, and products including recommended tolerances and space for maintenance and operation.

Provide catalog cuts for sign luminaires with photometric data attached for each sign to be illuminated. Photometric printouts shall include the sign number, the illumination on a one foot square grid covering the entire sign face, the average illumination, the maximum to minimum uniformity ratio, and a working drawing for the sign face attached.

Catalog cuts for roadway luminaires shall have photometric data attached as specified in the Contract Documents.

Submit working drawings as required for changes, substitutions, contractor design items, and Contractor designed methods of construction. Requirements for working drawings will be listed in appropriate Specification Sections and in Special Provisions. Drawings shall be accompanied by calculations or other information to completely explain the structure, machine or system described and its intended use. Review and approval of such drawings by the Engineer shall not relieve the Contractor from his responsibility with regard to the fulfillment of the terms of the Contract.

Working drawings and calculations as submitted shall be sealed, dated and signed by a Professional Engineer registered in the State of Maryland.

The review and approval of Contractor's drawings by the Administration shall not relieve the Contractor from his responsibility with regard to the fulfillment of the terms of the Contract. The Contractor shall be responsible for the verification and accuracy of all dimensions and insuring that all Contractor furnished items are compatible, and conform to all design and performance criteria.

All risks of error and omission are assumed by the Contractor and the Engineer will have no responsibility therefor.

Submittal Process. Each drawing submitted shall have affixed to it the following Certification Statement, signed by the Contractor:

"By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and pertinent data and I have checked and coordinated each item with other applicable approved drawings and Contract requirements."

With the first submittal, include a submittal schedule, listing by Specification Section number, all submittals required and approximate date submittal will be forwarded.

Each submittal having catalog descriptions, shop drawings, working drawings, photometric data, manufacturer's certifications, method of construction and manufacturer's installation recommendations shall be submitted to:

Chief, Traffic Operations Division
Maryland State Highway Administration
7491 Connelley Drive
Hanover, Maryland 21076

Each submittal shall have a transmittal page that indicates the Contractor's and Subcontractor's address and phone numbers. Submittals containing multiple items need the transmittal only on the exterior of each package. For original submittals, and each subsequent resubmittal that may be required, 9 copies will be submitted for projects administered by the District, and 6 copies will be submitted for projects administered by Office of Traffic and Safety. A separate copy shall be forwarded to the Engineer.

All submittals for approval shall have the following identification data, as applicable, contained thereon or permanently adhered thereto.

(a) Drawing title, drawing number, TIMS number, TOD number, revision number, and date of drawing and revision.

(b) Applicable Contract Drawing Numbers and Specification Section and Paragraph Numbers.

The first page of every catalog description, working drawing and material certification shall be stamped in red with the following. All pertinent Contract Document information shall be filled in the spaces provided.

MARYLAND STATE HIGHWAY ADMINISTRATION
SUBMITTAL PACKAGE #_____ DATED CONTRACT # _____ LOCATION PROJECT DESC. ITEM # _____ THIS ITEM CONTAINS_____ PAGES ITEM DESCRIPTION
☐ ACCEPTED ☐ ACCEPTED AS NOTED ☐ REJECTED - REVISE & RESUBMIT
REVIEWERS NAME DATE

Indicate the submittal package by sequential numbering and date of submittal. Catalog, product data or brochure submittals containing various products, sizes and materials shall be underscored or highlighted to indicate the salient features required to meet the specifications. Likewise, items not applicable to the Contract shall be marked "not applicable" or crossed out.

If one or more of the items in a submittal are not approved, resubmittal of only the unapproved items is required, highlighted to show the particular item being resubmitted. Resubmittals shall bear original submittal number and be lettered sequentially.

Three copies of all Contractors drawings will be returned to the Contractor.

Each submittal shall be in accordance with the submission schedule. Allow thirty days for checking and appropriate action by the Engineer.

Contractors submittals will be returned, marked with one of the following classifications:

ACCEPTED: no corrections, no marks

ACCEPTED AS NOTED: a few minor corrections. Item shall be installed in accordance with the corrected drawings.

REJECTED - REVISE & RESUBMIT: requires corrections or is otherwise not in accordance with the Contract Documents. No items shall be fabricated. Correct and resubmit drawings as per original submission. Allow thirty days for checking and appropriate action by the Engineer.

MEASUREMENT AND PAYMENT. Catalog Cuts, Manufacturers Certifications, Photometric Data and Working Drawings will not be measured but the cost will be incidental to the pertinent items specified in the Contract Documents.

CATEGORY 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 require 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**.**

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SECTION 901 — AGGREGATES

655 **DELETE: 901.01 -** Tables 901 A, 901 B, 901 C, and 901 D in their entirety.

INSERT: The following.

TABLE 901 A
AGGREGATE GRADING REQUIREMENTS
TEST METHOD T 27

MATERIAL		SIEVE SIZE														
		2-1/2"	2"	1-1/2"	1"	3/4"	1/2"	3/8"	No. 4	No. 8	No. 10	No. 16	No. 30	No. 40	No. 50	No. 100	No. 200
		63 mm	50 mm	37.5 mm	25 mm	19 mm	12.5 mm	9.5 mm	4.75 mm	2.36 mm	2.0 mm	1.18 mm	600 µm	425 µm	300 µm	150 µm	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 - PORTLAND CEMENT CONCRETE	57 and UNDERDRAIN (h)	—	—	100	95–100	—	25–60	—	0–10	0–5	—	—	—	—	—	—	—
	67	—	—	—	100	90–100	—	20–55	0–10	0–5	—	—	—	—	—	—	—
	7	—	—	—	—	100	90–100	40–70	0–15	0–5	—	—	—	—	—	—	—
FINE AGGREGATE — PORTLAND CEMENT CONCRETE, UNDERDRAIN, and PNEUMATIC MORTAR (d)		—	—	—	—	—	—	100	95–100	—	—	45–85	—	—	5–30	0–10	—
COARSE AGGREGATE — LIGHTWEIGHT PORTLAND CEMENT CONCRETE		—	—	—	100	90–100	—	10–50	0–15	—	—	—	—	—	—	—	—
FINE AGGREGATE — LIGHTWEIGHT PORTLAND CEMENT CONCRETE (d)		—	—	—	—	—	—	100	85–100	—	—	40–80	—	—	10–35	5–25	—
FINE AGGREGATE/SAND MORTAR and EPOXIES (d)		—	—	—	—	—	—	—	100	95–100	—	—	—	—	—	0–25	0–10
MINERAL FILLER		—	—	—	—	—	—	—	—	—	—	—	100	—	95–100	—	70–100

(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.

TABLE 901 B

AGGREGATE PHYSICAL PROPERTY REQUIREMENTS

MATERIAL	TEST METHOD				
	SPECIFICATION	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.

TABLE 901 C

ASPHALT MIXES

AGGREGATE GRADING REQUIREMENTS, % PASSING FOR MIX DESIGN

TEST METHOD T 27

MATERIAL		SIEVE SIZE									
		3/4in.	1/2in.	3/8in.	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200
		19.0 mm	12.5 mm	9.5 mm	4.75 mm	2.36 mm	1.18 mm	600 µm	300 µm	150 µm	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)	TYPE II	—	—	100	90–100	65–90	45–70	30–50	18–30	10–21	5–15
	TYPE III	—	—	100	70–95	45–70	28–50	19–34	12–25	7–18	5–15
CHIP SEAL SURFACE TREATMENT	7	100	90–100	40–70	0–15	0–5	—	—	—	—	—
	8	—	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)

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	LOS ANGELES ABRASION (LA)	SODIUM SULFATE SOUNDNESS	FLAT and ELONGATED (a) (h)	DFV (c)	BPN (c)
		% max	% max	% max	% max	min	min
4.75mm, 9.5mm, 12.5mm, and 19.0mm	M323	—	45	12	10	25 (b)	—
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

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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.

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/yd^2.

(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/yd^2.

(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/yd^2 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/yd^2 and shall have not less than of 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/yd^2.

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.

The concrete mixes shall conform to the following:

TABLE 902 A

PORTLAND CEMENT CONCRETE MIXTURES									
MIX NO.	28 DAY SPECIFIED COMPRESSIVE STRENGTH psi	STANDARD DEVIATION psi	CRITICAL VALUE psi	MIN CEMENT FACTOR lb/yd^3	COARSE AGGREGATE SIZE M 43 / M 195	MAX WATER/ CEMENT RATIO by wt	SLUMP RANGE in.	TOTAL AIR CONTENT %	CONCRETE TEMPERATURE 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 ofType 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/ft^3. Control testing for Density of Cured Concrete shall be two companion cylinders for each 100 yd^3, 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 alkalies 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 yd^3 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:

Critical Value = $fc^{'}$ + (1.14 X 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.

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 yd^3 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 yd^3) X (quantity of yd^3 represented by the failing concrete strength) X (percent of failure).

Example:

$400.00 per yd^3 X 50 yd^3 X [1-(3600/ 4500 psi)] = $4,000.00

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 yd^3) X (quantity of yd^3 represented by the failing cylinders) X (the adjustment factor).

Example:

$400.00 per yd^3 X 50 yd^3 X 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.

(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

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.

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 Ndesign gyrations.

(l) The air void content (percent Va) 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) C**o**mpare and evaluate the verification test r**e**sults 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

	Gradation Classification Control Sieve Mix Design Target (%Passing)	
Mix Designation	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

904.04.07Anti-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

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.

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(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 very 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 Length Wall Thickness Joint Style	Size Spacing Area: Specification and Test Results Adequacy and Quality of Welds and Splices	Visual Inspection Absorption: Specification and Test Results: Once per year **THREE EDGE BEARING** **0.01 in. Crack Strength**: Specification and Test Results **Ultimate Strength:** Specification and Test Results: Once per year

905.02.09 Responsibilities of the Administration. The Administration will notify each plant when to present its Quality Control Plan. Thirty days will be provided to make arrangements for delivery after the Administration is notified of the plan's completion. Verification of certification by Quality Assurance Audit will be performed a minimum of once per year, as determined.

The Administration reserves the right to discontinue acceptance of RCP if the verification process indicates that materials, test procedures, or finished pipe do not conform to the specifications, Contract Documents or QCP. Producers will be notified of any type of non-compliance revealed during Quality Assurance Audits and provided with a resolution procedure to resolve any deficiencies.

CATEGORY 900
MATERIALS

SECTION 908 — REINFORCEMENT STEEL

703 **DELETE:** 908.07 thru .10 in their entireties.

INSERT: The following.

908.07 FABRICATED STEEL BAR MATS. Steel shall meet A 184.

908.08 WIRE FABRIC FOR PNEUMATICALLY APPLIED MORTAR AND CONCRETE ENCASEMENT. Fabric shall meet A 185 and be galvanized as specified in 906.01.01. Fabricate from size W1.4 wire on 3 in. centers in each direction or from W0.9 wire on 2 in. centers in each direction.

908.09 COLD DRAWN STEEL WIRE. Concrete reinforcement shall meet M 32.

908.10 TIE DEVICES FOR CONCRETE PAVEMENT. Tie device sizes shall be as specified and produce a frictional force of at least 160 lb/ft per foot of spacing when tested per MSMT 512.

908.11 STEEL STRAND. M 203, Grade 270, Low Relaxation Strand.

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/ft^3 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

* 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 that 10 percent of the total sample mass, the material shall have at least 15 percent passing the No. 200 sieve.
** When A-4, the material has to be a manufactured product.

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,

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	<0.0001*M*

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 ± 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

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 noinjurious 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		No more than 2.0 x 1.0 in.
Thread		Degradable
Stitching and Spacing		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		No more than 1.0 x 0.75 in.
Thread		Nondegradable, UV stabilized, synthetic
Stitching and Spacing		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		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		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.

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		Excelsior – No more than 2.0 x 1.0 in. Straw and Straw / Coconut – No more than 0.75 x 0.75 in.
Thread		Degradable
Stitching and Spacing		Excelsior – No more that 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

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 923 — SLURRY SEAL

787 **DELETE:** SECTION 923 — SLURRY SEAL in its entirety.

INSERT: The following.

SECTION 923 — SLURRY SEAL AND MICRO-SURFACING

923.01 AGGREGATES. Aggregates shall be crushed stone, compatible with the emulsion, and meet the gradation requirements in D 3910 or D 6372. Aggregates shall also meet the physical requirements for Slurry Seal (SS) and Micro-surfacing (MS) in Table 901 D.

923.02 MINERAL FILLER. 901.01.

923.03 WATER. 921.01.

923.04 EMULSIFIED ASPHALT. Emulsified asphalt shall be neat or polymer modified. The polymer shall be milled or blended into the asphalt or emulsifier solution prior to the emulsification process. The polymer modified emulsion shall contain 3.0 percent polymer solids minimum by weight of asphalt. The emulsified asphalt shall meet M 208, Grade CSS-1h or CQS-1h. Each load of emulsified asphalt shall be accompanied by a Certificate of Analysis/Compliance that indicates the emulsion meets specification requirements.

923.05 MIX DESIGN APPROVAL. Submit mix design data for approval at least three weeks in advance of the paving operation. Include the following:

(a) Source, percentage, and grade of emulsified asphalt.

(b) Source, gradation and proportion of each component aggregate.

(c) Source and percentage of additional additives.

(d) Target gradation and residual asphalt content of mix.

(e) Mix design worksheets.

Test the mix design in accordance with D 3910 or D 6372. The mix design report shall show that the test results meet the following:

Slurry Seal.

TEST PROPERTY	TEST METHOD	SPECIFICATION LIMITS
Consistency Test (Mix Time), 77F, s, maximum	D 3910	180
Set Time, 77F, m, minimum	D 3910	15
Wet Track Abrasion, g/ft^{2,} max One-hour soak	*ISSA TB-100	75
Residual Asphalt: Type II	T 164 or T 308	7.5 – 13.5%
Type III	T 164 or T 308	6.5 – 12.0%

Micro-Surfacing.

TEST PROPERTY	TEST METHOD	SPECIFICATION LIMITS
Set Time 77F s, minimum	D 6372	30
Wet Track Abrasion, g/ft^2, maximum One-hour soak	*ISSA TB-100	50
Residual Asphalt (by dry weight of aggregates): Type II or Type III	T 164 or T 308	5.5 – 10.5%

*International Slurry Seal Association

CATEGORY 900
MATERIALS

789 **DELETE:** SECTION 925 — DETECTABLE WARNING SURFACES in its entirety.

INSERT: The following.

SECTION 925 — DETECTABLE WARNING SURFACES

925.01 GENERAL. Detectable warning surfaces shall conform to the current accessibility guidelines of the Americans with Disabilities Act (ADA). The Office of Materials Technology (OMT) maintains a Qualified Products List (QPL). Manufacturers seeking inclusion of their product on the QPL shall submit certified test results showing conformance to the properties in 925.07, as well as installation instructions and the types of adhesives and sealants required.

925.02 COMPOSITION. Warning surfaces shall be either flexible or rigid. If there is a change in the composition of a qualified product, the manufacturer shall notify OMT and submit new test results showing conformance with 925.07.

925.02.01 Pavers. Type III Brick Pavers shall conform to the requirements of C 902, Class SX, Type 1, and Application PX. The pavers shall be 2-1/4 x 4 x 8 in. with square edges and a surface meeting 925.03.

925.03 CONFIGURATION AND DIMENSIONS. The warning surface shall consist of a system of truncated domes having a base diameter of 0.9 in. to 1.4 in., a top diameter 50 to 65 percent of the base diameter, and a height of 0.2 in. The domes shall be arranged in a square grid with center-to-center spacing of 1.66 to 2.35 in.

925.04 COLOR. The color shall be homogeneous across the surface of the material and contrast with adjoining surfaces.

925.05 IDENTIFICATION. The top surface shall have an identifier that uniquely distinguishes the manufacturer. Brick pavers are excluded.

925.06 REQUIREMENTS.

TYPE	DESCRIPTION	PHYSICAL TEST REQUIREMENTS
Type I	Cast in Place	A, B, C, D, E, G
Type IIa	Surface Mount, Rigid	A, B, C, D, E, G
Type IIb	Surface Mount, Flexible	A, B, C, D, F, G
Type III	Brick Pavers	925.02.01
Type IV	Prefilled Pavers	A, B, C, D, G

925.07 PHYSICAL PROPERTIES.

	PROPERTY	TEST METHOD	SPECIFICATION LIMIT
A	Slip Resistance Coefficient	C 1028 (dry method)	0.80 minimum
B	Abrasive Wear, index	C 501	150 minimum
C	Fade (UV) Resistance/Color Retention	D 4587	Fade or Change in color after 2000 hours less than $\Delta E = 5$*
D	Freeze/Thaw Resistance	C 1026	No disintegration
E	Adhesion/Bond Strength, pull off	C 482/C 882(as appropriate)	No adhesion failure
F	Adhesion/Bond Strength, peel	D 903/D 429 (modified as appropriate)	No adhesion failure
G	Contrast	Contrast percentage formula** using E 1349 to determine cap Y brightness/light reflectance values (LRV)	Current ADA requirement***

***** Chromaticity coordinates (L*a*b* system) checked in conformance with D 2244, before and after test.

** Contrast % = $[(B_1 - B_2)/B_1] \times 100$,

where B_1 = (LRV) of the lighter area, and B_2 = (LRV) of the darker area.

*** For the purpose of determining whether a material meets acceptable contrast criteria, use actual cap Y brightness of detectable warning surface, and assume a value of 15 for the cap Y brightness of cured concrete, or a value of 3 for asphalt wearing surfaces to determine percentage difference. Detectable warning surfaces to be installed on other materials are required to undergo additional testing.

CATEGORY 900
MATERIALS

SECTION 950 — TRAFFIC MATERIALS

792 **DELETE**: 950.03 REFLECTORIZATION OF SIGNS AND CHANNELIZING DEVICES in its entirety.

INSERT: The following.

950.03 REFLECTORIZATION OF SIGNS AND CHANNELIZING DEVICES.

Provide retroreflective sheeting that meets the requirements of the latest version of ASTM D 4956 and is selected from the Administration's QPL. The type of sheeting to be used for different classifications of signs shall be as specified in the QPL and as described below.

Provide fluorescent colors, when yellow, orange or pink sheeting is specified. Color coordinates and values shall be as described in the MDMUTCD and 23 CFR Part 655, Subpart F, Appendix.

Provide non-reflective sheeting, when black sheeting is specified.

All sheeting for legend and backgrounds shall be from the same manufacturer and be a matched component system intended to be used together.

Use ASTM Type IV or VIII construction sheeting with a Class 1 backing for drums for maintenance of traffic. The sheeting must be reboundable as defined in the supplementary requirements of ASTM D 4956, latest version.

Use ASTM Type IV, V or VIII for delineators, and lane separator systems. Use ASTM Type IV, VI or VIII sheeting for cones for maintenance of traffic. The sheeting must be reboundable as defined in the supplementary requirements of ASTM D 4956, latest version.

Use ASTM Type VI sheeting with a Class 5 backing for Roll up signs for Maintenance of Traffic.

Use ASTM Type VIII, IX or XI sheeting for rigid temporary traffic signs.

Use ASTM Type IX or XI sheeting for Guide Signs, Exit Gore Signs, General Information Signs, School Signs, Warning Signs and Red Regulatory Signs.

Use ASTM Type IV, VIII, IX or XI sheeting for all other Regulatory Signs and for Route Markers.

Use ASTM Type I or higher sheeting for No Trespassing Signs, signs directed at Pedestrian

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 Luminaire~~s~~ 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 ($\pm$10 percent), maximum rated output current of 530mA ($\pm$5 percent), input frequency of 60Hz, minimum power factor of 90 percent at full load, Total Harmonic distortion less than 20 percent, case

temperature rated for -40˚C to 50˚C, and contain 3 kV input high voltage surge protection.

LED Roadway Luminaire on board circuitry shall include a Surge Protection Device (SPD) to withstand high repetition noise transients as a result of utility line switching, nearby lightning strikes, and other interference. The SPD shall protect the luminaries from damage and failure for transient peak voltages up to 10kV and transient peak currents up to 10kA.

Complete all photometric testing of the LED 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 ± 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 ΔE_{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 Yxy, 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 ΔE_{cmc} for white products and 1.3 ΔE_{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:

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

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

(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.

CATEGORY 900
MATERIALS

SECTION 951 — PAVEMENT MARKING MATERIALS

951.04 REMOVABLE PAVEMENT MARKING TAPE. Removable pavement marking tape shall remain in place on the pavement surface without being displaced by traffic, or affected by weather conditions. The material shall be capable of being removed without the use of heat, solvents, grinding, or sand blasting and shall not leave an objectionable residue.

The material shall be of good appearance and free from cracks. Edges shall be true, straight and unbroken. Line marking material shall be in rolls having no more than three splices per 150 ft of length. All marking materials shall be packaged in conformance with accepted commercial standards and shall have a minimum shelf life of one year.

Performance Requirements. When applied in conformance with the manufacturer's recommendations, the material shall provide a neat, durable marking that will not flow or distort due to temperature if the pavement surface or underlying markings remain stable. The material shall be weather resistant and, through normal traffic wear, shall show no lifting or shrinkage that will significantly impair the intended usage of the tape throughout its useful life, and shall show no significant tearing while in place, or other signs of poor adhesion. The material shall be capable of easy removal without tearing into small pieces.

951.04.01 White and Yellow. Removable preformed pavement marking materials shall conform to the requirements of the MdMUTCD and the following:

(a) Composition. The marking material shall consist of a mixture of polymeric materials, pigment, and glass beads distributed uniformly throughout the surface.

(b) Color. The color of the marking materials shall match Federal Test Standard No. 595 for the following color numbers:

White - 37925
Yellow - 38907

(c) Glass Beads. Glass beads shall conform to the General Requirements of M 247 and have a minimum refractive index of 1.90 when tested as specified in MSMT 211.

(d) Frictional Resistance. The British Pendulum Number shall be a minimum of 50 when tested as specified in E 303.

(e) Certification. Samples submitted to the Office of Materials Technology (OMT) for testing shall be accompanied by the manufacturer's certified analysis in conformance with TC-1.03.

Any material supplied for a Contract shall be identical in composition to the material originally submitted for testing. Conformity will be determined by OMT.

(f) Field Testing. Line marking materials conforming to the Contract Documents will be field tested by The National Transportation Product Evaluation Program (NTPEP) and over 180 day period as specified in MSMT 723 for conformance with the following:

(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.

(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 R_C. The surface of the keel and web shall be free of scale, dirt, oil, grease or any other contaminant, which may reduce its bond to the epoxy adhesive.

The casting shall be imprinted with the model number and the manufacturer's name.

Recessed Pavement Marker Adhesive. The adhesive used to fasten the pavement marker lens to the pavement surface shall conform to D 4383-05 Table X1.4.2.3 M 237 Type II. Rapid Set Type adhesives shall not be used.

Casting Adhesive. The epoxy adhesive used to fasten the castings to the pavement surface shall conform to D 4383-05 Table X1.1.

Reflector Lens Adhesive in Casting. The adhesive used to fasten the reflector lens to the casting shall conform to the manufacturers' recommendations.

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.

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.

(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 mcd/m^2/lux at the completion of the testing, will be placed on the Prequalified Materials List maintained by the Office of Materials and Technology.

Certification. Any marking material supplied during the Contract shall be identical in composition to the material submitted for initial testing. Samples submitted for testing shall be accompanied by the manufacturer's certified analysis in conformance with TC-1.03.

CATEGORY 900
MATERIALS

SECTION 951 — PAVEMENT MARKING MATERIALS

951.07 PERMANENT PREFORMED PATTERNED REFLECTIVE PAVEMENT (PPPRP) 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/m^2 for white and 250 mcd/L/m^2 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.

(c) Frictional Resistance. The surface of the retroreflective pliant polymer shall provide a minimum initial average skid resistance value of 45 BPN when tested according to ASTM E 303.

951.07.03 Field Testing. Materials conforming to this specification shall be field evaluated at the National Transportation Product Evaluation Program (NTPEP) Northeast test deck for performance. Materials performing satisfactorily throughout the test period will be placed on the Administration's Prequalified Materials List. All marking materials supplied during the Contract shall be identical in composition to the materials submitted for initial testing. Conformity with these requirements will be determined by the Office of Materials and Technology.

951.07.04 Prequalification. Samples shall be taken by Administration for testing. The manufacturer shall submit any data from AASHTO NTPEP Northeast Test Deck which support material performance. Materials conforming to this Specification will be placed on the Administration's Prequalified List of Patterned Tapes.

951.07.05 Certification. The Contractor shall furnish notarized certification as specified in TC-1.03. The manufacturer shall certify that any reflective thermoplastic materials supplied during the Contract conforms to the identical formulation as the samples submitted for evaluation on the NTPEP Northeast test deck, and identify the formulas by referring to the code used on the deck. Reflective thermoplastic materials which fail to conform will be rejected.

The manufacturer shall also provide the following:

(a) Material Safety Data Sheets for all materials submitted for testing and use.

(b) A facility, presently in operation, capable of producing the reflective thermoplastic materials in the quantity and quality required by the Administration.

(c) A laboratory subject to the Administration's approval which is capable of performing the required tests.

CATEGORY 900
MATERIALS

SECTION 951 — PAVEMENT MARKING MATERIALS

951.08 LEAD FREE TWO COMPONENT EPOXY PAVEMENT MARKING MATERIALS. The white and yellow lead free epoxy pavement marking material shall consist of a 100 percent solid two-part system with glass beads embedded homogeneously throughout the depth of the film and the surface. All of these materials shall be lead free as defined herein.

951.08.01 Epoxy Physical Components.

(a) Composition.

COMPONENT A	PERCENT BY WEIGHT	
	WHITE	YELLOW
Epoxy Resin	75 - 82	75 – 79
Titanium Dioxide	18 - 25	14 – 17
Organic Yellow	—	7 – 8

The entirety of the pigment of Component A white shall consist of D 476, Type II Rutile Titanium Dioxide. No extender pigments are permitted. Yellow pigments and tinting colors shall be added in proportions which will produce a color equal to the yellow color depicted in the color box described herein. Any Titanium Dioxide used shall conform to D 476, Type II Rutile.

The epoxy system shall contain no volatile solvents. The cured film shall be no less than 99.5 percent of the wet film thickness of the panel at the time it was prepared for test.

Restrictions. The manufacturer shall certify that the combined total of lead, cadmium, mercury, and hexavalent chromium shall not exceed 100 ppm when tested by X-ray diffraction, ICP, Atomic Absorption Spectroscopy, or a comparable method capable of this level of detection.

(b) Epoxide Number. The weight per epoxy equivalent (WPE) as determined by D 1652 for both white and yellow of Component A, on a pigment free basis, shall conform to a target value ± 50 provided by the manufacturer and approved by the Engineer.

(c) Amine Number. The amine value of the curing agent (component B) shall consist entirely of stable amines and shall be determined as specified in D 2074. The total amine value shall conform to a target value ± 50 provided by the manufacturer and approved by the Engineer.

951.08.02 Mixed Composition.

(a) Mixing Ratio. The mixing ratio for the epoxy pavement marking material shall be proportioned according to the manufacturer's recommendations. The ratio shall not vary more than 2.5 percent during any operation conducted in conjunction with these materials.

(b) Color (White and Yellow).

(1) Production. The color of the cured epoxy material film of the production sample shall essentially match the specified color chips conforming to Federal Standard 595 when visually compared or by instrumental measurement.

(2) Control. Control color matching determinations will be made using a Pacific Scientific Color Machine at an observation angle of 2 degrees, and the C.I.E. Chromatically Coordinate Color Matching System under light source Illuminate C, with the following tolerances permitted between the standard chip and the cured epoxy film sample:

	WHITE Color No. 17886		**YELLOW Color No. 13538**	
	X	Y	X	Y
Standard Chip	0.310	0.330	0.480	0.450
Delta Tolerance	± 0.020	± 0.020	± 0.030	± 0.030

(c) Yellowing Index. After curing for 72 hours, the yellowing index of the white material when tested in conformance with E 313, using the C.I.E. Scale Illuminate C and 45/2 degrees geometry, shall not exceed 8.0 preceding QUV, and shall not exceed 15.0 after 72 hours in QUV.

(d) Toxicity. After heating to the application temperature, the material shall not exude fumes which are toxic or injurious to persons or property.

(e) Directional Reflectance. The directional reflectance when tested in conformance with E 1347 after QUV using the C.I.E. Scale Illuminate C and 45/2 degrees geometry, shall be minimums of 80 for white and 50 for yellow.

(f) Abrasion Resistance. Abrasion Resistance of the mixed material without glass beads shall be 80 mg maximum loss when tested as specified in C 501 with a 1000 g load, 1000 cycles, CS-l7 wheel and a 15 ± 0.5 mil wet film thickness on a S-l6 plain steel plate.

(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.

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:

(1) Manufacturer's Name,

(2) Place of Manufacture,

(3) Color of Material and Component Type,

(4) Date of Manufacture (month-year),

(5) Batch or Lot Identification Number, and

(6) Size/quantity of lot represented.

(b) Glass Beads. The glass beads shall be shipped in 50 lb, moisture resistant bags with complete identification information imprinted on the outside.

The Contractor shall furnish samples of the glass beads and epoxy resin materials to the Administration's Central Laboratory. Physical testing will be performed every four months.

951.08.06 Certification. The Contractor shall furnish notarized certification as specified in TC-1.03. The manufacturer shall certify that any epoxy resin materials supplied during the Contract conforms to the identical formulation as the samples submitted for evaluation on the NTPEP Northeast test deck, and identify the formulas by referring to the code used on the deck. Epoxy resin materials which fail to conform will be rejected.

The manufacturer shall also provide the following:

(a) Material Safety Data Sheets for all materials submitted for testing and use.

(b) A facility, in operation, capable of producing the epoxy resin materials in the quantity and quality required by the Administration.

(c) A laboratory capable of performing the required tests. This laboratory will be subject to the Administration’s approval.

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
PROPOSAL FORM

Proposal by _____
Name

_____
Address (Street and/or P.O. Box)

_____
City State Zip

( ) ( )
A.C. Phone No. A.C. Fax No.

to furnish and deliver all materials and to do and perform all work, in conformance with the Standard Specifications, revisions thereto, General Provisions and the Special Provisions in this contract to MD 210 at Livingston/Kerby Hill Road located in, Prince George's County, Maryland, for which Technical Proposals will be received until 12:00 o'clock noon on Wednesday, February 18, 2015 and for which Price Proposals will be received until 12:00 o'clock noon on Tuesday, March 3, 2015, this work being situated as follows: The project consists of the design and construction of a grade separated interchange at MD 210 (Indian Head Highway) and Livingston Road/Kerby Hill Road.

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Ms. Norie A. Calvert
Director, 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 proposal as principals, and that an examination has been made of the work site, the Specifications, and Request for Proposals, including the Special Provisions contained herein. I/We propose to furnish all necessary machinery, equipment, tools, labor and other means of construction, and to furnish all materials required to complete the project at the following unit price or lump sum price.

ITEM NO. CCS NO.	APPROXIMATE QUANTITIES	DESCRIPTION OF ITEMS	SECTION	UNIT PRICE DOLLARS	 CENTS	AMOUNTS DOLLARS	 CENTS
1001 100000	LUMP SUM	.DESIGN-BUILD	XXX	LUMP SUM			
1002 110500	69,000	EACH OF PRICE ADJUSTMENT FOR DIESEL FUEL	XXX SP	1	00	69,000	00
1003 130900	3,000	HOURS OF ON-THE-JOB TRAINING	XXX	0	80	2,400	00

END OF CATEGORY NO. 1

ITEM NO. CCS NO.	APPROXIMATE QUANTITIES	DESCRIPTION OF ITEMS	SECTION	UNIT PRICE DOLLARS	 CENTS	AMOUNTS DOLLARS	 CENTS
3001 300000	3	EACH OF .SEVERE WEATHER EVENT	XXX	66,918	00	200,754	00
3002 300000	2	EACH OF .WETLAND INCENTIVE	XXX	8,000	00	16,000	00
3003 388130	14	EACH OF QUARTERLY EROSION AND SEDIMENT CONTROL INCENTIVE	308 SP	13,200	00	184,800	00
3004 388135	LUMP SUM	FINAL EROSION AND SEDIMENT CONTROL INCENTIVE	308 SP	184,800	00	184,800	00

END OF CATEGORY NO. 3

ITEM NO. CCS NO.	APPROXIMATE QUANTITIES	DESCRIPTION OF ITEMS	SECTION	UNIT PRICE DOLLARS	 CENTS	AMOUNTS DOLLARS	 CENTS
5001 504600	130,000	EACH OF PRICE ADJUSTMENT FOR ASPHALT BINDER	504 SP	1	00	130,000	00
5002 504605	170,000	EACH OF PAYMENT ADJUSTMENT FOR PAVEMENT DENSITY	504 SP	1	00	170,000	00
5003 504610	170,000	EACH OF PAYMENT ADJUSTMENT FOR HOT MIX ASPHALT MIXTURE	504 SP	1	00	170,000	00
5004 535100	66,000	EACH OF PAVEMENT SURFACE PROFILE PAY ADJUSTMENT	535 SP	1	00	66,000	00

END OF CATEGORY NO. 5

ITEM NO. CCS NO.	APPROXIMATE QUANTITIES	DESCRIPTION OF ITEMS	SECTION	UNIT PRICE DOLLARS	UNIT PRICE CENTS	AMOUNTS DOLLARS	AMOUNTS CENTS
7001 700000	8	EACH OF .REFORESTATION INCENTIVE	XXX	2,500	00	20,000	00

END OF CATEGORY NO. 7

ITEM NO. CCS NO.	APPROXIMATE QUANTITIES	DESCRIPTION OF ITEMS	SECTION	UNIT PRICE DOLLARS	 CENTS	AMOUNTS DOLLARS	 CENTS
8001 800000	LUMP SUM	.WASHINGTON GAS	XXX	LUMP SUM			
8002 800000	LUMP SUM	.WSSC	XXX	LUMP SUM			

END OF CATEGORY NO. 8

ITEM NO. CCS NO.	APPROXIMATE QUANTITIES	DESCRIPTION OF ITEMS SECTION	UNIT PRICE DOLLARS CENTS	AMOUNTS DOLLARS CENTS
		AGGREGATE AMOUNT AT UNIT PRICES ALTERNATE A IS USING BID 1001-1003, 3001-3004, 5001-5004, 7001, 8001, 8002		
		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:

(1) Production of steel by any of the following processes:

(a) Open hearth furnace.
(b) Basic oxygen.
(c) Electric furnace.
(d) Direct reduction.

(2) Rolling, heat treating, and any other similar processing.

(3) Fabrication of the products:

(a) Spinning wire into cable or strand.
(b) Corrugating and rolling into culverts.
(c) Shop fabrication.

(c) The manufacturing process for a steel/iron product is considered complete when the product is ready for use as an item (e.g., fencing, posts, girders, pipe, manhole cover, etc.) or could be incorporated as a component of a more complex product through a further manufacturing process (e.g., prestressed concrete girders, reinforced concrete pipe, traffic control devices, bearing pads, etc.). A product containing both steel and/or iron components, may be assembled outside the United States and meet Buy America requirements if the constituent steel and iron components (in excess of the minimal amounts permitted) were manufactured domestically and are not modified at the assembly location prior to final assembly.

(d) If domestically produced steel billets or iron ingots are exported outside of the U.S., as defined above, for any manufacturing process then the resulting product does not conform to the Buy America requirements. Additionally, products manufactured domestically from foreign source steel billets or iron ingots do not conform to the Buy America requirements because the initial melting and mixing of alloys to create the material occurred in a foreign country.

(e) Due to a nationwide waiver, Buy America does not apply to raw materials (iron ore and alloys), scrap (recycled steel or iron), and pig iron or processed, pelletized, and reduced iron ore.

(f) For the Buy America provisions to apply, the steel or iron product must be permanently incorporated into the project. If an item is rendered as a "donated material" in accordance with 23 U.S.C. 323 – Donations and Credits, it will have to comply with Buy America requirements. While States and local governments may receive a credit for donated material, this material must generally comply with Buy America requirements. Buy America does not apply to temporary steel items, e.g., temporary sheet piling, temporary

bridges, steel scaffolding and falsework. Further, Buy America does not apply to materials which remain in place at the contractor convenience.

(g) Certifications which document that steel and iron have been manufactured and that coatings for iron or steel have been applied in the United States shall be provided to the Contractor by the manufacturer. The Contractor shall provide the required certifications to the Engineer prior to such items being incorporated into the permanent work. Certifications shall extend to materials utilized in manufactured and fabricated products purchased by the Contractor.

(h) Products manufactured of foreign steel or iron materials may be used, provided the cost of such products as they are delivered to the project does not exceed 0.1% of the total contract amount, or $2,500, whichever is greater. If a supplier or fabricator wishes to use a partial fabrication process where domestic and foreign source components are assembled at a domestic location, the "as delivered cost" of the foreign components should include any transportation, assembly and testing costs required to install them in the final product.

(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)_____

ALTERNATE BID - USING FOREIGN PRODUCTS
BIDDER'S INSTRUCTIONS

When the bidder elects to submit a bid for one or more items using Foreign Products, the following form must be used. For each item that Foreign Products are contemplated, the appropriate "Item Numbers", "Approximate Quantities", "Description of Items", "Unit Price or Lump Sum Price", "Item Amount Domestic" and "Item Amount Foreign" shall be tabulated below as specified in the initial bid. The bidder shall indicate the unit price in dollars and cents and show the total cost of the item for each item that utilizes Foreign Products. When all items utilizing Foreign Products have been listed, the bidder shall indicate on Page 4 of 20 the subtotals of the Item Amounts for Domestic Products in Line (2) and for Foreign Products in Line (3).

Item Nos.	Approximate Quantities	Description of Items	Unit Price or Lump Sum Dollars.Cts.	Items Amount Domestic Dollars.Cts.	Items Amount Foreign Dollars.Cts.

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

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

of the proceedings, the name(s) of the person(s) involved and their current positions and responsibilities with the business, the grounds of the debarment or suspension, and the details of each person's involvement in any activity that formed the grounds of the debarment or suspension): _____

F. AFFIRMATION REGARDING DEBARMENT OF RELATED ENTITIES

I FURTHER AFFIRM THAT:

1. The business was not established and it does not operate in a manner designed to evade the application of or defeat the purpose of debarment pursuant to Sections 16-101, et seq., of the State Finance and Procurement Article of the Annotated Code of Maryland; and

2. The business is not a successor, assignee, subsidiary, or affiliate of a suspended or debarred business, except as follows (you must indicate the reasons why the affirmations cannot be given without qualification):
_____
_____
_____.

G. SUB-CONTRACT AFFIRMATION

I FURTHER AFFIRM THAT:

Neither I, nor to the best of my knowledge, information, and belief, the above business, has knowingly entered into a contract with a public body under which a person debarred or suspended under Title 16 of the State Finance and Procurement Article of the Annotated Code of Maryland will provide, directly or indirectly, supplies, services, architectural services, construction related services, leases of real property, or construction.

H. AFFIRMATION REGARDING COLLUSION

I FURTHER AFFIRM THAT:

Neither I, nor to the best of my knowledge, information, and belief, the above business has:

1. Agreed, conspired, connived, or colluded to produce a deceptive show of competition in the compilation of the accompanying bid or offer that is being submitted;

2. In any manner, directly or indirectly, entered into any agreement of any kind to fix the bid price or price proposal of the bidder or Offeror or of any competitor, or otherwise taken any action in restraint of free competitive bidding in connection with the contract for which the accompanying bid or offer is submitted.

I. 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.)

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:

(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

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 convenants 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)

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

03-05-14

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

MDOT DBE FORM A
FEDERALLY-FUNDED CONTRACTS
CERTIFIED DBE UTILIZATION AND FAIR SOLICITATION AFFIDAVIT
PAGE 1 OF 2

This affidavit must be included with the bid/ proposal. If the bidder/offeror fails to accurately complete and submit this affidavit as required, the bid shall be deemed not responsive or the proposal shall be deemed not susceptible of being selected for award.

In connection with the bid/proposal submitted in response to Solicitation No. , I affirm the following:

1. DBE Participation (PLEASE CHECK ONLY ONE)

☐ I have met the overall certified Disadvantaged Business Enterprise (DBE) participation goal of Twenty Seven Percent percent (27%%). I agree that this percentage of the total dollar amount of the Contract for the DBE goal will be performed by certified DBE firms as set forth in the DBE Participation Schedule - Part 2 of the MDOT DBE Form B (Federally-Funded Contracts).

OR

☐ I conclude that I am unable to achieve the DBE participation goal. I hereby request a waiver, in whole or in part, of the goal. Within 10 business days of receiving notice that our firm is the apparent awardee or as requested by the Procurement Officer, I will submit a written waiver request and all required documentation in accordance with COMAR 21.11.03.11. For a partial waiver request, I agree that certified DBE firms will be used to accomplish the percentages of the total dollar amount of the Contract as set forth in the DBE Participation Schedule - Part 2 of the MDOT DBE Form B (Federally-Funded Contracts).

2. Additional DBE Documentation

I understand that if I am notified that I am the apparent awardee or as requested by the Procurement Officer, I must submit the following documentation within 10 business days of receiving such notice: (a) Outreach Efforts Compliance Statement (MDOT DBE Form C - Federally-Funded Contracts); (b) Subcontractor Project Participation Statement (MDOT DBE Form D - Federally-Funded Contracts); (c) DBE Waiver Request documentation per COMAR 21.11.03.11 (if waiver was requested); and (d) Any other documentation required by the Procurement Officer to ascertain bidder's responsibility/ offeror's susceptibility of being selected for award in connection with the certified DBE participation goal.

MDOT DBE FORM A
FEDERALLY-FUNDED CONTRACTS
CERTIFIED DBE UTILIZATION AND FAIR SOLICITATION AFFIDAVIT
PAGE 2 OF 2

I acknowledge that if I fail to return each completed document (in 2 (a) through (d)) within the required time, the Procurement Officer may determine that I am not responsible and therefore not eligible for contract award or not susceptible of being selected for award.

3. Information Provided to DBE firms

In the solicitation of subcontract quotations or offers, DBE firms were provided not less than the same information and amount of time to respond as were non-DBE firms.

4. Products and Services Provided by DBE firms

I hereby affirm that the DBEs are only providing those products and services for which they are MDOT certified.

I solemnly affirm under the penalties of perjury that the information in this affidavit is true to the best of my knowledge, information and belief.

_____	_____
Company Name	Signature of Representative
_____	_____
Address	Printed Name and Title
_____	_____
City, State and Zip Code	Date

MDOT DBE FORM B
FEDERALLY-FUNDED CONTRACTS
DBE PARTICIPATION SCHEDULE

PART 1 – INSTRUCTIONS FOR DBE PARTICIPATION SCHEDULE

PARTS 2 AND 3 MUST BE INCLUDED WITH THE BID/PROPOSAL. IF THE BIDDER/OFFEROR FAILS TO ACCURATELY COMPLETE AND SUBMIT PART 2 WITH THE BID/PROPOSAL AS REQUIRED, THE BID SHALL BE DEEMED NOT RESPONSIVE OR THE PROPOSAL SHALL BE DEEMED NOT SUSCEPTIBLE OF BEING SELECTED FOR AWARD.

***** STOP *****
FORM INSTRUCTIONS
PLEASE READ BEFORE COMPLETING THIS FORM

1. Please refer to the Maryland Department of Transportation (MDOT) DBE Directory at www.mdot.state.md.us to determine if a firm is certified for the appropriate North American Industry Classification System ("NAICS") Code **and** the product/services description (specific product that a firm is certified to provide or specific areas of work that a firm is certified to perform). For more general information about NAICS, please visit www.naics.com. Only those specific products and/or services for which a firm is certified in the MDOT Directory can be used for purposes of achieving the DBE participation goal.

2. In order to be counted for purposes of achieving the DBE participation goal, the firm `must be certified for that specific NAICS ("DBE" for Federally-funded projects designation after NAICS Code). **WARNING:** If the firm's NAICS Code is in **graduated status**, such services/products **will not be counted** for purposes of achieving the DBE participation goals. Graduated status is clearly identified in the MDOT Directory (such graduated codes are designated with the word graduated after the appropriate NAICS Code).

3. Examining the NAICS Code is the **first step** in determining whether a DBE firm is certified and eligible to receive DBE participation credit for the specific products/services to be supplied or performed under the contract. The **second step** is to determine whether a firm's Products/Services Description in the DBE Directory includes the products to be supplied and/or services to be performed that are being used to achieve the DBE participation goal.

4. If you have any questions as to whether a firm is MDOT DBE certified, or if it is certified to perform specific services or provide specific products, please call MDOT's Office of Minority Business Enterprise at 1-800-544-6056 or send an email to mbe@mdot.state.md.us.

MDOT DBE FORM B
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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 descrition of products/services) of the products/supplies to be provided? If the answer is NO please continue to Item E If the answer is YES, for purposes of achieving the DBE participation goal, you may count the total amount of the subcontract. For Column 3 of the DBE Participation Schedule, please divide the total amount of the subcontract by the total Contract value and insert the percentage in Line 3.1.

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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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GOAL WORKSHEET	
Total DBE Firm Participation (Add percentages in Column 3 for all DBE firms listed in DBE Participation Schedule)	(A) _____%
The percentage amount in Box A above should be equal to the percentage amount in Box E below.	
Add *Countable* Subcontract Amounts (see 6 through 8 of Instructions) for all DBE firms listed in DBE Participation Schedule, and insert in Box B	(B) $_____
Insert the Total Contract Amount in Box C	(C) $_____
Divide Box B by Box C and Insert in Box D	(D) =_____
Multiply Box D by 100 and insert in Box E	(E) =_____%

MDOT DBE FORM B
FEDERALLY-FUNDED CONTRACTS
DBE PARTICIPATION SCHEDULE
PART 2 – DBE PARTICIPATION SCHEDULE

PARTS 2 AND 3 MUST BE INCLUDED WITH THE BID/PROPOSAL. IF THE BIDDER/OFFEROR FAILS TO ACCURATELY COMPLETE AND SUBMIT PART 2 WITH THE BID/PROPOSAL AS REQUIRED, THE BID SHALL BE DEEMED NOT RESPONSIVE OR THE PROPOSAL SHALL BE DEEMED NOT SUSCEPTIBLE OF BEING SELECTED FOR AWARD.

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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.
☐ 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.)** ☐ African American-Owned ☐ Hispanic American- Owned ☐ Asian American-Owned ☐ Women-Owned ☐ Other DBE Classification _____	3.1. **TOTAL PERCENTAGE TO BE PAID TO THE SUBCONTRACTOR** (STATE THIS PERCENTAGE AS A PERCENTAGE OF THE TOTAL CONTRACT VALUE- EXCLUDING PRODUCTS/SERVICES FROM SUPPLIERS, WHOLESALERS OR REGULAR DEALERS). _____% (Percentage for purposes of calculating achievement of DBE Participation goal) 3.2 **TOTAL PERCENTAGE TO BE PAID TO THE SUBCONTRACTOR FOR ITEMS OF WORK WHERE THE DBE FIRM IS BEING USED AS A SUPPLIER, WHOLESALER AND/OR REGULAR DEALER)** (STATE THE PERCENTAGE AS A PERCENTAGE OF THE TOTAL CONTRACT VALUE AND THEN APPLY THE 60% RULE PER SECTION 6(E) IN PART 1 - INSTRUCTIONS). _____% Total percentage of Supplies/Products x _____60% (60% Rule) _____% (Percentage for purposes of calculating achievement of DBE Participation goal)

☐ Please check if Continuation Sheets are attached.

MDOT DBE FORM B
FEDERALLY-FUNDED CONTRACTS
DBE PARTICIPATION SCHEDULE
CONTINUATION SHEET

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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.
☐ 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.)** ☐ African American-Owned ☐ Hispanic American-Owned ☐ Asian American-Owned ☐ Women-Owned ☐ Other DBE Classification _____	3.1. **TOTAL PERCENTAGE TO BE PAID TO THE SUBCONTRACTOR** (STATE THIS PERCENTAGE AS A PERCENTAGE OF THE TOTAL CONTRACT VALUE- EXCLUDING PRODUCTS/SERVICES FROM SUPPLIERS, WHOLESALERS OR REGULAR DEALERS). _____% (Percentage for purposes of calculating achievement of DBE Participation goal) 3.2 **TOTAL PERCENTAGE TO BE PAID TO THE SUBCONTRACTOR FOR ITEMS OF WORK WHERE THE DBE FIRM IS BEING USED AS A SUPPLIER, WHOLESALER AND/OR REGULAR DEALER)** (STATE THE PERCENTAGE AS A PERCENTAGE OF THE TOTAL CONTRACT VALUE AND THEN APPLY THE 60% RULE PER SECTION 6(E) IN PART 1 - INSTRUCTIONS). _____% Total percentage of Supplies/Products x _____60% (60% Rule) _____% (Percentage for purposes of calculating achievement of DBE Participation goal)

☐Please check if Continuation Sheets are attached.

MDOT DBE FORM B
FEDERALLY-FUNDED CONTRACTS
DBE PARTICIPATION SCHEDULE

PART 3 – CERTIFICATION FOR DBE PARTICIPATION SCHEDULE

PARTS 2 AND 3 MUST BE INCLUDED WITH THE BID/PROPOSAL AS DIRECTED IN THE SOLICITATION.

I hereby affirm that I have reviewed the Products and Services Description (specific product that a firm is certified to provide or areas of work that a firm is certified to perform) set forth in the MDOT DBE Directory for each of the DBE firms listed in Part 2 of this DBE Form B for purposes of achieving the DBE participation goal that was identified in the DBE Form A that I submitted with this solicitation, and that the DBE firms listed are only performing those products/services/areas of work for which they are certified. I also hereby affirm that I have read and understand the form instructions set forth in Part 1 of this DBE Form B.

The undersigned Prime Contractor hereby certifies and agrees that it has fully complied with the State Minority Business Enterprise law, State Finance and Procurement Article §14-308(a)(2), Annotated Code of Maryland which provides that, except as otherwise provided by law, a contractor may not identify a certified minority business enterprise in a bid or proposal and:

(1) fail to request, receive, or otherwise obtain authorization from the certified minority business enterprise to identify the certified minority business enterprise in its bid or proposal;

(2) fail to notify the certified minority business enterprise before execution of the contract of its inclusion of the bid or proposal;

(3) fail to use the certified minority business enterprise in the performance of the contract; or

(4) pay the certified minority business enterprise solely for the use of its name in the bid or proposal.

I solemnly affirm under the penalties of perjury that the contents of Parts 2 and 3 of MDOT DBE Form B are true to the best of my knowledge, information and belief.

Company Name	Signature of Representative
Address	Printed Name and Title
City, State and Zip Code	Date

MDOT MBE/DBE FORM E
GOOD FAITH EFFORTS GUIDANCE AND DOCUMENTATION

PART 1 – GUIDANCE FOR DEMONSTRATING GOOD FAITH EFFORTS TO MEET MBE/DBE PARTICIPATION GOALS

In order to show that it has made good faith efforts to meet the Minority Business Enterprise (MBE)/Disadvantaged Business Enterprise (DBE) participation goal (including any MBE subgoals) on a contract, the bidder/offeror must either (1) meet the MBE/DBE Goal(s) and document its commitments for participation of MBE/DBE Firms, or (2) when it does not meet the MBE/DBE Goal(s), document its Good Faith Efforts to meet the goal(s).

I. Definitions

MBE/DBE Goal(s) – "MBE/DBE Goal(s)" refers to the MBE participation goal and MBE participation subgoal(s) on a State-funded procurement and the DBE participation goal on a federally-funded procurement.

Good Faith Efforts – The "Good Faith Efforts" requirement means that when requesting a waiver, the bidder/offeror must demonstrate that it took all necessary and reasonable steps to achieve the MBE/DBE Goal(s), which, by their scope, intensity, and appropriateness to the objective, could reasonably be expected to obtain sufficient MBE/DBE participation, even if those steps were not fully successful. Whether a bidder/offeror that requests a waiver made adequate good faith efforts will be determined by considering the quality, quantity, and intensity of the different kinds of efforts that the bidder/offeror has made. The efforts employed by the bidder/offeror should be those that one could reasonably expect a bidder/offeror to take if the bidder/offeror were actively and aggressively trying to obtain DBE participation sufficient to meet the DBE contract goal. Mere *pro forma* efforts are not good faith efforts to meet the DBE contract requirements. The determination concerning the sufficiency of the bidder's/offeror's good faith efforts is a judgment call; meeting quantitative formulas is not required.

Identified Firms – "Identified Firms" means a list of the DBEs identified by the procuring agency during the goal setting process and listed in the federally-funded procurement as available to perform the Identified Items of Work. It also may include additional DBEs identified by the bidder/offeror as available to perform the Identified Items of Work, such as DBEs certified or granted an expansion of services after the procurement was issued. If the procurement does not include a list of Identified Firms or is a State-funded procurement, this term refers to all of the MBE Firms (if State-funded) or DBE Firms (if federally-funded) the bidder/offeror identified as available to perform the Identified Items of Work and should include all appropriately certified firms that are reasonably identifiable.

Identified Items of Work – "Identified Items of Work" means the bid items identified by the procuring agency during the goal setting process and listed in the procurement as possible items of work for performance by MBE/DBE Firms. It also may include additional portions of items of work the bidder/offeror identified for performance by MBE/DBE Firms to increase the likelihood that the MBE/DBE Goal(s) will be achieved. If the procurement does not include a list of Identified Items of Work, this term refers to all of the items of work the bidder/offeror identified as possible items of work for performance by MBE/DBE Firms and should include all reasonably identifiable work opportunities.

MBE/DBE Firms – For State-funded contracts, "MBE/DBE Firms" refers to certified **MBE** Firms. Certified MBE Firms can participate in the State's MBE Program. For federally-funded contracts, "MBE/DBE Firms" refers to certified **DBE** Firms. Certified DBE Firms can participate in the federal DBE Program.

II. Types of Actions MDOT will Consider

The bidder/offeror is responsible for making relevant portions of the work available to MBE/DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available MBE/DBE subcontractors and suppliers, so as to facilitate MBE/DBE participation. The following is a list of types of actions MDOT will consider as part of the bidder's/offeror's Good Faith Efforts when the bidder/offeror fails to meet the MBE/DBE Goal(s). This list is not intended to be a mandatory checklist, nor is it intended to be exclusive or exhaustive. Other factors or types of efforts may be relevant in appropriate cases.

A. Identify Bid Items as Work for MBE/DBE Firms

1. Identified Items of Work in Procurements

(a) Certain procurements will include a list of bid items identified during the goal setting process as possible work for performance by MBE/DBE Firms. If the procurement provides a list of Identified Items of Work, the bidder/offeror shall make all reasonable efforts to solicit quotes from MBE Firms or DBE Firms, whichever is appropriate, to perform that work.

(b) Bidders/Offerors may, and are encouraged to, select additional items of work to be performed by MBE/DBE Firms to increase the likelihood that the MBEDBE Goal(s) will be achieved.

2. Identified Items of Work by Bidders/Offerors

(a) When the procurement does not include a list of Identified Items of Work, bidders/offerors should reasonably identify sufficient items of work to be performed by MBE/DBE Firms.

(b) Where appropriate, bidders/offerors should break out contract work items into economically feasible units to facilitate MBE/DBE participation, rather than perform these work items with their own forces. The ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the bidder/offeror of the responsibility to make Good Faith Efforts.

B. Identify MBE Firms or DBE Firms to Solicit

1. DBE Firms Identified in Procurements

(a) Certain procurements will include a list of the DBE Firms identified during the goal setting process as available to perform the items of work. If the procurement provides

a list of Identified DBE Firms, the bidder/offeror shall make all reasonable efforts to solicit those DBE firms.

(b) Bidders/offerors may, and are encouraged to, search the MBE/DBE Directory to identify additional DBEs who may be available to perform the items of work, such as DBEs certified or granted an expansion of services after the solicitation was issued.

2. MBE/DBE Firms Identified by Bidders/Offerors

(a) When the procurement does not include a list of Identified MBE/DBE Firms, bidders/offerors should reasonably identify the MBE Firms or DBE Firms, whichever is appropriate, that are available to perform the Identified Items of Work.

(b) Any MBE/DBE Firms identified as available by the bidder/offeror should be certified in the appropriate program (MBE for State-funded procurements or DBE for federally-funded procurements)

(c) Any MBE/DBE Firms identified as available by the bidder/offeror should be certified to perform the Identified Items of Work.

C. Solicit MBE/DBEs

1. Solicit 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.

3. "Electronic Means" includes, for example, information provided *via* a website or file transfer protocol (FTP) site containing the plans, specifications, and other requirements of the contract. If an interested MBE/DBE cannot access the information provided by electronic means, the bidder/offeror must make the information available in a manner that is accessible by the interested MBE/DBE.

4. Follow up on initial written solicitations by contacting DBEs to determine if they are interested. The follow up contact may be made:

(a) by telephone using the contact information in the MBE/DBE Directory, unless the bidder/offeror has a valid basis for using different contact information; or

(b) in writing *via* a method that differs from the method used for the initial written solicitation.

5. In addition to the written solicitation set forth in C.1 and the follow up required in C.4, use all other reasonable and available means to solicit the interest of MBE/DBE Firms certified to perform the work of the contract. Examples of other means include:

(a) attending any pre-bid meetings at which MBE/DBE Firms could be informed of contracting and subcontracting opportunities;

(b) if recommended by the procurement, advertising with or effectively using the services of at least two minority focused entities or media, including trade associations, minority/women community organizations, minority/women contractors' groups, and local, state, and federal minority/women business assistance offices listed on the MDOT Office of Minority Business Enterprise website; and

(c) effectively using the services of other organizations, as allowed on a case-by-case basis and authorized in the procurement, to provide assistance in the recruitment and placement of MBE/DBE Firms.

D. Negotiate With Interested MBE/DBE Firms

Bidders/Offerors must negotiate in good faith with interested MBE/DBE Firms.

1. Evidence of negotiation includes, without limitation, the following:

(a) the names, addresses, and telephone numbers of MBE/DBE Firms that were considered;

(b) a description of the information provided regarding the plans and specifications for the work selected for subcontracting and the means used to provide that information; and

(c) evidence as to why additional agreements could not be reached for MBE/DBE Firms to perform the work.

2. A bidder/offeror using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration.

3. The fact that there may be some additional costs involved in finding and using MBE/DBE Firms is not in itself sufficient reason for a bidder's/offeror's failure to meet the contract DBE goal, as long as such costs are reasonable. Factors to take into consideration when determining whether a MBE/DBE Firm's quote is excessive or unreasonable include, without limitation, the following:

(a) the dollar difference between the MBE/DBE subcontractor's quote and the average of the other subcontractors' quotes received by the bidder/offeror;

(b) the percentage difference between the MBE/DBE subcontractor's quote and the average of the other subcontractors' quotes received by the bidder/offeror;

(c) the percentage that the DBE subcontractor's quote represents of the overall contract amount;

(d) the number of MBE/DBE firms that the bidder/offeror solicited for that portion of the work;

(e) whether the work described in the MBE/DBE and Non-MBE/DBE subcontractor quotes (or portions thereof) submitted for review is the same or comparable; and

(f) the number of quotes received by the bidder/offeror for that portion of the work.

4. The above factors are not intended to be mandatory, exclusive, or exhaustive, and other evidence of an excessive or unreasonable price may be relevant.

5. The bidder/offeror may not use its price for self-performing work as a basis for rejecting a MBE/DBE Firm's quote as excessive or unreasonable.

6. The "average of the other subcontractors' quotes received by the" bidder/offeror refers to the average of the quotes received from all subcontractors, except that there should be quotes from at least three subcontractors, and there must be at least one quote from a MBE/DBE and one quote from a Non-MBE/DBE.

7. A bidder/offeror shall not reject a MBE/DBE Firm as unqualified without sound reasons based on a thorough investigation of the firm's capabilities. For each certified MBE/DBE that is rejected as unqualified or that placed a subcontract quotation or offer that the bidder/offeror concludes is not acceptable, the bidder/offeror must provide a written detailed statement listing the reasons for this conclusion. The bidder/offeror also must document the steps taken to verify the capabilities of the MBE/DBE and Non-MBE/DBE Firms quoting similar work.

(a) The factors to take into consideration when assessing the capabilities of a MBE/DBE Firm, include, but are not limited to the following: financial capability, physical capacity to perform, available personnel and equipment, existing workload, experience performing the type of work, conduct and performance in previous contracts, and ability to meet reasonable contract requirements.

(b) The MBE/DBE Firm's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the efforts to meet the project goal.

E. Assisting Interested MBE/DBE Firms

When appropriate under the circumstances, the decision-maker will consider whether the bidder/offeror:

1. made reasonable efforts to assist interested MBE/DBE Firms in obtaining the bonding, lines of credit, or insurance required by MDOT or the bidder/offeror; and

2. made reasonable efforts to assist interested MBE/DBE Firms in obtaining necessary equipment, supplies, materials, or related assistance or services.

III. Other Considerations

In making a determination of Good Faith Efforts the decision-maker may consider engineering estimates, catalogue prices, general market availability and availability of certified MBE/DBE Firms in the area in which the work is to be performed, other bids or offers and subcontract bids or offers substantiating significant variances between certified MBE/DBE and Non-MBE/DBE costs of participation, and their impact on the overall cost of the contract to the State and any other relevant factors.

The decision-maker may take into account whether a bidder/offeror decided to self-perform subcontract work with its own forces, especially where the self-performed work is Identified Items of Work in the procurement. The decision-maker also may take into account the

performance of other bidders/offerors in meeting the contract. For example, when the apparent successful bidder/offeror fails to meet the contract goal, but others meet it, this reasonably raises the question of whether, with additional reasonable efforts, the apparent successful bidder/offeror could have met the goal. If the apparent successful bidder/offeror fails to meet the goal, but meets or exceeds the average MBE/DBE participation obtained by other bidders/offerors, this, when viewed in conjunction with other factors, could be evidence of the apparent successful bidder/offeror having made Good Faith Efforts.

IV. Documenting Good Faith Efforts

At a minimum, a bidder/offeror seeking a waiver of the MBE/DBE Goal(s) or a portion thereof must provide written documentation of its Good Faith Efforts, in accordance with COMAR 21.11.03.11, within 10 business days after receiving notice that it is the apparent awardee. The written documentation shall include the following:

A. Items of Work (Complete Good Faith Efforts Documentation Form E, Part 2)

A detailed statement of the efforts made to select portions of the work proposed to be performed by certified MBE/DBE Firms in order to increase the likelihood of achieving the stated MBE/DBE Goal(s).

B. Outreach/Solicitation/Negotiation

1. The record of the bidder's/offeror's compliance with the outreach efforts prescribed by COMAR 21.11.03.09C(2)(a) through (e) and 49 C.F.R. Part 26, Appendix A. **(Complete Outreach Efforts Compliance Statement)**

2. A detailed statement of the efforts made to contact and negotiate with MBE/DBE Firms including:

(a) the names, addresses, and telephone numbers of the MBE/DBE Firms who were contacted, with the dates and manner of contacts (letter, fax, email, telephone, etc.) **(Complete Good Faith Efforts Form E, Part 3, and submit letters, fax cover sheets, emails, etc. documenting solicitations)**; and

(b) a description of the information provided to MBE/DBE Firms regarding the plans, specifications, and anticipated time schedule for portions of the work to be performed and the means used to provide that information.

C. Rejected MBE/DBE Firms (Complete Good Faith Efforts Form E, Part 4)

1. For each MBE/DBE Firm that the bidder/offeror concludes is not acceptable or qualified, a detailed statement of the reasons for the bidder's/offeror's conclusion, including the steps taken to verify the capabilities of the MBE/DBE and Non-MBE/DBE Firms quoting similar work.

2. For each certified MBE/DBE Firm that the bidder/offeror concludes has provided an excessive or unreasonable price, a detailed statement of the reasons for the bidder's/offeror's conclusion, including the quotes received from all MBE/DBE and Non-MBE/DBE firms bidding on the same or comparable work. **(Include copies of all quotes received.)**

3. A list of MBE/DBE Firms contacted but found to be unavailable. This list should be accompanied by a Minority Contractor Unavailability Certificate signed by the MBE/DBE contractor or a statement from the bidder/offeror that the MBE/DBE contractor refused to sign the Minority Contractor Unavailability Certificate.

D. Other Documentation

1. Submit any other documentation requested by the Procurement Officer to ascertain the bidder's/offeror's Good Faith Efforts.

2. Submit any other documentation the bidder/offeror believes will help the Procurement Officer ascertain its Good Faith Efforts.

MDOT MBE/DBE FORM E
GOOD FAITH EFFORTS GUIDANCE AND DOCUMENTATION

PART 2 – CERTIFICATION REGARDING GOOD FAITH EFFORTS DOCUMENTATION

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Prime Contractor	Project Description	Solicitation Number

PARTS 3, 4, AND 5 MUST BE INCLUDED WITH THIS CERTIFICATE ALONG WITH ALL DOCUMENTS SUPPORTING YOUR WAIVER REQUEST.

I hereby request a waiver of (1) the Minority Business Enterprise (MBE) participation goal and/or subgoal(s), (2) the Disadvantaged Business Enterprise (DBE) participation goal, or (3) a portion of the pertinent MBE/DBE participation goal and/or MBE subgoal(s) for this procurement.[1] I affirm that I have reviewed the Good Faith Efforts Guidance MBE/DBE Form E. I further affirm under penalties of perjury that the contents of Parts 3, 4, and 5 of MDOT MBE/DBE Form E are true to the best of my knowledge, information and belief.

Company Name	Signature of Representative
Address	Printed Name and Title
City, State and Zip Code	Date

[1] MBE participation goals and subgoals apply to State-funded procurements. DBE participation goals apply to federally-funded procurements. Federally-funded contracts do not have subgoals.

MDOT MBE/DBE FORM E
GOOD FAITH EFFORTS GUIDANCE AND DOCUMENTATION

PART 3 – IDENTIFIED ITEMS OF WORK BIDDER/OFFEROR MADE AVAILABLE TO MBE/DBE FIRMS

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Prime Contractor	Project Description	Solicitation Number

Identify those items of work that the bidder/offeror made available to MBE/DBE Firms. This includes, where appropriate, those items the bidder/offeror identified and determined to subdivide into economically feasible units to facilitate the MBE/DBE participation. For each item listed, show the anticipated percentage of the total contract amount. It is the bidder's/offeror's responsibility to demonstrate that sufficient work to meet the goal was made available to MBE/DBE Firms, and the total percentage of the items of work identified for MBE/DBE participation equals or exceeds the percentage MBE/DBE goal set for the procurement. Note: If the procurement includes a list of bid items identified during the goal setting process as possible items of work for performance by MBE/DBE Firms, the bidder/offeror should make all of those items of work available to MBE/DBE Firms or explain why that item was not made available. If the bidder/offeror selects additional items of work to make available to MBE/DBE Firms, those additional items should also be included below.

Identified Items of Work	Was this work listed in the procurement?	Does bidder/offeror normally self-perform this work?	Was this work made available to MBE/DBE Firms? If no, explain why?
	□ Yes □ No	□ Yes □ No	□ Yes □ No
	□ Yes □ No	□ Yes □ No	□ Yes □ No
	□ Yes □ No	□ Yes □ No	□ Yes □ No
	□ Yes □ No	□ Yes □ No	□ Yes □ No
	□ Yes □ No	□ Yes □ No	□ Yes □ No
	□ Yes □ No	□ Yes □ No	□ Yes □ No

☐ Please check if Additional Sheets are attached.

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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.

Name of Identified MBE/DBE Firm & MBE Classification	**Describe Item of Work Solicited**	**Initial Solicitation Date & Method**	**Follow-up Solicitation Date & Method**	**Details for Follow-up Calls**	**Quote Rec'd**	**Quote Used**	**Reason Quote Rejected**
Firm Name: _____ **MBE Classification (Check only if requesting waiver of MBE subgoal.)** ☐ African American-Owned ☐ Hispanic American-Owned ☐ Asian American-Owned ☐ Women-Owned ☐ Other MBE Classification _____		Date: □ Mail □ Facsimile □ Email	Date: □ Phone □ Mail □ Facsimile □ Email	Time of Call: Spoke With: □ Left Message	□ Yes □ No	□ Yes □ No	□ Used Other MBE/DBE □ Used Non-MBE/DBE □ Self-performing
Firm Name: _____ **MBE Classification (Check only if requesting waiver of MBE subgoal.)** ☐ African American-Owned ☐ Hispanic American-Owned ☐ Asian American-Owned ☐ Women-Owned ☐ Other MBE Classification _____		Date: □ Mail □ Facsimile □ Email	Date: □ Phone □ Mail □ Facsimile □ Email	Time of Call: Spoke With: □ Left Message	□ Yes □ No	□ Yes □ No	□ Used Other MBE/DBE □ Used Non-MBE/DBE □ Self-performing

☐Please check if Additional Sheets are attached.

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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
	□ Self-performing □ Using Non-MBE/DBE _____	$_____	_____ □ MBE/DBE □ Non-MBE/DBE	$_____	□ Price □ Capabilities □ Other
	□ Self-performing □ Using Non-MBE/DBE _____	$_____	_____ □ MBE/DBE □ Non- MBE/DBE	$_____	□ Price □ Capabilities □ Other
	□ Self-performing □ Using Non-MBE/DBE _____	$_____	_____ □ MBE/DBE □ Non- MBE/DBE	$_____	□ Price □ Capabilities □ Other

☐ Please check if Additional Sheets are attached.

INFORMATION REQUIRED TO BE SUBMITTED FOR FEDERALLY ASSISTED CONTRACTS:

(a) Each bidder shall provide the following information:

NAME OF FIRM:_____

_____
Street and/or P.O. Box

_____
City State Zip Code

_____ DBE _____ Non-DBE Age of the firm _____ years
Annual gross receipts per last calendar year _____<$500,000 _____$500,000-1,000,000
_____$1,000,000-3,000,000 _____$3,000,000-5,000,000 _____$5,000,000-10,000,000
_____>$10,000,000

(b) Each bidder shall provide the following information for each firm quoting or considered as subcontractors and/or suppliers:

NAME OF FIRM:_____

_____
Street and/or P.O. Box

_____
City State Zip Code

_____ DBE _____ Non-DBE Age of the firm _____ years
Annual gross receipts per last calendar year _____<$500,000 _____$500,000-1,000,000
_____$1,000,000-3,000,000 _____$3,000,000-5,000,000 _____$5,000,000-10,000,000
_____> $10,000,000

NAME OF FIRM:_____

_____
Street and/or P.O. Box

_____
City State Zip Code

_____ DBE _____ Non-DBE Age of the firm _____ years
Annual gross receipts per last calendar year _____<$500,000 _____$500,000-1,000,000
_____$1,000,000-3,000,000 _____$3,000,000-5,000,000 _____$5,000,000-10,000,000
_____> $10,000,000

NAME OF FIRM:____

____
Street and/or P.O. Box

____
City State Zip Code

_____ DBE _____ Non-DBE Age of the firm _____ years
Annual gross receipts per last calendar year _____<$500,000 _____$500,000-1,000,000
_____$1,000,000-3,000,000 _____$3,000,000-5,000,000 _____$5,000,000-10,000,000
_____> $10,000,000

NAME OF FIRM:____

____
Street and/or P.O. Box

____
City State Zip Code

_____ DBE _____ Non-DBE Age of the firm _____ years
Annual gross receipts per last calendar year _____<$500,000 _____$500,000-1,000,000
_____$1,000,000-3,000,000 _____$3,000,000-5,000,000 _____$5,000,000-10,000,000
_____> $10,000,000

NAME OF FIRM:____

____
Street and/or P.O. Box

____
City State Zip Code

_____ DBE _____ Non-DBE Age of the firm _____ years
Annual gross receipts per last calendar year _____<$500,000 _____$500,000-1,000,000
_____$1,000,000-3,000,000 _____$3,000,000-5,000,000 _____$5,000,000-10,000,000
_____> $10,000,000

Submit additional copies of this page as page 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

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.

3

CONTRACT TIME. To commence work as specified in the "Notice to Proceed" and to prosecute the work to complete the contract within/or before

_____ (calendar date to entered by Proposer)

Any delay in awarding or the execution of this contract will not be considered as a basis for any monetary claim, however, an extension of time may be considered by the Administration, if warranted.

BONDING. When the Contractor's bid is $100,000 or more, the Contractor shall furnish a Payment Bond and a Performance Bond in the full amount of the Contract Award as security for the construction and completion of the contract in conformance with the Plans, Standard Specifications, revisions thereto, General Provisions and Special Provisions.

To guarantee all of the work performed under this contract to be done in conformance with the Standard Specifications, revisions thereto, General Provisions and Special Provisions in a good workmanlike manner and to renew or repair any work which may be rejected due to defective materials or workmanship, prior to final completion and acceptance of the work, also we have the equipment, labor, supervision and financial capacity to perform this contract either with our organization or with Subcontractors.

LIQUIDATED DAMAGES. The Contractor is hereby advised that liquidated damages in the amount of

Eight Thousand Six Hundred & Seventy dollars ($8,670) per calendar day

will be assessed for unauthorized extensions beyond the contracted time of completion.

PROPOSAL GUARANTY. A bid security is not required on Contract Proposals under $100,000.

A bid security totaling at least five percent (5%) of the bid amount will be required on contracts of $100,000 or over.

Acceptable forms of security for bid guaranty shall be:

(1) A bond in a form satisfactory to the State underwritten by a company licensed to issue bonds in this State;

(2) A bank certified check, bank cashier's check, bank treasurer's check, or cash;

(3) Pledge of security backed by the full faith and 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).