STATE OF DELAWARE

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in order to submit a Bid.

DEPARTMENT OF TRANSPORTATION

BID PROPOSAL

for

CONTRACT T200411701.01

FEDERAL AID PROJECT NO. ESTP-2011(17)

WEST DOVER CONNECTOR

KENT COUNTY

ADVERTISEMENT DATE: September 22, 2014

Completion Date 817 Calendar Days

SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION
DELAWARE DEPARTMENT OF TRANSPORTATION
AUGUST 2001

Bids will be received in the Bidder's Room, Transportation Administration Center, 800 Bay Road, Dover, Delaware until 2:00 P.M. local time **October 21, 2014**

Contract No.T200411701.01
Federal Aid Project No. ESTP-2011(17)

WEST DOVER CONNECTOR
KENT COUNTY

GENERAL DESCRIPTION

LOCATION

These improvements are located in KENT County more specifically shown on the Location Map(s) of the enclosed Plans.

DESCRIPTION

The improvements consist of furnishing all labor and materials for the construction of 3.5 miles of new roadway on new alignment including two new bridges to span existing roadway, railways and wetlands. Several new traffic signals, ITMS and roadway lighting will be installed. Bicycle facilities, dart services and multi-use paths will be constructed throughout the project limits interconnecting multiple park facilities, commercial centers and residential communities. As well as other incidental construction in accordance with the location, notes and details shown on the plans and as directed by the Engineer.

COMPLETION DATE

All work on this contract must be complete within 817 Calendar Days . The Contract Time includes an allowance for 80 Weather Days. It is the Department's intent to issue a Notice to Proceed such that work starts on or about January 26, 2015.

PROSPECTIVE BIDDERS NOTES:

1. No retainage will be withheld on this contract.

2. The Department's External Complaint Procedure can be viewed on our Website at; http://www.deldot.gov/information/business/, or you may request a copy by calling (302) 760-2555.

3. This project incorporates the electronic bidding system **Expedite**, **version 5.9a**.. Bidders wishing to use the electronic bidding option will find the installation file on the plan holders bid file disk. The installation file and instructions are also available on our Website at: http://www.deldot.gov/information/business/bids/const_proj_bid_info.shtml.

4. BIDDERS MUST REQUEST A CD OF THE OFFICIAL PLANS AND SPECIFICATIONS FROM THE DEPARTMENT IN ORDER TO SUBMIT A BID.

5. Please note the Special Provision titled **Changes to Project Documents During Advertisement**. The Department is using an alternative method of providing bid documents for this contract.

6. Proposed Trainee Plans as required. Number of required programs is listed in the Training Special Provisions within Contract General Notices. The program(s) must be submitted within 10 Calendar Days of notification of apparent low bidder status. Contract Award will not take place until acceptable On-the-Job (OJT) program plans are received by the Civil Rights Group of the Department.

   Failure of the apparent low bidder to present copies of an acceptable OJT Trainee Programs within ten (10) calendar days of notification of apparent low bidder status, shall create a rebuttable presumption that the bid is not responsive.

7. Section 4 & 5 are alternate choices, you must bid both of these choices. The Department will decide which choice (4 or 5) will be used after bids have been submitted.

   NOTE: The bid total will always use the lowest cost alternate choice.

8. Appendix A-Technical Specifications, is attached and applies to item 753516 only.

9. CONTRACTOR / SUBCONTRACTOR LICENSE: 29 DEL. C. §6967 (b): No agency shall accept a proposal for a public works contract unless such contractor has provided a proper and current copy of its occupational and/or business license, as required by Title 30, to such agency. (c) Any contractor that enters a public works contract must provide to the agency to which it is contracting, within 30 days of entering such public works contract, copies of all occupational and business licenses of subcontractors and/or independent contractors that will perform work for such public works contract. However, if a subcontractor or independent contractor is hired or contracted more than 20 days after the contractor entered the public works contract the occupational or business license of such subcontractor or independent contractor shall be provided to the agency within 10 days of being contracted or hired.

10. Norfolk Southern Railroad Agreement is attached and applies to this contract.

CONSTRUCTION ITEMS UNITS OF MEASURE

English Code	English Description	Multiply By	Metric Code	Metric Description	Suggested CEC Metric Code
ACRE	Acre	0.4047	ha	Hectare	HECTARE
BAG	Bag	N/A	Bag	Bag	BAG
C.F.	Cubic Foot	0.02832	m^3	Cubic Meter	M3
C.Y.	Cubic Yard	0.7646	m^3	Cubic Meter	M3
EA-DY	Each Day	N/A	EA-DY	Each Day	EA-DY
EA-MO	Each Month	N/A	EA-MO	Each Month	EA-MO
EA/NT	Each Night	N/A	EA-NT	Each Night	EA/NT
EACH	Each	N/A	EA	Each	EACH
GAL	Gallon	3.785	L	Liter	L
HOUR	Hour	N/A	h	Hour	HOUR
INCH	Inch	25.4	mm	Millimeter	MM
L.F.	Linear Foot	0.3048	m	Linear Meter	L.M.
L.S.	Lump Sum	N/A	L.S.	Lump Sum	L.S.
LA-MI	Lane Mile	1.609	LA-km	Lane-Kilometer	LA-KM
LB	Pound	0.4536	kg	Kilogram	KG
MFBM	Thousand Feet of Board Measure	2.3597	m^3	Cubic Meter	M3
MGAL	Thousand Gallons	3.785	kL	Kiloliter	KL
MILE	Mile	1.609	km	Kilometer	KM
S.F.	Square Foot	0.0929	m^2	Square Meter	M2
S.Y.	Square Yard	0.8361	m^2	Square Meter	M2
SY-IN	Square Yard-Inch	0.8495	m^2-25 mm	Square Meter-25 Millimeter	M2-25 MM
TON	Ton	.9072	t	Metric Ton (1000kg)	TON
N.A.*	Kip	4.448	kN	Kilonewton	N.A.*
N.A.*	Thousand Pounds per Square Inch	6.895	MPa	Megapascal	N.A.*

*Not used for units of measurement for payment.

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GENERAL NOTICES

SPECIFICATIONS:

The specifications entitled "Delaware Standard Specifications for Road and Bridge Construction, August, 2001", hereinafter referred to as the Standard Specifications; Supplemental Standard Specifications; the Special Provisions; notes on the Plans; this Bid Proposal; and any addenda thereto, shall govern the work to be performed under this contract.

CLARIFICATIONS:

Under any Section or Item included in the Contract, the Contractor shall be aware that when requirements, responsibilities, and furnishing of materials are outlined in the details and notes on the Plans and in the paragraphs preceding the " Basis of Payment" paragraph in the Standard Specifications or Special Provisions, no interpretation shall be made that such stipulations are excluded because reiteration is not made in the "Basis of Payment" paragraph.

ATTESTING TO NON-COLLUSION:

The Department requires as a condition precedent to acceptance of bids a sworn statement executed by, or on behalf of, the person, firm, association, or corporation to whom such contract is to be awarded, certifying that such person, firm, association, or corporation has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with such contract. The form for this sworn statement is included in the proposal and must be properly executed in order to have the bid considered.

QUANTITIES:

The quantities shown are for comparison of bids only. The Department may increase or decrease any quantity or quantities without penalty or change in the bid price.

PREFERENCE FOR DELAWARE LABOR:

Delaware Code, Title 29, Chapter 69, Section 6962, Paragraph (d), Subsection (4)b

> "In the construction of all public works for the State or any political subdivision thereof, or by firms contracting with the State or any political subdivision thereof, preference in employment of laborers, workmen or mechanics shall be given to bona fide legal citizens of the State who have established citizenship by residence of at least 90 days in the State. Each public works contract for the construction of public works for the State or any political subdivision thereof shall contain a stipulation that any person, company or corporation who violates this section shall pay a penalty to the Secretary of Finance equal to the amount of compensation paid to any person in violation of this section."

EQUALITY OF EMPLOYMENT OPPORTUNITY ON PUBLIC WORKS:

Delaware Code, Title 29, Chapter 69, Section 6962, Paragraph (d), Subsection (7)

> "a. As a condition of the awarding of any contract for public works financed in whole or in part by State appropriation, such contracts shall include the following provisions:
>
> `During the performance of this contract, the contractor agrees as follows:
>
> 1. The contractor will not discriminate against any employee or applicant for employment because of race, creed, color, sex, sexual orientation or natural origin. The contractor will take positive steps to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, creed, color, sex, sexual orientation or national origin. Such action shall include, but not be limited to, the following: 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. The contractor agrees to post in conspicuous places available to employees and applicants for employment notices to be provided by the contracting agency setting forth this nondiscrimination clause.

2. The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, creed, color, sex or national origin.'

TAX CLEARANCE:

As payments to each vendor or contractor aggregate $2,000, the Division of Accounting will report such vendor or contractor to the Division of Revenue, who will then check the vendor or contractor's compliance with tax requirements and take such further action as may be necessary to insure compliance.

LICENSE:

A person desiring to engage in business in this State as a contractor shall obtain a license upon making application to the Division of Revenue. Proof of said license compliance to be made prior to, or in conjunction with, the execution of a contract to which he has been named.

DIFFERING SITE CONDITIONS,

SUSPENSIONS OF WORK and SIGNIFICANT CHANGES IN THE CHARACTER OF WORK:

Differing site conditions: During the progress of the work, if subsurface or latent physical conditions are encountered at the site differing materially from those indicated in the contract of if unknown physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work provided for in the contract are encountered at the site, the party discovering such conditions shall promptly notify the other party in writing of the specific differing conditions before they are disturbed and before the affected work is performed.

Upon written notification, the engineer will investigate the conditions, and if he/she determines that the conditions materially differ and cause an increase or decrease in the cost or time required for the performance of any work under the contract, an adjustment, excluding loss of anticipated profits, will be made and the contract modified in writing accordingly. The engineer will notify the contractor of his/her determination whether or not an adjustment of the contract is warranted.

No contract adjustment which results in a benefit to the contractor will be allowed unless the contractor has provided the required written notice.

No contract adjustment will be allowed under their clause for any effects caused on unchanged work.

Suspensions of work ordered by the engineer: If the performance of all or any portion of the work is suspended or delayed by the engineer in writing for an unreasonable period of time (not originally anticipated, customary or inherent to the construction industry) and the contractor believes that additional compensation and/or contract time is due as a result of such suspension or delay, the contractor shall submit to the engineer in writing a request for adjustment within 7 calendar days of receipt of the notice to resume work. The request shall set fourth the reasons and support for such adjustment.

Upon receipt, the engineer will evaluate the contractor's request. If the engineer agrees that the cost and/or time required for the performance of the contract has increased as a result of such suspension and the suspension was caused by conditions beyond the control of and not the fault of the contractor, its suppliers, or subcontractors at any approved tier, and not caused by weather, the engineer will make an adjustment (excluding profit) and modify the contract in writing accordingly. The engineer will notify the contractor of his/her determination whether or not an adjustment of the contract is warranted.

No contract adjustment will be allowed unless the contractor has submitted the request for adjustment within the time prescribed.

No contract adjustment will be allowed under this clause to the extent that performance would have been suspended or delayed by any other cause, or for which an adjustment is provided for or excluded under any other term or condition of this contract.

Significant changes in the character of work: The engineer reserves the right to make, in writing, at any time during the work, such changes in quantities and such alterations in the work as are necessary to satisfactorily

complete the project. Such changes in quantities and alterations shall not invalidate the contract nor release the surety, and the contractor agrees to perform the work as altered.

If the alterations or changes in quantities significantly change the character of the work under the contract, whether or not changed by any such different quantities or alterations, an adjustment, excluding loss of anticipated profits, will be made to the contract. The basis for the adjustment shall be agreed upon prior to the performance of the work. If a basis cannot be agreed upon, then an adjustment will be made either for or against the contractor in such amount as the engineer may determine to be fair and equitable.

The term "significant change" shall be construed to apply only to the following circumstances:

(A) When the character of the work as altered differs materially in kind or nature from that involved or included in the original proposed construction or

(B) When a major item of work, as defined elsewhere in the contract, is increased in excess of 125 percent or decreased below 75 percent of the original contract quantity. Any allowance for an increase in quantity shall apply only to that portion in excess of 125 percent of original contract item quantity, or in case of a decrease below 75 percent, to the actual amount of work performed.

CONFLICT WITH FEDERAL STATUTES OR REGULATIONS:

Delaware Code, Title 29, Chapter 69, Section 6904, Paragraph (a)

> "If any provision of this subchapter conflicts or is inconsistent with any statute, rule or regulation of the federal government applicable to a project or activity, the cost of which is to be paid or reimbursed in whole or in part by the federal government, and due to such conflict or inconsistency the availability of federal funds may be jeopardized, such provision shall not apply to such project or activity."

FEDERAL LABOR AND EMPLOYMENT REQUIREMENTS

Federal Regulation 23 CFR § 635.117(b) Labor and employment, states:

> "No procedures or requirement shall be imposed by any State which will operate to discriminate against the employment of labor from any other State, possession or territory of the United States, in the construction of a Federal-aid project."

CONVICT PRODUCED MATERIALS:

(a) Materials produced after July 1, 1991, by convict labor may only be incorporated in a Federal-aid highway construction project if such materials have been:

(1) Produced by convicts who are on parole, supervised release, or probation from a prison or

(2) Produced in a qualified prison facility and the cumulative annual production amount of such materials for use in Federal-aid highway construction does not exceed the amount of such materials produced in such facility for use in Federal-aid highway construction during the 12-month period ending July 1, 1987.

(b) Qualified prison facility means any prison facility in which convicts, during the 12-month period ending July 1, 1987, produced materials for use in Federal-aid highway construction projects.

TO REPORT BID RIGGING ACTIVITIES:

The U. S. Department of Transportation (DOT) operates the below toll-free "hotline" Monday through Friday, 8:00 a.m. to 5:00 p.m. eastern time. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should use the "hotline" to report such activities.

The "hotline" is part of the DOT's continuing effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the DOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

TO REPORT BID RIGGING ACTIVITIES
CALL 1-800-424-9071

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

1. The Offeror's or Bidder's 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 follows:

Goals for Minority Participation In Each Trade	Goals for Female Participation In Each Trade
12.3% (New Castle County) 14.5% (Kent & Sussex Counties)	6.9% (Entire State)

These goals are applicable to all the Contractor's 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 non-federally involved construction.

The Contractor's compliance with the Executive Order and the Executive Order and the regulations in 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 the 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 solicitation. 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 KENT County.

REV. 11-3-80

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 peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
      iv. American Indian 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 7a through 7p 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. Covered Construction contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Program Office or from the Federal procurement contracting offices. The Contractor is expected to make substantially uniform progress in meeting its goals 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 the reason therefor, 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 7b 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 Foreman, 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 ensure 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 subcontractors 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 (7a through 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 of its obligations under 7a through 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 participating, 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 noncompliance.

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 under utilized).

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 Order 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 Contractor 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 least include for each employee the name, address, telephone numbers, construction trade, union 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 (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

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TRAINING SPECIAL PROVISIONS

This Training Special Provision supersedes subparagraph 7b of the Special Provision entitled "Specific Equal Employment Opportunity Responsibilities", (Attachment 1), and is in implementation of 23 U.S.C. 140(a). As part of the contractor's equal employment opportunity affirmative action program, training shall be provided as follows:

The contractor shall provide on-the-job training aimed at developing full journeyman in the type of trade or job classification involved.

The number of trainees to be trained under the special provision will be __2__. In the event the contractor subcontracts a portion of the contract work, he shall determine how many, if any, of the trainees are to be trained by the subcontractor, provided however, that the contractor shall retain the primary responsibility for meeting the training requirements imposed by this special provision. The contractor shall also insure that this Training Special Provision is made applicable to such subcontract. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year apprenticeship or training.

The number of trainees shall be distributed among the work classification on the basis of the contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment. Prior to commencing construction, the contractor shall submit to the Department of Highways and Transportation for approval the number of trainees to be trained in each selected classification and training program to be used. Furthermore, the contractor shall specify the starting time for training in each of the classifications. The contractor will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for such trainees as provided hereinafter.

Training and upgrading of minorities and women toward journeyman status is a primary objective of this Training Special Provision. Accordingly, the contractor shall make every effort to enroll minority trainees and women (e.g., by conducting systematic and direct recruitment through public and private sources likely to yield minority and women trainees) to the extent that such persons are available within a reasonable area of recruitment. The contractor will be responsible for demonstrating the steps that he has taken in pursuance thereof, prior to a determination as to whether the contractor is in compliance with this Training Special Provision. This training commitment is not intended, and not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

No employee shall be employed as a trainee in any classification in which he has successfully completed a training course leading to journeyman status or in which he has been employed as a journeyman. The contractor should satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used the contractor's records should document the findings in each case.

The minimum length and type of training for each classification will be as established in the training program selected by the contractor and approved by the Department of Highways and Transportation and the Federal Highway Administration. The Department of Highways and Transportation and the Federal Highway Administration shall approve a program if it is reasonably calculated to meet the equal employment opportunity obligations of the contractor and to qualify the average trainee for journeyman status in the classification concerned by the end of the training period. Furthermore, 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 but not necessarily sponsored by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training shall also be considered acceptable provided it is being administered in a manner consistent with the equal employment

obligations of Federal-aid highway construction contracts. Approval or acceptance of a training program shall be obtained from the State prior to commencing work the classification covered by the program. It is the intention of these provisions that the training is to be provided in the construction crafts rather than clerk-typists or secretarial-type positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc., where the training is oriented toward construction applications. Training in the laborer classification may be permitted provided that significant and meaningful training is provided and approved by the division office. Some off-site 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.

Except as otherwise noted below, the contractor will be reimbursed 80 cents per hour of training given an employee on this contract in accordance 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 receives additional training program funds from other sources, provided such other sources does not specifically prohibit the contractor from receiving other reimbursement. Reimbursement for off-site training indicated above may only be made to the contractor where he does one or more of the following and the trainees are concurrently employed on a Federal-aid project; contributes to the cost of the training; provides the instruction of the trainee; or pays the trainee's wages during the off-site training period.

No payment shall be made to the contractor if either the failure to provide the required training, or the failure to hire the trainees as a journeyman, is caused by the contractor and evidences a lack of good faith on the part of the contractor in meeting the requirements of this Training Special Provision. It is normally expected that a trainee will begin his training on the project as soon as feasible after start of work utilizing the skill involved and remain on the project as long as training opportunities exist in his work classification or until he has completed his training program. It is not required that all trainees be on board for the entire length of the contract. A contractor will have fulfilled his responsibilities under this Training Special Provision if he has provided acceptable training to the number of trainees specified. The number trained shall be determined on the basis of the total number enrolled on the contract for a significant period.

Trainees will be paid a least 60 percent of the appropriate minimum journeymen's rate specified in the contract for the first half of the of the training period, 75 percent for the third quarter of the training period, and 90 percent for the last quarter of the training period, unless apprentices or trainees is an approved existing program are enrolled as trainees on this project. In fact case, the appropriate rates approved by the Department of Labor or Transportation in connection with the existing program shall apply to all trainees being trained for the same classification who are covered by this Training Special Provisions.

The contractor shall furnish the trainee a copy of the program he will follow in providing the training.

The contractor shall provide each trainee with a certification showing the type and length of training satisfactorily completed.

The contractor will provide for the maintenance of records and furnish periodic reports documenting his performance under this Training Special Provision.

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INTERMODAL SURFACE TRANSPORTATION EFFICIENCY ACT & TRANSPORTATION EQUITY ACT

Recipients of Federal-aid highway funds authorized under Titles I (other than Part B) and V of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), or Titles I, III, and V of the Transportation Equity Act for the 21st Century (TEA-21) are required to comply with the regulations of 49 Code of Federal Regulations (CFR) Part 26 - Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs.

DISADVANTAGED BUSINESS ENTERPRISE (DBE) PROGRAM SPECIFICATION

The U.S. Department of Transportation (DOT) requires that the Delaware Department of Transportation continue the established Disadvantaged Business Enterprise (DBE) Program for participation in U.S. DOT programs and that the program follow the final rules as stated in 49 CFR Part 26 and the Department's approved DBE Program plan.

The following definitions apply to this subpart:

Disadvantaged Business Enterprise or DBE means a for-profit small business concern (1) that is at least 51 percent owned by one or more individuals who are both socially and economically disadvantaged or, in the case of a corporation, in which 51 percent of the stock is owned by one or more such individuals; and, (2) whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who own it.

DOT-assisted contract means any contract between a recipient and a contractor (at any tier) funded in whole or in part with DOT financial assistance, including letters of credit or loan guarantees, except a contract solely for the purchase of land.

Good Faith Efforts means efforts to achieve a DBE goal or other requirement of this part which, by their scope, intensity, and appropriateness to the objective, can reasonably be expected to fulfill the program requirement.

Joint Venture means an association of a DBE 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 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.

Race-conscious measure or program is one that is focused specifically on assisting only DBEs, including women-owned DBEs.

Race-neutral measure or program is one that is, or can be, used to assist all small businesses. For the purposes of this part, race-neutral includes gender neutrality.

Small Business concern means, with respect to firms seeking to participate as DBEs in DOT-assisted contracts, a small business concern as defined pursuant to section 3 of the Small Business Act and Small Business Administration regulations implementing it (13 CFR part 121) that also does not exceed the cap on average annual gross receipts specified in 49 CFR §26.65(b).

Socially and economically disadvantaged individuals means any individual who is a citizen (or lawfully admitted permanent resident) of the United States and who is - (1) any individual who a recipient finds to be a socially and economically disadvantaged individual 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:

(i) Black Americans which includes persons having origins in any of the Black racial groups of Africa;
(ii) 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;
(iii) Native Americans which includes persons who are American Indians, Eskimos, Aluets, or Native Hawaiians;
(iv) Asian-Pacific Americans which includes 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;
(v) Subcontinent Asian Americans which includes persons whose origins are from India, Pakistan, Bangladesh, Bhutan, the Maldives Islands, Nepal or Sri Lanka;
(vi) Women;
(vii) Any additional groups whose members are designated as socially and economically disadvantaged by the SBA, at such time as the SBA designation becomes effective.

DelDOT will establish specific goals for each particular DOT-assisted project which will be expressed as a percentage of the total dollar amount of contract bid.

The specific contract goals for this contract are:

Disadvantaged Business Enterprise 10 % Percent

DelDOT continues to reserve the right to approve DBE subcontractors and all substitutions of DBE subcontractors prior to award and during the time of the contract.

Bidders are required to submit with their bids the completed DBE Program Assurance portion of the Certification document which will state the bidders intent of meeting the goals established for this contract;

or in the instance where a contractor cannot meet the assigned DBE Goals for this contract, he/she shall at the time of bid submit documentation required to verify that he/she has made a Good Faith Effort to meet the DBE Goals. Guidance for submitting a Good Faith Effort is identified in the next section and in the DBE Program Plan. Further, the apparent low bidder must submit to DelDOT within ten (10) calendar days after the bid opening, executed originals of each and every DBE subcontract to satisfy contract goals consistent with the DBE Program Assurance submitted as part of the bid package.

No contract work shall be performed by a DBE subcontractor until the executed DBE subcontract is approved in writing by DelDOT and the Department has issued the required Notice to Proceed. Any DBE subcontract relating to work to be performed pursuant to this contract, which is submitted to DelDOT for approval, must contain all DBE subcontractor information, the requirements contained in this contract, and must be fully executed by the contractor and DBE subcontractor.

Each contract between the prime contractor and each DBE subcontractor shall at the minimum include the following:

1. All pertinent provisions and requirements of the prime contract.
2. Description of the work to be performed by the DBE subcontractor.
3. The dollar value of each item of work to be completed by the DBE subcontractor and the bid price of each item of work to be completed by the DBE subcontractor.

* * * * *

CRITICAL DBE REQUIREMENTS

A bid may be held to be non-responsive and not considered if the required DBE information is not provided. In addition, the bidder may lose its bidding capability on Department projects and such other sanctions as the Department may impose. It is critical that the bidder understands:

1. In the event that the bidder cannot meet the DBE goal as set forth in this specification, he/she shall at the time of bid submit to the Department that percentage of the DBE Goal that will be met, if any, on the written and notarized assurance made a part of this contract. The contractor shall also at the time of bid submit all documentation that the contractor wishes to have the Department consider in determining that the contractor made a Good Faith Effort to meet contract DBE Goals. The Department will not accept Good Faith Effort documentation other than on the scheduled date and time of the bid opening. However, the Department may ask for clarification of information submitted should the need arise.
2. A bid which does not contain either a completely executed DBE Program Assurance and/or Good Faith Effort documentation, where appropriate, shall be declared non-responsive and shall not be considered by the Department.
3. Failure of the apparent low bidder to present originals of all DBE subcontracts to substantiate the volume of work to be performed by DBE's as indicated in the bid within ten (10) calendar days after the bid opening shall create a rebuttable presumption that the bid is not responsive.
4. Bidders are advised that failure to meet DBE Goals during the term of the contract may subject them to Department sanctions as identified in the DBE Program Plan.
5. In the execution of this contract, the successful bidder agrees to comply with the following contract clauses:

   Prompt Payment: The prime contractor/consultant receiving payments shall, within 30 days of receipt of any payment, file a statement with the Department on a form to be determined by the Department that all subcontractors furnishing labor or material have been paid the full sum due them at the stage of the contract, except any funds withheld under the terms of the contract as required by Chapter 8, Title 17 of the Delaware Code, annotated and as amended. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of DelDOT. This clause applies to both DBE and non-DBE subcontractors.

   Retainage: The prime contractor agrees to return retainage to each subcontractor within 15 calendar days after the subcontractor's work is satisfactorily completed. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of DelDOT. This clause covers both DBE and non-DBE subcontractors. As guidance, once a subcontractor has satisfactorily completed the physical work, and has given to the prime contractor a certified statement

that all laborers, lower tier contractors, and materialmen who have furnished labor and materials to the subcontractor have been paid all monies due them, the prime contractor shall return retainage to the subcontractor within 15 calendar days.

6. In the execution of this contract, the successful bidder agrees to comply with the following contract assurance and will include this same language in each subcontractor contract:

   "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 remedy as the recipient deems appropriate." 49 CFR Section 26.13

7. In addition to this specification, bidders must comply with all provisions of the rules and regulations adopted by the U.S. Department of Transportation for DBE participation in U.S. DOT and DelDOT Programs (49 CFR Part 26) and the Delaware Department of Transportation Disadvantaged Business Enterprise Program Plan; each of which is hereby incorporated and made part of this specification. Bidders are also reminded that they must be responsible and responsive bidders in all other aspects aside from the DBE Program in order to be awarded the contract.

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GUIDANCE FOR GOOD FAITH EFFORT

When the DBE Goals established for a contract by DelDOT are not met, the contractor shall demonstrate good faith efforts to meet the DBE contract goals. The contractor shall demonstrate that the efforts made were those that a contractor actively and aggressively seeking to meet the goals established by DelDOT would make, given all relevant circumstances. Evidence of this good faith effort will be submitted with the bid at the time of the bid opening.

The contractor is expected to demonstrate good faith efforts by actively and aggressively seeking out DBE participation in the project to the maximum extent, given all relevant circumstances. Following are the kinds of efforts that may be taken but are not deemed to be exclusive or exhaustive and DelDOT will consider other factors and types of efforts that may be relevant:

1. Efforts made to select portions of the work proposed to be performed by DBEs in order to increase the likelihood of achieving the stated goal. Selection of portions of work are required to at least equal the goal for DBE utilization specified in this contract.
2. Written notification at least ten (10) calendar days prior to the opening of a bid soliciting DBE interest in participating in the contract as a subcontractor or supplier and for specific items of work.
3. Efforts made to obtain and negotiate with DBE firms for specific items of work:
   a. Description of the means by which firms were solicited (i.e. by telephone, e-mail, written notice, advertisement).
   b. The names, addresses, telephone numbers of DBE's contacted, the dates of initial contact; and whether initial solicitations of interest were followed-up by contacting the DBEs to determine with certainty whether the DBEs were interested.
   c. A description of the information provided to DBE firms regarding the plans, specifications and estimated quantities for portions of the work to be performed.
   d. A statement of why additional agreements with DBE's were not reached in order to meet the projected goal.
   e. Listing of each DBE contacted but not contracted and the reasons for not entering a contract.
4. Efforts made to assist DBEs that need assistance in obtaining bonding, insurance, or lines of credit required by the contractor.
5. Reasons why certified DBEs are not available or not interested.
6. Efforts to effectively use the services of available disadvantaged community organizations; disadvantaged contractor's groups; local, state and federal DBE assistance offices; and other organizations that provide assistance in recruitment and placement of DBEs.

The following are examples of actions that may not be used as justification by the contractor for failure to meet DBE contract goals:

1. Failure to contract with a DBE solely because the DBE was unable to provide performance and/or payment bonds.
2. Rejection of a DBE bid or quotation based on price alone.
3. Rejection of a DBE because of its union or non-union status.
4. Failure to contract with a DBE because the contractor normally would perform all or most of the work in the contract.

Administrative reconsideration:

Within five (5) days of being informed by DelDOT that it is not responsive because it has not documented sufficient good faith efforts, a bidder may request administrative reconsideration. Bidder should make this request in writing to the following reconsideration official: Director of Administration, DelDOT, P. O. Box 778, Dover, Delaware 19903. The reconsideration official will not have played any role in the original determination that the bidder did not document sufficient good faith efforts.

As part of this reconsideration, the bidder will have the opportunity to provide written documentation or argument concerning the issue of whether it met the goal or made adequate good faith efforts to do so. The bidder will have the opportunity to meet in person with the reconsideration official, explaining the basis for finding that the bidder did or did not meet the goal or make adequate good faith efforts to do so. The final decision made by the reconsideration official will be communicated to the bidder in writing. The result of the reconsideration process is not administratively appealable to the U.S. Department of Transportation.

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REQUIRED CONTRACT PROVISIONS - FEDERAL-AID CONSTRUCTION CONTRACTS
(Exclusive of Appalachian Contracts)

FHWA-1273 -- Revised May 1, 2012 http://www.fhwa.dot.gov/programadmin/contracts/1273/1273.docx

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

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.

* * * * *

PREVAILING WAGES

Included in this proposal are the minimum wages to be paid various classes of laborers and mechanics as determined by the Department of Labor of the State of Delaware in accordance with Title 29 Del.C. §6960, relating to wages and the regulations implementing that Section.

REQUIREMENT BY DEPARTMENT OF LABOR FOR SWORN PAYROLL INFORMATION

Title 29 Del.C. §6960 stipulates;

> (b) Every contract based upon these specifications shall contain a stipulation that the employer shall pay all mechanics and laborers employed directly upon the site of the work, unconditionally and not less often than once a week and without subsequent deduction or rebate on any account, the full amounts accrued at time of payment, computed at wage rates not less than those stated in the specifications, regardless of any contractual relationship which may be alleged to exist between the employer and such laborers and mechanics. The specifications shall further stipulate that the scale of wages to be paid shall be posted by the employer in a prominent and easily accessible place at the site of the work, and that there may be withheld from the employer so much of accrued payments as may be considered necessary by the Department of Labor to pay to laborers and mechanics employed by the employer the difference between the rates of wages required by the contract to be paid laborers and mechanics on the work and rates of wages received by such laborers and mechanics to be remitted to the Department of Labor for distribution upon resolution of any claims.
>
> (c) Every contract based upon these specifications shall contain a stipulation that sworn payroll information, as required by the Department of Labor, be furnished weekly. The Department of Labor shall keep and maintain the sworn payroll information for a period of 6 months from the last day of the work week covered by the payroll.

Bidders are specifically directed to note the Department of Labor's prevailing wage regulations implementing §6960 relating to the effective date of the wage rates, at Part VI., Section C., which in relevant part states:

> "Public agencies (covered by the provisions of 29 Del.C. §6960) are required to use the rates which are in effect on the date of the publication of specifications for a given project. In the event that a contract is not executed within one hundred twenty (120) days from the date the specifications were published, the rates in effect at the time of the execution of the contract shall be the applicable rates for the project."

PREVAILING WAGE REQUIREMENTS

It is DelDOT's understanding that the Davis-Bacon Act is not a preemptive statute in the broad sense, and does not preempt or displace State of Delaware prevailing wage requirements.

When a contract for a project contains both Federal Davis-Bacon and State of Delaware prevailing wage standards because of concurrent Federal and State coverage, the employer's minimum wage obligations are determined by whichever standards are higher.

STATE OF DELAWARE
DEPARTMENT OF LABOR
DIVISION OF INDUSTRIAL AFFAIRS
OFFICE OF LABOR LAW ENFORCEMENT
PHONE: (302) 451-3423

Mailing Address:
225 CORPORATE BOULEVARD
SUITE 104
NEWARK, DE 19702

Located at:
225 CORPORATE BOULEVARD
SUITE 104
NEWARK, DE 19702

PREVAILING WAGES FOR **HIGHWAY CONSTRUCTION** EFFECTIVE MARCH 14, 2014

CLASSIFICATION	NEW CASTLE	KENT	SUSSEX
BRICKLAYERS	48.08	48.08	14.51
CARPENTERS	43.15	50.91	40.47
CEMENT FINISHERS	30.88	26.13	26.33
ELECTRICAL LINE WORKERS	22.50	22.50	21.25
ELECTRICIANS	62.10	62.10	62.10
IRON WORKERS	42.20	23.87	25.35
LABORERS	33.01	38.68	37.97
MILLWRIGHTS	16.11	15.63	13.49
PAINTERS	60.64	60.64	60.64
PILEDRIVERS	66.42	23.75	26.95
POWER EQUIPMENT OPERATORS	41.18	27.61	28.47
SHEET METAL WORKERS	22.75	20.31	18.40
TRUCK DRIVERS	33.90	21.03	22.19

CERTIFIED: 9/9/14 BY: _____
ADMINISTRATOR, OFFICE OF LABOR LAW ENFORCEMENT

NOTE: THESE RATES ARE PROMULGATED AND ENFORCED PURSUANT TO THE PREVAILING WAGE REGULATIONS ADOPTED BY THE DEPARTMENT OF LABOR ON APRIL 3, 1992.

CLASSIFICATIONS OF WORKERS ARE DETERMINED BY THE DEPARTMENT OF LABOR. FOR ASSISTANCE IN CLASSIFYING WORKERS, OR FOR A COPY OF THE REGULATIONS OR CLASSIFICATIONS, PHONE (302) 451-3423.

NON-REGISTERED APPRENTICES MUST BE PAID THE MECHANIC'S RATE.

PROJECT: T200411701.01 West Dover Connector, Kent County

GENERAL DECISION: DE140014 04/04/2014 DE14

State: DELAWARE

Construction Type: HIGHWAY

COUNTY: Kent County in Delaware

HIGHWAY CONSTRUCTION PROJECTS

Modification Number: 0 Publication Date: 04/04/2014

SUDE2013-002 04/24/2013

	Rates	Fringes
Bricklayer	48.08	
Carpenter	50.91	
Cement Mason/Concrete Finisher	26.13	
ELECTRICIAN		
Electrician	62.10	
Line Worker	22.50	
Ironworker	23.87	
Laborer	38.68	
Millwright	15.63	
Operator: Piledriver	23.75	
Painter	60.64	
Power Equipment Operator	27.61	
Sheet Metal Worker	20.31	
Truck Driver	21.03	

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

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 (29 CFR 5.5(a) (1) (ii)).

In the listing above, the "SU" designation means that rates listed under that identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

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

Union Identifiers

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

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

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

Non-Union Identifiers

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

Survey wage rates will remain in effect and will not change until a new survey is conducted.

WAGE DETERMINATION APPEALS PROCESS

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

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

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

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

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

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

END OF GENERAL DECISION

APPLICABILITY OF DAVIS-BACON LABOR STANDARD PROVISIONS TO FLAGGERS

The U.S. Department of Labor has established that the duties of flaggers working on contracts covered by the Davis-Bacon Act, are manual and physical in nature. Accordingly, all employees performing the work of flaggers on Davis-Bacon covered contracts shall be entitled to receive applicable prevailing wage rates.

* * * * *

ALL AGENCY MEMORANDUM NO. 130
U.S. DEPARTMENT OF LABOR
EMPLOYMENT STANDARDS ADMINISTRATION
WAGE AND HOUR DIVISION
WASHINGTON, DC 20210

GUIDELINES

HIGHWAY CONSTRUCTION

Highway projects include the construction, alteration, or repair of roads, streets, highways, runways, taxiways, alleys, trails, paths, parking areas, and other similar projects not incidental to building or heavy construction.

EXAMPLES: Alleys, Base Courses, Bituminous treatments, Bridle Paths, Concrete pavement, Curbs, Excavation and embankment (for road construction), Fencing (highway), Grade crossing elimination (overpasses and underpasses), Guard rails on highway, Highway signs, Highway bridges (overpasses, underpasses, grade separation), Medians, Parking lots, Parkways, Resurfacing streets and highways, Roadbeds, Roadways, Runways, Shoulders, Stabilizing courses, Storm sewers incidental to road construction, Street paving, Surface courses, Taxiways, and Trails.

ANY QUESTIONS REGARDING THE APPLICATION OF THE GUIDELINES ABOVE TO A PARTICULAR PROJECT OR ANY DISPUTES REGARDING THE APPLICATION OF THE WAGE SCHEDULES ARE TO BE REFERRED TO THE WAGE AND HOUR DIVISION, U.S. DEPARTMENT OF LABOR FOR RESOLUTION, AND THE INSTRUCTIONS OF THE WAGE AND HOUR DIVISION ARE TO BE OBSERVED IN ALL INSTANCES.

* ALL AGENCY MEMORANDUM NO. 130
U.S. DEPARTMENT OF LABOR
EMPLOYMENT STANDARDS ADMINISTRATION
WAGE AND HOUR DIVISION
WASHINGTON, DC 20210

SUPPLEMENTAL SPECIFICATIONS
TO THE
AUGUST 2001
STANDARD SPECIFICATIONS

EFFECTIVE AS OF THE ADVERTISEMENT DATE OF THIS PROPOSAL AND INCLUDED BY REFERENCE

The Supplemental Specifications can be viewed and printed from the Department's Website.

To access the Website;
- in your internet browser, enter; http://www.deldot.gov
- on the left side of the page under 'INFORMATION', Click; 'Publications'
- scroll down under 'MANUALS' and Click; "Standard Specifications 2001"

The full Website Link is;
http://www.deldot.gov/information/pubs_forms/manuals/standard_specifications/index.shtml

Printed copies of the Supplemental Specifications are available upon request. A printed copy of the above referenced Supplemental Specifications will be included in the final contract documents upon award.

The Contractor shall make himself aware of these revisions and corrections (Supplemental Specifications), and apply them to the applicable item(s) of this contract.

SPECIAL PROVISIONS

CHANGES TO PROJECT DOCUMENTS DURING ADVERTISEMENT

1. PRINTED PLANS AND SPECIFICATIONS NOT AVAILABLE FROM DELDOT.

The Department is not providing printed plans or specifications for this project. Bidders must contact the Department in order to receive a CD that contains all bid documents. Bidders are able to use the CD to print the plans and specifications, or have them printed from the Website. While the plans and specifications are available on-line at DelDOT's Website, the Website bid documents are not authorized for submitting bids, and the Website documents are marked as such. To receive required bid Documents on a CD, contact:

Contract Administration
Delaware Department of Transportation
P.O. Box 778, Dover, DE 19903
e-mail: dot-ask@state.de.us
Phone: (302) 760-2030
FAX: (302) 739-2254

The Department is providing a printed set of plans and specifications available for viewing in the Bidder's Room, Transportation Administration Center, 800 Bay Road, Dover, Delaware, Monday through Friday excluding holidays from 8:00A.M. through 4:15 P.M..

2. QUESTIONS AND ANSWERS

All questions pertaining to this project are to be submitted to the following e-mail address:

dot-ask@state.de.us

Questions and Answers will be dated and posted periodically on Delaware's Bid Solicitation Directory Website located at: http://www.bids.delaware.gov/

The final Questions and Answers will be posted no later than the end of the day, two working days prior to the bid date.

All Questions and Answers posted by the Department on the above Website are included by reference and become part of the contract documents. The awarded bidder will receive a hard copy of the final posted Questions and Answers.

Potential bidders that do not have access to the internet may contact Jim Hoagland, Contract Services Administrator, by telephone at (302) 760-2036 to make other arrangements.

NOTE: There is space provided on the CERTIFICATION page to insert the Posted Date of the final Questions and Answers. The Final Posted Date is the latest Posted Date of the Questions and Answers one day prior to Bid Date. This final Posted Date must be submitted on the Certification page.

3. ADDENDA

The Department is not providing printed Addendums, if issued, for this project. **All addendums will be posted on the Department's Website, and are included by reference and become part of the contract documents**. It is the responsibility of the bidder to check the Website as needed. If there are Addendums issued, the final Addendum will be posted no later than the end of the day, two working days prior to the bid date.

NOTE: There is space provided on the CERTIFICATION page to insert each issued Addendum and the date you acknowledge receipt of the addendum. Each Addendum number and date acknowledged must be submitted on the Certification page.

CONSTRUCTION ITEM NUMBERS

All construction pay items are assigned a six (6) digit number, shown as Item Number on the Plans and/or in the Special Provisions, and shall be interpreted in accordance with the following:

Standard Item Number:

The first three digits of the construction item numbers indicates the Section number as described in the Standard Specifications, and all applicable requirements of the Section shall remain effective unless otherwise modified by the Special Provisions. The last three digits of the construction item identifies the item by sequential number under that Section. Sequential numbers for all items covered under Standard Specifications range from 000 to 499. A comprehensive list of construction item numbers begins on page 421 of the Standard Specifications. Additions to this list will be made as required.

Special Provisions Item Number:

The first three digits of the construction items, covered under Special Provisions, indicates the applicable Section number of the Standard Specifications, and shall be governed fully by the requirements of the Special Provisions. The last three digit of the items covered under Special Provisions identifies the item by sequential number. Sequential numbers for Special Provision items, range from 500 to 999.

Examples

Standard Item Number - 202000 Excavation and Embankment

202 Indicates Section Number

000 Indicates Sequential Number

Special Provision Item Number - 202500 Grading and Reshaping Roadway

202 Indicates Section Number

500 Indicates Sequential Number

401502 - ASPHALT CEMENT COST ADJUSTMENT

For Sections 304, 401, 402, 403, 404, and 405, payments to the Contractor shall be adjusted to reflect increases or decreases in the Delaware Posted Asphalt Cement Price when compared to the Project Asphalt Cement Base Price, as defined in these Special Provisions.

The Delaware Posted Asphalt Cement Price will be issued monthly by the Department and will be the industry posted price for Asphalt Cement, F.O.B. Philadelphia, Pennsylvania.

The Project Asphalt Cement Base Price will be the anticipated Delaware Posted Asphalt Cement Price expected to be in effect at the time of receipt of bids.

All deviations of the Delaware Posted Asphalt Cement Price from the Project Asphalt Cement Base Price are eligible for cost adjustment. No minimum increases or decreases or corresponding percentages are required to qualify for cost adjustment.

Actual quantity of asphalt cement qualifying for any Asphalt Cement Cost Adjustment will be computed on the basis of weight tickets and asphalt percentage from the approved job mix formula.

For Recycled Hot-Mix the asphalt percentage eligible for cost adjustment shall be only the new asphalt cement added to the mix.

There shall be no separate payment per ton (metric ton) cost of asphalt cement. That cost shall be included in the various unit prices bid per ton (metric ton) for those bid items that contain asphalt cement (mentioned above).

The Asphalt cement cost adjustment will be calculated on grade PG 64-22 asphalt regardless of the actual grade of asphalt used. The Project Asphalt Cement Base Price for the project will be $623.30 per ton ($687.11 per metric ton).

If the Contractor exceeds the authorized allotted completion time, the price of asphalt cement on the last authorized allotted work day, shall be the prices used for cost adjustment during the time liquidated damages are assessed. However, if the industry posted price for asphalt cement goes down, the asphalt-cement cost shall be adjusted downward accordingly.

NOTE

Application of Asphalt Cement Cost Adjustment requirements as indicated above shall apply only to those contracts involving items related to bituminous base and pavements, and with bitumen, having a total of 1,000 tons (1,000 metric tons) or more of hot-mix bid quantity in case of Sections 401, 402 and 403; and 15,000 gallons (60 000 liters) or more in case of Sections 304, 404 and 405.

202505 – SETTLEMENT PLATFORM
202518 – SETTLEMENT MONUMENT

Description:

The work of this section includes furnishing, installing, protecting and maintaining settlement monitoring plates (SMP), pipe extensions, and monument settlement points conforming to the design and at the locations shown on the Plans or as directed by the Department. All labor, materials, equipment and incidentals necessary to complete this work shall be considered part of this item required to provide devices to observe ground movement during and after construction. The Contractor shall perform the monitoring, recording and reporting of the settlement.

Submittals:

1. Qualifying Experience

The Contractor shall submit proof of three or more projects of similar size and complexity on which the firm and personnel assigned to the project have successfully installed similar instrumentation within the last three years. The Contractor shall present the following information for each project listed as a reference at or prior to any preconstruction meetings:

   1. Project Name, Location, Project Description, and Completion Date.
   2. Surface and Subsurface Conditions.
   3. Type and number of instruments installed.
   4. Installation equipment and techniques utilized when applicable.
   5. Provide names, current phone numbers, and current business addresses for the owner/designer, geotechnical consultant, and contract manager.

2. Settlement surveying and monitoring plan for review prior to construction. The plan shall identify the detailed location of settlement monitoring points, reference benchmarks, survey schedules and procedures and reporting formats.

3. Description of the surveying equipment to be used.

4. Settlement Plate Layout and Installation Details: Within two days after the installation of each settlement plate, the Contractor shall submit an installation record sheet including appropriate items from the following list.

   i. Project name.
   ii. Contract name and number.
   iii. Settlement plate number.
   iv. Material sizes and compositions.
   v. Planned location in horizontal position and elevation.
   vi. Planned orientation.
   vii. Personnel responsible for installation.
   viii. Date and time of start and completion.
   ix. Weather conditions at the time of installation.
   x. Notes of importance on the installation including problems encountered, delays, unusual features of the installation, and details of any events that may have a bearing on settlement plate behavior.

Schedule for Settlement Platform Installations and Readings:

The Contractor shall provide settlement monitoring plates, pipe extensions and monument settlement points to monitor settlement of new fill embankments. The Contractor shall make regular readings of the settlement as indicated on the plans.

Settlement monitoring plates shall be installed as shown on the plans. Settlement monitoring plates shall be located by repeatable survey (locations and elevations) and referenced to permanent benchmarks. Locations of benchmarks are to be determined by the Contractor and approved by the Engineer, and shall be located outside the zone of influence of the construction activity. Settlement monitoring plates shall be placed level and the risers shall be plumb.

The approximate locations of each instrument to be installed by the Contractor are shown on the project plans and include the following types: settlement plates and settlement monuments. Other locations may need to be added as directed by the Engineer.

Protection of Instrumentation and Repair of Damage

a. The Contractor shall protect all instruments and appurtenant fixtures, leads, connections, and other components of instrumentation systems from damage due to construction operations.

b. If an instrument is damaged or made inoperative due to the Contractor's operations or the operation of subcontractors under the direction of the Contractor, the Contractor shall notify the Engineer immediately. The Engineer will be the sole judge of whether repair or replacement is required. For each instrument that is abandoned for these reasons, the Contractor shall replace that instrument at no additional cost to the Department.

c. Should any instrument become damaged or inoperative through no fault of the Contractor, the damaged or inoperative instrument shall be repaired or replaced at the contract unit prices for that instrument.

d. The Engineer will advise the Contractor immediately upon discovery of damage to instruments as to the necessary schedule for replacement and the times of required access. Damaged instruments shall be repaired or replaced within 24 hours of initial damage. The Contractor's construction operations in the area of a damaged instrument(s) may be halted during repair or replacement of each damaged instrument at the request of the Department.

Materials:

Settlement Plates

a. Settlement plates are sub-surface displacement reference platforms placed on the prepared ground surface prior to embankment fill placement. Risers are extended from the settlement plate as the fill is placed. A casing is placed around the riser for protection. Settlement plates are monitored by optical survey methods to determine vertical displacements occurring during and after embankment construction.

b. The base plate shall be made from steel conforming to the requirements of ASTM A36. The riser pipe and outer casing shall be steel pipe conforming to the requirements of ASTM A53, Grade B, standard weight. The casing and the risers shall be as shown on the plan. The casing pipe shall have a minimum wall thickness of 0.375 inches. The riser pipe shall be galvanized and have a minimum wall thickness of 0.25 inches. Couplings, pipe caps, etc. shall conform to the requirements of ASTM A865. Threaded pipes shall be used for riser and casing pipe extensions.

c. Sand shall conform to the requirements of ASTM C33.

Settlement Monuments

a. Materials for the construction of the Settlement Monument shall conform to the applicable sections of Section 812 for the Concrete, Class C of the Standard Specifications.
b. The Reinforcement Bar shall conform to Section 824 of the Standard Specifications.

Construction Methods:

1. Readings on the settlement platforms and settlement monuments shall be performed by the Contractor. The Contractor is fully responsible for establishing benchmarks, submittals, and furnishing, installing and maintaining the settlement platforms.

2. The settlement monuments shall be installed at locations indicated on the plans or as directed by the Department.

3. The settlement plates shall be installed as indicated on the plans after all clearing and grubbing and topsoil removal has been completed. The sand base shall be tamped to provide a firm, level, and unyielding bearing surface for the base plate. The riser pipe shall be marked in 1-foot increments and labeled at 5-foot increments to indicate the distances above the plate extending up through the embankment fill. Settlement plates shall be fabricated as shown on the plans.

4. The initial casing and riser pipes shall have a maximum length of 4 feet for each section. Spacers shall be provided between the riser pipe and the casing at a minimum of 4-foot intervals to ensure concentricity. The spacers shall not be directly attached to the riser pipe or otherwise installed that would impede the independent movement of the riser pipe.

5. As the height of fill above the settlement plate changes, the casing and riser pipes shall be increased or decreased in a maximum of 4-foot intervals to maintain the top of the riser pipe and casing above the embankment. As each additional length of pipe is added or removed, the pipe cap on the casing shall be immediately transferred to the top section on the settlement plate so as to prevent fill material from entering the casing. At other times, the cap shall only be removed to check settlement.

6. The casing pipe shall be marked by flags or other approved method to clearly show its location and to warn equipment operators and others of its location. The Contractor shall maintain the flags during the entire length of the Contract and replace those flags that are missing. At no time shall the settlement plate risers and casings extend higher than 5 feet above the ground surface elevation. Sections shall be added or removed as necessary during embankment construction to maintain the tops of the risers and casings at least 1-foot above the surface of the embankment.

7. The Contractor is responsible for maintaining the settlement plates in working order during the length of the Contract. Settlement Plates which are to be abandoned at the completion of the project shall have their riser pipes cut off two feet below roadway subgrade level and capped. If an instrument is damaged, moved, or disturbed due to causes other than settlement, the Contractor shall repair, reset, or replace the damaged instrument at no additional cost to the Department within three days after being damaged. The Engineer will be the sole judge of whether repair, resetting, or replacement is required. No additional fills shall be placed within fifty (50) feet of a damaged settlement platform until the damage has been corrected to the satisfaction of the Engineer. The Engineer may impose a work stoppage in the vicinity of the damaged instrument until it is again operational at no additional cost to the Department. Any repairs or replacements required will be at the Contractor's expense.

8. By the end of the first work day in each week, the Contractor shall submit to the Engineer a description of the work performed during the previous week. This description shall include at a minimum: a plan view location of the placed embankment, the volume of embankment placed, and in-situ density test results in accordance with Standard Specification sections 202 and 209.

9. The use of the settlement platforms for collecting data related to embankment foundation response will extend beyond the time of completion of the Contractor's embankment placement operations. The Contractor shall be responsible for assuring that all platforms are in working order until the time of completion of the Contract.

10. Instrumentation shall be read as indicated on the plans.

11. For vertical deformation monitoring, runs shall be performed by a single run beginning and ending on two different benchmarks installed in accordance with NGS standards. Settlement monitoring points shall be used as turning points or as intermediate foresights from two different turning points, allowing elevations to be adjusted and eliminating significant observational errors. The maximum length of line of sight shall be 150 feet, and the imbalance between backsight and foresight shall not exceed 30 feet. Allowable level loop misclosure shall not exceed ±0.033 times the square root of M feet (where M is the distance of the level run in miles) for a single run between two benchmarks. A formal initial reading on a settlement monitoring point will consist of the average of three elevations, from three independent level runs, which

meet the closure specified herein. Elevations established subsequent to a formal initial reading shall be determined by a single run as specified herein. The least count (without estimation) of the rod and level combination shall read to 0.003 foot or less, such that the accuracy of an elevation measurement shall be ±0.01 foot (at 95 percent level of confidence).

12. Data shall be recorded in U.S. survey feet or inches.

13. Instruments used for vertical deformation monitoring shall have a minimum accuracy of plus or minus 0.005 of a foot (standard deviation for 3300 feet of double run leveling) and a minimum setting accuracy of plus or minus 1.0 arc seconds. Leveling rods shall be non-telescopic in design (i.e. "Chicago" style leveling rod). A bull's eye bubble shall be used to plumb the leveling rod. The use of fiberglass rods will need approval of Engineer prior to use.

14. All data recorded by the Contractor shall be of the following form:
    a. Raw and reduced data shall be on summary tables in printed tabular format on 8-1/2 inch x 11 inch sheets of paper.
    b. Reduced data for up to six like instruments that are located in the same geographical area shall be plotted on the same graphical plot. Each plot shall be submitted on an 8-1/2 inch x 11 inch sheet or 11 inch by 17 inch sheet.
    c. Plots of deformation data at Settlement Monitoring Plates shall show absolute vertical deformation versus time with height or elevation of fill placed at time of reading. Plots of settlement plate data shall show absolute vertical deformation versus time and shall show the height or elevation of fill placed at the time of reading. Deformation plots shall also be provided in electronic data file format.
    d. Survey data reports prepared by the Contractor shall be signed and sealed by either a Professional Engineer or Professional Land Surveyor licensed in the State of Delaware.

Method of Measurement:

The number of Settlement Platforms measured will be the actual number of platforms set in place and/or maintained as shown on the Plans or as directed by the Engineer. No measurement for payment will be made for pipe extensions. The number of Settlement Monuments measured will be the actual number of monuments set in place and/or maintained as shown on the Plans or as directed by the Engineer.

Basis of Payment:

Settlement Platforms and Settlement Monuments will be paid for at the Contract unit price per Each, complete in place, which price shall be full compensation for all materials, tools, labor, and work incidental thereto including pipe extensions, steel plate, sand, couplings, spacers, welding, protection of the plate and pipe extensions during construction, all labor tools, equipment, and necessary incidentals to complete the work.

10/16/10

202508 - WETLAND ACCESS ROAD, TYPE II

Description:

Furnish, place, maintain, and remove all materials, including all engineering, testing, labor, equipment, and incidental construction required to create stable construction access to, within, and across Plan designated wetlands and Waters of the U.S. (hereinafter collectively referred to as wetlands) and to restore access areas and diverted streams to original condition as specified in the Contract Documents and as directed by the Engineer.

All work must be performed in accordance with applicable permits.

The specific type and location of the Wetland Access Road, Type II is at the discretion of the Contractor subject to the review and approval of the Engineer. The Delaware Department of Natural Resources and Environmental Control (DNREC) and the United States Army Corps of Engineers (USACE). have approved the limit of construction and requirements for wetland access and restoration shown on the plans and described in the permits and this specification.

Materials:

The materials used in the construction of the Wetland Access Road, Type II shall be in strict conformance with the requirements as stipulated by the Contractor's engineering design of the wetland access road itself. All materials used in the construction of the Wetland Access Road shall be approved by the Engineer.

As a minimum, any fill used in the construction of the wetland access road shall be a well-graded borrow free of any debris and shall meet the specific grading criteria required by the engineering designer of the road. Geotextile materials used to reinforce or strengthen the wetland access road fill installation shall be capable of resisting strain deformations of less than two (2) percent biaxially. A geotextile fabric that conforms to the separation requirements of AASHTO M288 shall be placed to separate fill materials used in the construction of the wetland access road from existing ground. The separation geotextile fabric shall also be placed and securely anchored on the sides and the entire top of the fill materials.

Construction Methods:

This work shall consist of furnishing and installing all materials necessary to construct the temporary access road which may include, but is not limited to, rip rap, stone, borrow or fill, silt fencing, reinforced silt fencing, geotextile materials, timber matting, drainage piping, and wooden crane mats. All engineering, testing, labor and equipment necessary to perform the work will be included as well. Clearing of trees in the wetland access area shall be in accordance with Section 201 of the Standard Specifications except as modified herein. This work shall also include all necessary field testing and verification to aid in the design of the temporary access road which may include additional geotechnical investigations such as borings, vane shear tests, etc. To perform any additional geotechnical investigations, access shall be within the limits of construction shown on the plans, clearing shall be kept to a minimum and in accordance with this specification and all disturbed areas shall be stabilized at the contractor's expense.

The Contractor shall design the wetland access road so that all construction activities within wetlands can be conducted from the wetland access road. The wetland access road shall minimize damage to existing wetlands that will be restored following construction.

The Contractor shall prepare working drawings of the anticipated wetland access denoting the limits of the proposed temporary road and showing the limits of construction as shown on the plans. The drawings shall also include all necessary sections and details of the proposed temporary road including the method for erosion and sediment control and maintenance of stream flow, and a sequence of construction for both the installation of the road and its subsequent removal and restoration of the wetland area. The limits of the temporary access road as shown on the plans shall not be exceeded. Work is not to be performed outside of the Limit of Construction as shown on the plans. Detailed working drawings shall be furnished

in accordance with Subsection 105.04 of the Standard Specifications. Complete design calculations of the temporary access road shall be included and shall be stamped and signed by a Professional Engineer licensed in the State of Delaware. The temporary access road shall be designed to account for the loadings anticipated by the Contractor which may include cranes, earth moving equipment, and delivery trucks. In addition, the working drawings shall incorporate all proposed staging, material storage, laydown areas, and anticipated equipment movements throughout the length of the access road. Methods for fueling and servicing equipment within wetlands shall be shown, including methods for spill containment.

The working drawings shall include the existing topography of the area as described in the contract Project Notes.

After the Department's approval, the working drawings and calculations as described herein will be submitted by the Department to the USACE and the DNREC for review and approval. Review by the USACE and the DNREC shall require thirty (30) calendar days.

Install erosion and sediment control devices as indicated on the plans and as directed by the Engineer. Construction of the temporary access road shall include provisions for protecting the existing wetland to prevent any contamination from the access road from entering the wetland. The access road shall also include provisions for the conveyance of permanent or intermittent streams underneath the road. Temporary diversion(s) and or temporary pipe(s) placed for this purpose shall be sized to convey a two year storm event and shall include adequate scour protection to prevent erosion of the stream channel during construction. Temporary diversion(s) and or temporary pipe(s) shown on the plans provide the minimum hydraulic capacity and any alternatives shall be equal or larger in size.

Clear only the trees and vegetation directly in conflict with access and with proposed construction. These trees and limits of clearing shall be flagged prior to beginning the clearing operation and approval for clearing must be obtained from the Engineer prior to commencement of clearing operations. During tree removal, the contractor will not be allowed to enter wetlands with wheeled or tracked equipment. All trees shall be cut by manual methods and all felled trees shall be removed by use of a winch or other similar equipment or manually as approved by the Engineer. Trees shall be cut as close to the existing ground as possible. No stump removal will be permitted. This requirement applies only to those trees in conflict with access roads to bridge pier areas and in conflict with access roads across wetlands outside the mainline roadway of the contract. It is not intended for mainline roadway construction or permanent elements associated with the bridge. The Contractor shall minimize disturbances to the existing wetland root mat system in the areas affected by the temporary access road.

The total thickness of the temporary access road and the need for crane matting will be at the discretion of the Contractor based on the type of equipment he proposes to use. Stability of the access road is also the responsibility of the Contractor and any failures and/or resulting equipment damage will be the sole and complete responsibility of the Contractor.

Install geotextile fabric on existing ground. Geotextile fabric shall be used to separate all materials used to construct the Wetland Access Road, Type II from the wetland surface. Geotextile fabric shall be installed with enough excess material to ensure wetland soils remain separated from temporary access materials during settlement and compaction, especially around stumps. Concurrently construct Wetland Access Road, Type II beginning in uplands and proceeding in stages as necessary to ensure that heavy equipment is operated from the constructed and stable temporary surface. As access road construction progresses, install temporary pipes and other stream diversion measures as indicated on the plans. Install wooden mats if necessary to support proposed equipment.

Continual maintenance and stability of the access road and associated stream diversion devices by the Contractor during the construction will be incidental to this item. No construction equipment utilized to construct the temporary access road will be permitted outside the limits of the road. The Contractor shall design the wetland access road such that the working surface of the wetland access road is above the above the 2 year storm water surface elevation. The 2 year storm water surface shall account for the wetland access road and temporary pipe(s) and diversions effect on the storm water surface elevation.

The Contractor shall have the responsibility of monitoring weather forecasts for rain events and shall inspect the diversion systems for damage, pipe joint separation, etc in order to minimize impacts to the work area during storms.

The temporary access road shall be removed in its entirety upon completion of the construction activities that necessitated the access road. After the roadway is no longer needed, carefully remove and dispose of all materials including geotextile fabric and stream diversion devices. Removal operations must be performed such that heavy equipment can be operated from the constructed and stable temporary surface. All wetland areas disturbed by the construction shall be restored using low ground pressure equipment to their original pre-construction condition including elevations, and re-seeded in accordance with the approved permit, as noted in the plans, or as may be directed by the Engineer. Erosion and Sediment Control devices shall not be removed until the Engineer and Erosion and Sediment Control inspector have provided final acceptance of all plantings. Upon removal of Erosion and Sediment Control devices, stabilize all areas disturbed by the process immediately.

Method of Measurement:

The item will be paid on a lump sum basis. No separate measurement will be made.

Basis of Payment:

Wetland Access Road, Type II will be paid at the lump sum price bid per designated location, which price shall be full compensation for all engineering, testing, and shop drawing preparation, as well as furnishing all materials, labor, tools, equipment, and incidentals necessary to construct and maintain temporary roads for the purpose of accessing wetlands with construction equipment. Payment includes all engineering, testing, and working drawing preparation, as well as furnishing, installation and maintenance of fill, geotextile fabric, R-4 rip-rap, Del. Number 1 Stone, Del. Number 57 Stone, temporary pipes, temporary stream diversions, clearing of necessary trees, wooden mats as necessary, erosion control measures, any seeding or planting and any other materials specified on the Plans. Payment shall also be full compensation for the proper removal of all materials, restoration of the wetland site to original grades, and the seeding and planting at the conclusion of the work.

The Contractor is required to submit, as part of the bid proposal, his estimated breakdown of all items and quantities involved, and the dollar value assigned to these respective items and quantities, for each lump sum Wetland Access Road, Type II bid per location. Failure of the Contractor to include any necessary work items or quantities in his breakdown will not relieve the Contractor of his responsibility to perform all work required by these specifications. No additional compensation will be considered as a result of the contractor's failure to include any necessary items in his breakdown or his failure to accurately estimate the quantities required to perform the work required by these specifications.

The Contractor may submit to the Engineer after the contract has been awarded a Value Engineering Proposal(s) (VEP) for modifying the Wetland Access Road, Type II for construction of structures in designated wetland areas as per section 104.12 of the Standard Specifications. All plan and specifications changes or other requirements of the contract for the purpose of reducing the cost of construction or otherwise modifying the access and restoration requirements will require written approval by the USACE and DNREC. No consideration will be given for delays or additional compensation as a result of processing the VEP to the USACE and DNREC or for the rejection of the VEP or modification. The Contractor is required to prepare the bid proposal as per the Wetland Access Road, Type II described by this specification.

4/22/13

272500 - SKIMMER DEWATERING DEVICE

Description:

The work consists of furnishing all materials, constructing, installing and maintaining skimmer dewatering device(s) in accordance with notes and details on the Plans, the Standard Construction Details, these specifications and as directed by the Engineer.

Materials and Construction Methods:

Materials and construction methods shall be as specified in the Standard Construction Details.

The skimmer dewatering device(s) shall be maintained in proper operational condition while required on the project.

At the completion of the project, or when directed by the Engineer, the Contractor shall remove the skimmer dewatering device(s) from the project site.

Method of Measurement:

The quantity of skimmer dewatering devices will be measured as the actual number of devices constructed, installed and accepted.

Basis of Payment:

The quantity of skimmer dewatering devices will be paid for at the Contract unit price per each for skimmer dewatering devices. Price and payment will constitute full compensation for furnishing all materials; for constructing, installing, maintaining, and removing the devices; and for all labor, tools, equipment and incidentals required to complete the work.

12/14/01

272501 - POND OUTLET STRUCTURE, SPECIAL

Description:

This item shall consist of furnishing all materials and constructing Pond Outlet Structure, Special in accordance with locations, notes, details on Plans and as directed by the Engineer.

Materials:

Borrow. Borrow for backfill material shall be Clay Borrow, Type 1 & Clay Borrow, Type 2 and shall conform to the requirements of Subsection 274.02.

Concrete. Concrete used in structure may be precast or cast-in-place. Concrete used in structure shall be Class A conforming to the requirements of Section 812

Grout. Grout shall be non-shrink conforming to the requirements of ASTM C 1107

Reinforcing Steel. Reinforcing steel shall be Grade 60 (Grade 400) and conform to the requirements of Section 603.

Construction Methods:

Excavation. The Contractor shall excavate to the required depth. The foundation upon which the structure is to be placed shall be compacted to a firm and level surface.

Outlet Structure. Concrete structure shall be poured in place or pre-cast. If the concrete structures are pre-cast, the Contractor shall design the lifting lugs, and all hardware required to transport and install the structure. The top slab shall not be used to lift the weir structure. For cast-in-place structures, steel reinforcing shall be continous through cold joints and keyways.

Backfill. The backfill material next structures shall be placed to the required elevation in 4" (100 mm) horizontal loose-thickness lifts at the same rate on all sides to prevent damage from unequal loading. Each lift shall be compacted by a manually directed power tamper around the structure to 90% or more of maximum dry density. Compaction next to cast-in-place concrete structures will not begin until the concrete has reached enough strength to support the load.

Submittals. Working drawings for precast structures shall be submitted for review and acceptance in accordance with Section 105 of the Standard Specifications.

Method of Measurement:

The quantity of pond outlet structure will be measured as the actual number of completed pond outlet structures, concrete, installed and accepted.

Basis of Payment:

The quantity of pond outlet structure, concrete will be paid for at the Contract unit price for pond outlet structure, concrete. Price and payment will constitute full compensation for excavating; for all ground preparation; for furnishing and placing all materials, reinforcing steel, concrete, grout, bedding, clay backfills, and all other materials required for pond outlet structure, concrete; for welding; and for all labor, equipment, tools, and incidentals necessary to complete the work. Any and all dewatering necessary to complete this work to the satisfaction of the Engineer will be paid for under Item No. 271501- Dewatering of Existing Stormwater Management Pond.

3/30/07

401577 - PAVER-LAID ULTRATHIN BITUMINOUS CONCRETE

Description:

This work consists of furnishing and placing of a single, hot, specially-graded, bituminous concrete wearing surface; this surface lift shall be placed immediately after a heavy application of a polymer-modified tack coat has been sprayed on the existing surface. The resulting surface should be homogeneous, well textured, and durable.

Materials:

Tack Coat. The tack coat shall be a cationic asphalt emulsion modified with an approved natural or synthetic polymer. It shall be smooth and homogeneous; and it shall conform to the following requirements:

TEST (AASHTO T 59, EXCEPT AS NOTED)	MINIMUM	MAXIMUM
Elastic Recovery @10C (AASHTO T301)	58	-
Distillation: Asphalt, % by Mass[1]	63	-
Viscosity [77°F (25°C), SSF]	20	100
Storage stability (%, 24 hour sedimentation)	-	1
Sieve test (% mass, 850 microns)	-	0.10
Demulsibility (%, dioctyl sodium sulfosuccinate)	40	-

[1] T59 Modified to include 350ºF ±10ºF maximum temperature to be held for a period of 15 minutes. Use an ASTM 16C thermometer to monitor the temperature of the emulsion.

Asphalt Cement. The asphalt binder shall meet the requirements of Superpave PG 76-22 performance grade asphalt, as referenced in the Plans, Specifications, and/or Notes, according to AASHTO M320, Table 1 and tested according to AASHTO R29 with the following test ranges:

TEST PROCEDURE	AASHTO REFERENCE	SPECIFICATION LIMITS
Temperature, ºC	M320	Per Grade
Original DSR, G*/sin (δ)	T315	1.00 - 2.50 kPa

If the roadway has an ADT greater than 8,000 and a posted speed limit greater than 35 MPH, the aggregates shall be non-carbonate.

Recycled asphalt pavement (RAP) and recycled asphalt shingles (RAS) shall not be used for this item.

Coarse Aggregate. The coarse aggregate shall conform to Section 805, Coarse Aggregate, shall be 100% crushed material, and shall conform to the following property and grading requirements:

TEST (AASHTO TEST METHOD)	RESULT
L.A. Abrasion (T 96)	30 % maximum
Soundness, sodium sulfate, % loss (T104)	15% maximum
Flat & Elongated, 5:1, +4.75 mm (ASTM D4791)	10% maximum
Water Absorption (T 85)	2 % maximum
Clay Lumps and Friable Particles (T 112)	2 % maximum
Micro Deval, % loss (T327)	18% Maximum

Fine Aggregate. The fine aggregate shall conform to Section 804, Fine Aggregate for Use in Portland Cement Concrete and shall be 100% crushed material meeting the following requirements:

TEST AND AASTO METHOD	LIMIT
Sand Equivalent (T176)	45 minimum
Uncompacted Void Content (T304)	40 minimum

Mineral Filler. Mineral filler shall conform to AASHTO M 17; and it shall be baghouse fines, rock dust, crushed limestone, hydrated lime, or flyash.

Bituminous Concrete Wearing Surface:

This wearing surface shall be a combination of coarse and fine aggregate, mineral filler, and asphalt cement. The wearing surface shall be mixed in conformance to the applicable requirements of Section 401. The job mix formula shall be submitted by the Contractor to and approved by the Engineer. The job mix formula shall identify a single target percentage of material passing the individual sieves within the Master Band Gradation Limits, as indicated on the following table. Production shall be at or within the tolerances from the approved job mix formula percentages for each sieve, as indicated on the following table, showing production tolerance (plus or minus from the job mix formula value):

Master Band Gradation Limits

SIEVE SIZE	PERCENT PASSING BY WEIGHT
	TYPE C
3/4" (19.0 mm)	100
½"(12.5 mm)	85 – 100
3/8"(9.5 mm)	60 – 80
#4 (4.75 mm)	28 – 38
#8 (2.36 mm)	19 – 32
#16 (1.18 mm)	15 – 23
#30 (0.6 mm)	10 – 18
#50 (0.3 mm)	8 – 13
#100 (0.15 mm)	6 – 10
#200 (0.075 mm)	4.0 – 5.5

Hot-Mix Design Criteria

PROPERTY	TYPE A	TYPE B	TYPE C
Asphalt Content	5.0 – 5.8	4.6 – 5.8	4.6 – 5.6
Draindown Test (T305)	0.10% max		
Moisture Sensitivity (T283) [1]	80% min		
Application Rate (lb/sy) [2]	70 (± 10)	80 (± 10)	90 (± 10)
Tack Rate (gal/yd^2)	0.14	0.17	0.20

[1] Follow AASHTO T283 with the following exceptions:

a. Condition the mixture for 2 hours in accordance with AASHTO R30, Section 7.1.
b. Compact the SGC specimens to 100 gyrations.
c. Extrude the samples as soon as possible without damage to the sample.
d. Use AASHTO T269 to determine the void content.
e. Record the void content of the specimens (for reference only)
f. If less than 55% saturation is achieved, the procedure does not need to be repeated unless the difference in tensile strength between duplicate specimens is greater than 25 pounds per square inch.

[2] Application rates outside of these ranges must be approved by the Engineer.

Construction Methods:

Surface Preparation. Before applying the tack and the paver-laid ultrathin hot mix, all thermoplastic pavement markings shall be removed; all debris, dust, and loose surface material shall be removed by a mechanical or vacuum type sweeper.

Environmental Requirements. The pavement shall not be wet (although it may be damp). The ambient and pavement surface temperature shall be at least 50ºF.

Equipment. Hauling and compaction equipment shall meet the applicable requirements of Section 401.

The tack application and the hot mix placement and screeding shall be performed by a single piece of equipment. The placement operation shall advance at a rate of 30 to 100 feet (9 to 30 meters) per minute, placing a full lane width in one pass. The tack shall be applied by a metered pressure sprayer; the meter must accurately and continuously monitor the rate of the tack application.

Tack Application. The tack shall be applied uniformly over the entire width and length to be overlaid; application shall be at a rate of 0.20 ± 0.05 gal/yd²; and the application shall be at a temperature of 140°F to 180°F. No part of the paving machine or other equipment shall come into contact with the tack coat.

Bituminous Concrete Overlay. The bituminous concrete wearing surface shall be placed on the tack within 5 seconds after the tack has been applied (with the exception of small areas where hand work is required). The mixture shall be placed at a temperature of 300ºF to 330ºF. The bituminous concrete shall be smoothed over its full width, and length, using a heated screed to ensure an even mat surface.

Compaction. The wearing surface shall be compacted using a minimum of 2 double-drum static 10 ton steel wheel rollers. At least two complete roller passes shall be completed before the mix cools to 160°F at mid-layer.

Opening to Traffic. The new pavement surface shall be opened to traffic immediately after rolling has been completed.

Performance Requirements. Materials, equipment, and labor shall be utilized in methods and procedures which will provide a product with adequate ride smoothness, with proper texture for high skid resistance and low tire contact noise, and with durability.

Method of Measurement:

The quantity of paver-laid ultrathin bituminous concrete will be measured as the number of square yards measured at the surface of the bituminous concrete placed and accepted.

Basis of Payment:

The quantity of paver-laid ultrathin bituminous concrete will be paid for at the Contract unit price per square yard. Price and payment will constitute full compensation for preparing the surface, for furnishing, hauling, and placing all materials, for furnishing labor, for furnishing equipment and tools, and incidentals necessary to complete the work.

10/25/2013

401699 - QUALITY CONTROL/QUALITY ASSURANCE OF BITUMINOUS CONCRETE

.01 Description

This item shall govern the Quality Assurance Testing for supplying bituminous asphalt plant materials and constructing bituminous asphalt pavements and the calculation for incentives and disincentives for materials and construction. The Engineer will evaluate all materials and construction for acceptance. The procedures for acceptance are described in this Section. Include the costs for all materials, labor, equipment, tools, and incidentals necessary to meet the requirements of this specification in the bid price per ton for the bituminous asphalt. Payment to the Contractor for the bituminous asphalt item(s) will be based on the Contract price per ton and the pay adjustments described in this specification.

.02 Bituminous Concrete Production – Quality Acceptance

(a) Material Production - Tests and Evaluations.

All acceptance tests shall be performed by qualified technicians at qualified laboratories following AASHTO or DelDOT procedures, and shall be evaluated using Quality Level Analysis. The Engineer will conduct acceptance tests. The Engineer will directly base acceptance on the acceptance test results, the asphalt cement quality, the Contractor's QC Plan work, and the comparisons of the acceptance test results to the QC test results. The Engineer may elect to utilize test results of the Contractor in some situations toward judging acceptance.

Supply and capture samples, as directed by the Engineer under the purview of the Engineer from delivery trucks before the trucks leave the production plant. Hand samples to the Engineer to be marked accordingly. The sample shall represent the material produced by the Contractor, and shall be of sufficient size to allow the Engineer to complete all required acceptance tests. The Engineer will direct the Contractor when to capture these samples, on a statistically random, unbiased basis, established before production begins each day based upon the anticipated production tonnage. The captured sample shall be from the Engineer specified delivery truck. The Contractor may visually inspect the specified delivery load during sampling and elect to reject the load. If the contractor elects to reject the specified delivery truck, each subsequent load will be inspected until a visually acceptable load is produced for acceptance testing. All visually rejected loads shall not be sent to a Department project.

The first sample of the production day will be randomly generated by the Engineer between loads 0 and 12 (0-250 tons). Subsequent samples will be randomly generated by the Engineer on 500-ton sub-lots for the production day. Samples not retrieved in accordance with the Contractor's QC plan will be deemed unacceptable and may be a basis for rejection of material produced. Parallel tests or dispute resolution tests will only be performed on material captured at the same time and location as the acceptance test sample. Parallel test samples or Dispute Resolution samples will be created by splitting a large sample or obtaining multiple samples that equally represent the material. The Engineer will perform all splitting and handling of material after it is obtained by the Contractor.

The Contractor may retain dispute resolution samples or perform parallel tests with the Engineer on any acceptance sample.

The Engineer will evaluate and accept the material on a lot basis. All the material within a lot shall have the same JMF (mixture ID). The lot size shall be targeted for 2000 tons or a maximum period of three days, whichever is reached first. If the 2000th ton target lot size is achieved during a production day, the lot size shall extend to the end of that production day. The Contractor may interrupt the production of one JMF in order to produce different material; this type of interruption will not alter the determination of the size or limits of material represented by a lot. The Engineer will evaluate each lot on a sublot basis. The size for each sublot shall be 100 to 500 tons and testing for the sub lots will be completed on a daily basis. For each sublot, the Engineer will evaluate one sample.

The target size of sub-lots within each lot, except for the first sample of the production day, is equal-sized 500 ton sub lots and will be based upon anticipated production, however, more or fewer sublots, with differing sizes, may result due to the production schedule and conditions. If the actual production is less than anticipated, and it's determined a sample will not be obtained (based upon the anticipated tonnage), a new sample location will be determined on a statistically random, unbiased basis based upon

the new actual production. If the actual production is going to be 50 tons or greater over the anticipated sub lot production, a new sample location will be determined on a statistically random, unbiased basis based upon the new actual production. The Engineer will combine the evaluation and test results for all of the applicable sublots in order to evaluate each individual lot.

If the Engineer is present, and the quantity exceeds 25 tons, a statistically random sample will be used for analysis. When the anticipated production is less than 100 tons and greater than 25 tons, and the Engineer is not present, the contractor shall randomly select a sample using the Engineer's random location program. The captured sample shall be placed in a suitable box, marked to the attention of the Engineer, and submitted to the Engineer for testing. A box sample shall also be obtained by the contractor at the same time and will be used as the Dispute Resolution sample if requested by the Engineer. The Contractor shall also obtain one liquid asphalt sample (1 pint) per grade of asphalt used per day and properly label it with all pertinent information.

The Engineer will conduct the following tests in order to characterize the material for the pavement compaction quality and to judge acceptance and the pay adjustment for the material:

- AASHTO T312 - Preparing and Determining the Density of Hot Mix Asphalt (HMA) Specimens by Means of the Superpave Gyratory Compactor
- AASHTO T166, Method C (Rapid Method) - Bulk Specific Gravity of Compacted Hot Mix Asphalt (HMA) Using Saturated Surface Dry Specimens
- AASHTO T308 - Determining the Asphalt Binder Content of Hot Mix Asphalt (HMA) by the Ignition Method
- AASHTO T30 - Mechanical Analysis of Extracted Aggregate
- AASHTO T209 - Theoretical Maximum Specific Gravity and Density of Hot Mix Asphalt (HMA)
- ASTM D7227 - Standard Practice for Rapid Drying of Compacted Asphalt Specimens using Vacuum Drying Apparatus

(b) Pavement Construction - Tests and Evaluations.

The Engineer will directly base acceptance on the compaction acceptance test results, and on the inspection of the construction, the Contractor's QC Plan work, ride smoothness as referenced in the contract documents, lift thickness as referenced in the contract documents, joint quality as referenced in the contract documents, surface texture as referenced in the contract documents, and possibly the comparisons of the acceptance test results to the independent test results. For the compaction acceptance testing, the Engineer will sample the work on a statistically random basis, and will test and evaluate the work based on daily production.

Notify the Engineer of any locations within that road segment that may not be suitable to achieve minimum (93%) compaction due to existing conditions prior to paving the road segment. Schedule and hold a meeting in the field with the Engineer in order to discuss all areas that may potentially be applicable to Table 5a before paving starts. Areas that will be considered for Table 5a will be investigated in accordance to the method described in Appendix B. If this meeting is not held prior to paving, no areas will be considered for Table 5a. Areas of allowable exemptions that will not be cored include the following: partial-depth patch areas, driveway entrances, paving locations of less than 100 tons, areas around manholes and driveway entrances, and areas of paving that are under 400 feet in continuous total length and/or 5 feet in width.

The exempt areas around manholes will be a maximum of 4 feet transversely on either side from the center of the manhole, and 20 feet longitudinally on either side from the center of the manhole. The exempt areas around driveway entrances shall be the entire width of the driveway, and 3 feet from the edge of the longitudinal joint next to the driveway. Areas of exemption that will be cored for informational purposes only include: areas where the mat thickness is less than three times the nominal maximum aggregate size as directed by the Engineer, violations of Section 401.08 in the Standard Specifications as directed by the Engineer, and areas shown to contain questionable subgrade properties as proven by substantial yielding under a fully legally loaded truck. Failure to obtain core samples in these areas will result in zero payment for compaction regardless of the exempt status.

The Engineer will evaluate and accept the compaction work on a daily basis. Payment for the compaction will be calculated by using the material production lots as referenced in **.02 Acceptance Plan (a) Material Production - B Tests and Evaluation** and analyzing the compaction results over the

individual days covered in the material production lot. The compaction results will be combined with the material results to obtain a payment for this item.

The minimum size of a compaction lot shall be 100 tons. If the compaction lot is between 101 and 1000 tons, the Engineer shall randomly determine four compaction acceptance test locations. If the compaction lot is between 1001 and 1500 tons, the Engineer shall randomly determine six compaction acceptance test locations. If the compaction lot is between 1501 and 2000 tons, the Engineer shall randomly determine eight compaction acceptance test locations. If the compaction lot is greater than 2000 tons, the Engineer shall randomly determine two compaction acceptance test locations per 500 tons.

If a randomly selected area falls within an Engineer approved exemption area, the Engineer will select one more randomly generated location to be tested per the requirements of this Specification. If that cannot be accomplished, or if an entire location has been declared exempt, the compaction testing shall be performed as per these Specifications but a note will be added to the results that the location was an Engineer approved exempt location.

Testing locations will be a minimum of 1.0 feet from the newly placed longitudinal joint and 50 feet from a new transverse joint.

Cut one six (6) inch diameter core through the full lift depth at the exact location marked by the Engineer. Cores submitted that are not from the location designated by the Engineer will not be tested and will be paid at zero pay.

Notify the Engineer prior to starting paving operations with approximate tonnage to be placed. The Contractor is then responsible for notifying the appropriate Engineer test personnel within 12 hours of material placement. The Engineer will mark core locations within 24 hours of notification. After determination of locations, the Contractor shall complete testing within two operational days of the locations being marked. If the cores are not cut within two operational days, the area in question will be paid at zero pay for compaction testing.

Provide any traffic control required for the structural number investigation, sampling, and testing work at no additional cost to the Department.

Commence coring of the pavement after the pavement has cooled to a temperature of 140°F or less. Cut each core with care in order to prevent damaging the core. Damaged cores will not be tested. Label each core with contract number, date of construction, and number XX of XX upon removal from the roadway Place cores in a 6-inch diameter plastic concrete cylinder mold or approved substitute for protection. Separate cores in the same cylinder mold with paper. Attach a completed QC test record for the represented area with the corresponding cores. The Engineer will also complete a test record for areas tested for the QA report and provide to Materials & Research. Deliver the cores to the Engineer for testing, processing, and report distribution at the end of each production day.

Repair core holes per Appendix A, Repairing Core Holes in Bituminous Asphalt Pavements. Core holes shall be filled immediately. Failure to repair core holes at the time of coring will result in zero pay for compaction testing for the area in question.

The Engineer will conduct the following tests on the applicable portion of the cores in order to evaluate their quality:

- AASHTO T166, Method C (Rapid Method) – Bulk Specific Gravity of Compacted Hot Mix Asphalt (HMA) Using Saturated Surface Dry Specimens
- AASHTO T209 - Theoretical Maximum Specific Gravity and Density of Hot Mix Asphalt
- ASTM D7227 - Standard Practice for Rapid Drying of Compacted Asphalt Specimens using Vacuum Drying Apparatus

The Engineer will use the average of the last five test values of the same JMF (mixture ID) material at the production plant in order to calculate the average theoretical maximum specific gravity of the cores. The average will be based on the production days test results and as many test results needed from previous days production to have an average of five samples. If there are less than five values available, the Engineer will use the JMF design value in addition to the available values to calculate the average theoretical maximum specific gravity.

.03 Payment and Pay Adjustment Factors.

The Engineer will determine pay adjustments for the bituminous asphalt item(s) in accordance with this specification. The Engineer will determine a pay adjustment factor for the material produced and a pay adjustment factor for the pavement construction. Pay adjustments for material and construction will be calculated independently. When the pay adjustment calculation for either material or construction falls to zero payment per tables 4, 5, or 5a, the maximum pay adjustment for the other factor will not exceed 100.

Pay Adjustment factors will only be calculated on in place material. Removed material will not be used in payment adjustment calculations.

Material Production Pay Adjustments will be calculated based upon 70% of the contract unit price and calculated according to section .03(a) of this specification. Pavement construction Pay Adjustments will be calculated based upon 30% of the contract unit price and calculated according to section .03(b) of this specification.

(a) Material Production - Pay Adjustment.

Calculate the material pay adjustment by evaluating the production material based on the following parameters:

Table 2

Table 2 - Material Parameter Weight Factors		
Material Parameter	**Single Test Tolerance (+/-)**	**Weight Factor**
Asphalt Content	0.4	0.30
#8 Sieve (>=19.0 mm)	7.0	0.30
#8 Sieve (<=12.5 mm)	5.0	0.30
#200 Sieve (0.075mm Sieve)	2.0	0.30
Air Voids (4.0% Target)	2.0	0.10

Using the JMF target value, the single test tolerance (from Table 2), and the test values, the Engineer will use the following steps to determine the material pay adjustment factor for each lot of material:

1. For each parameter, calculate the mean value and the standard deviation of the test values for the lot to the nearest 0.1 unit.
2. For each parameter, calculate the Upper Quality Index (QU):
   QU = ((JMF target) + (single test tolerance) - (mean value)) / (standard deviation).
3. For each parameter, calculate the Lower Quality Index (QL):
   QL = ((mean value) - (JMF target) + (single test tolerance)) / (standard deviation).
4. For each parameter, locate the values for the Upper Payment Limit (PU) and the Lower Payment Limit (PL) from Table 3 - Quality Level Analysis by the Standard Deviation Method. (Use the column for "n" representing the number of sublots in the lot. Use the closest value on the table when the exact value is not listed).
5. Calculate the PWL for each parameter from the values located in the previous step:
   PWL = PU + PL - 100.
6. Calculate each parameter's contribution to the payment adjustment by multiplying its PWL by the weight factor shown in Table 2 for that parameter.
7. Add the calculated adjustments of all the parameters together to determine the Composite PWL for the lot.
8. From Table 4, locate the value of the Pay Adjustment Factor corresponding to the calculated PWL. When all properties of a single test are within the single test tolerance of Table 2, Pay Adjustment factors shall be determined by Column B. When any property of a single test is outside of the Single Test Tolerance parameters defined in Table 2, the Material Pay Adjustment factor shall be determined by Column C.
9. For each lot, determine the final material price adjustment:

Final Material Pay Adjustment =
(Lot Quantity) x (Item Bid Price) x (Pay Adjustment Factor) x 70%. This final pay calculation will be paid to the cent.

In lieu of being assessed a pay adjustment penalty, the Contractor may choose to remove and replace the material at no additional cost to the Department. When the PWL of any material parameter in Table 2 is below 60, the Engineer may require the removal and replacement of the material at no additional cost to the Department. Test results on removed material shall not be used in calculation of future PWL calculations for Mixture ID.

The test results from the Engineer on production that is less than 100 tons will be combined with the two most recently completed Engineer tests with the same Mixture ID to calculate payment for the lot encompassing the single test. If that cannot be accomplished, the approved JMF will be used to calculate payment for the lot encompassing the single test. Payment for previously closed lots will not be affected by the analysis.

When a sample is outside of the allowable single test tolerance for any Materials criteria in Table 2, that sample will be isolated. For payment purposes, the test result of the out of acceptable tolerance sample will be combined with the two previous acceptable samples of the same JMF and analyzed per this specification. The material that is considered out of the acceptable tolerance will only include the material within the represented sub-lot (i.e., a maximum of 500 tons). If the previous acceptable test result is from the previous production day, only the material produced on the second production day will be considered out of tolerance. All future sub lots will not include the isolated test. The pay factors for the out of tolerance sample lot will be calculated using column C of table 4.

If, during production, a QA sample test result does not meet the acceptable tolerances and the Contractors QC sample duplicates the QA sample test result, the Contractor can make an appropriate change to the mixture (within the JMF boundaries), and request to have that sample further isolated. After the Contractor has made appropriate changes, the Contractor will visually inspect each produced load. The first visually acceptable load will be sampled and tested. If that sample test result shows compliance with the specifications, the material that is considered out of the acceptable tolerance will include the material from the previous acceptable test result to the third load after the initially sampled and tested sample. If the sample does not meet the specification requirements, the Engineer will no longer accept material. Production may resume when changes have been made and an acceptable sample and test result is obtained.

Table 3 – Quality Level Analysis by the Standard Deviation Method

PU or PL	QU and QL for "n" Samples						
	n = 3	n = 4	n = 5	n = 6	n = 7	n = 8	n = 9
100	1.16	1.50	1.79	2.03	2.23	2.39	2.53
99		1.47	1.67	1.80	1.89	1.95	2.00
98	1.15	1.44	1.60	1.70	1.76	1.81	1.84
97		1.41	1.54	1.62	1.67	1.70	1.72
96	1.14	1.38	1.49	1.55	1.59	1.61	1.63
95		1.35	1.44	1.49	1.52	1.54	1.55
94	1.13	1.32	1.39	1.43	1.46	1.47	1.48
93		1.29	1.35	1.38	1.40	1.41	1.42
92	1.12	1.26	1.31	1.33	1.35	1.36	1.36
91	1.11	1.23	1.27	1.29	1.30	1.30	1.31
90	1.10	1.20	1.23	1.24	1.25	1.25	1.26
89	1.09	1.17	1.19	1.20	1.20	1.21	1.21
88	1.07	1.14	1.15	1.16	1.16	1.16	1.17
87	1.06	1.11	1.12	1.12	1.12	1.12	1.12
86	1.04	1.08	1.08	1.08	1.08	1.08	1.08

Table 3 – Quality Level Analysis by the Standard Deviation Method							
	QU and QL for "n" Samples						
PU or PL	n = 3	n = 4	n = 5	n = 6	n = 7	n = 8	n = 9
85	1.03	1.05	1.05	1.04	1.04	1.04	1.04
84	1.01	1.02	1.01	1.01	1.00	1.00	1.00
83	1.00	0.99	0.98	0.97	0.97	0.96	0.96
82	0.97	0.96	0.95	0.94	0.93	0.93	0.93
81	0.96	0.93	0.91	0.90	0.90	0.89	0.89
80	0.93	0.90	0.88	0.87	0.86	0.86	0.86
79	0.91	0.87	0.85	0.84	0.83	0.82	0.82
78	0.89	0.84	0.82	0.80	0.80	0.79	0.79
77	0.87	0.81	0.78	0.77	0.76	0.76	0.76
76	0.84	0.78	0.75	0.74	0.73	0.73	0.72
75	0.82	0.75	0.72	0.71	0.70	0.70	0.69
74	0.79	0.72	0.69	0.68	0.67	0.66	0.66
73	0.75	0.69	0.66	0.65	0.64	0.63	0.63
72	0.74	0.66	0.63	0.62	0.61	0.60	0.60
71	0.71	0.63	0.60	0.59	0.58	0.57	0.57
70	0.68	0.60	0.57	0.56	0.55	0.55	0.54
69	0.65	0.57	0.54	0.53	0.52	0.52	0.51
68	0.62	0.54	0.51	0.50	0.49	0.49	0.48
67	0.59	0.51	0.47	0.47	0.46	0.46	0.46
66	0.56	0.48	0.45	0.44	0.44	0.43	0.43
65	0.52	0.45	0.43	0.41	0.41	0.40	0.40
64	0.49	0.42	0.40	0.39	0.38	0.38	0.37
63	0.46	0.39	0.37	0.36	0.35	0.35	0.35
62	0.43	0.36	0.34	0.33	0.32	0.32	0.32
61	0.39	0.33	0.31	0.30	0.30	0.29	0.29
60	0.36	0.30	0.28	0.27	0.27	0.27	0.26
59	0.32	0.27	0.25	0.25	0.24	0.24	0.24

Table 4 - PWL Pay Adjustment Factors		
PWL	Pay Adjustment Factor (%) Column B	Pay Adjustment Factor (%) Column C
100	+5	0
99	+4	-1
98	+3	-2
97	+2	-3
96	+1	-4
95	0	-5
94	-1	-6
93	-2	-7

92	-3	-8
91	-4	-9
PWL<91	PWL - 100	PWL - 100

(b) Pavement Construction - Pay Adjustments.

The Engineer will determine the pavement construction pay adjustment by evaluating the construction of the pavement, based on the following parameter:

- Degree of compaction of the in-place material

Using the test values for the cores, the Engineer will use the following steps to determine the pavement construction pay adjustment for each lot of work. .

1. Calculate the core bulk specific gravity values from the sublot tests values, to the nearest 0.001 unit. Obtain the Theoretical maximum Specific Gravity values from the corresponding laboratory sublot tests.
2. Calculate the Degree of Compaction:
   Degree of Compaction =
   ((Core Bulk Specific Gravity) / (Theoretical Maximum Specific Gravity)) x 100% recorded to the nearest 0.1%.
3. The average compaction for the sublots shall be averaged together for the compaction level of the lot. The lots compaction test level shall be averaged and recorded to the nearest whole percent.
4. Locate the value of the Payment Adjustment Factor corresponding to the calculated degree of compaction from Table 5 or Table 5a.
5. Determine the pavement construction price adjustment by using the following formula:
   Construction Pay adjustment = (Lot Quantity) x (Bid Price) x (Pay Adjustment Factor) x 30%.

Table 5: Compaction Price Adjustment Highway Locations

Degree of Compaction (%)	Range	Pay Adjustment Factor (%)
>= 97.0	>= 96.75	-100*
96.5	96.26 – 96.74	-5
96.0	95.75 – 96.25	-3
95.5	95.26 – 95.74	-2
95.0	94.75 – 95.25	0
94.5	94.26 – 94.74	0
94.0	93.75 – 94.25	1
93.5	93.26 – 93.74	3
93.0	92.75 – 93.25	5
92.5	92.26 – 92.74	3
92.0	91.75 – 92.25	0
91.5	91.26 – 91.74	0

91.0	90.75 – 91.25	-5
90.5	90.26 – 90.74	-15
90.0	89.75 – 90.25	-20
89.5	89.26 – 89.74	-25
89.0	88.75 – 89.25	-30
88.5	88.26 – 88.74	-50
=<88.0	=<88.25	-100*

* or remove and replace it at Engineer's discretion

Table 5A: Compaction Price Adjustment Other[1] Locations		
Degree of Compaction	Range	Pay Adjustment Factor (%)
>= 97.0	>= 96.75	-100*
96.5	96.26 – 96.74	-5
96.0	95.75 – 96.25	-3
95.5	95.26 – 95.74	-2
95.0	94.75 – 95.25	0
94.5	94.26 – 94.74	0
94.0	93.75 – 94.25	0
93.5	93.26 – 93.74	1
93.0	92.75 – 93.25	3
92.5	92.26 – 92.74	1
92.0	91.75 – 92.25	0
91.5	91.26 – 91.74	0
91.0	90.75 – 91.25	0
90.5	90.26 – 90.74	0
90.0	89.75 – 90.25	0
89.5	89.26 – 89.74	0
89.0	88.75 – 89.25	-1
88.5	88.26 – 88.74	-3
88.0	87.75 – 88.25	-5
87.5	87.26 – 87.74	-10
87.0	86.75 – 87.25	-15
86.5	86.26 – 86.74	-20
86.0	85.75 – 86.25	-25
85.5	85.26 – 85.74	-30

85.0	84.75 – 85.25	-40
84.5	84.26 – 84.74	-50
=< 84.0	=<84.25	-100*

* or remove and replace at Engineer's discretion

[1] This chart is to be used for areas where the structural value of the area to be paved is less than 1.75 as determined by the Engineer. See Appendix B - Method for Obtaining Cores for Determination of Roadway Structure. This chart is applicable to rehabilitation work only; full depth construction will not be considered for Table 5a.

.04 Dispute Resolution.

Disputes or questions about any test result shall be brought to the attention of the Contractor and the Engineer within two operational days of reported test results. The following dispute resolution procedures will be used.

The Engineer and the Contractor will review the sample quality, the test method, the laboratory equipment, and the laboratory technician. If these factors are not the cause of the dispute, a third party dispute resolution will be used.

Third party resolution testing can be performed at either another Contractor's laboratory, the Engineer's laboratory, or an independent accredited laboratory. Unless otherwise mutually agreed upon by DAPA and the Engineer, the Engineer's qualified laboratory in Dover and qualified personnel shall conduct the necessary testing for third party Dispute Resolution after the Engineer has provided reasonable notice to allow the Contractor to witness this testing.

When disputes over production testing occur, the samples used for Dispute Resolution testing will be those samples the properly captured, labeled, and stored, as described in the second paragraph of the section of these specifications titled **.02 Acceptance Plan, (a) Material Production - Tests and Evaluations**. If no samples are available, the original testing results will be used for payment calculations.

Dispute Resolution samples for air void content will be heated by a microwave oven.

If there is a discrepancy between the Engineer's acceptance test result and the Contractor's test result, the Contractor may ask for the Dispute Resolution sample to be tested. The Contractor may request up to two dispute resolution samples be tested per calendar year without charge. Any additional Dispute Resolution samples run at the Contractors request where the results substantiate the acceptance test result will be assessed a fee of $125. Any additional Dispute Resolution samples that substantiate the Contractors test result will not be assessed the fee.

When disputes over compaction core test results occur, the Engineer's acceptance core will be used for the dispute resolution sample. The Contractor will be advised on when the testing will occur as referenced above to witness the testing.

The results of the dispute resolution testing shall replace all of the applicable disputed test results for payment purposes.

Appendix A - Repairing Core Holes in Bituminous Asphalt Pavement

Description.

This appendix describes the procedure required to repair core holes in a bituminous concrete pavement.

Materials and Equipment.

The following material shall be available to complete this work:

- Patch Material - DelDOT approved High Performance Cold Patch material shall be used.

The following equipment shall be available to complete this work:

- Sponge or other absorbent material - Used to extract water from the hole.
- Compaction Hammer - mechanical (electrical, pneumatic, or gasoline driven) tamping device with a flat, circular tamping face smaller than 6 inches in diameter. .

Construction Method.

After core removal from the hole, remove all excess water from within the hole, and prevent water from re-entering the hole.

Place the patch material in lifts no greater than 3 inches and compact with mechanical tamping device. If the hole is deeper than 3 inches, use two lifts of approximately equal depths so that optimum compaction is achieved. Make sure that the patch surface matches the grade of the existing roadway. Make every effort to achieve the greatest possible compaction

Performance Requirements.

The Engineer will judge the patch on the following basis:

- The patch shall be well compacted
- The patch surface shall match the grade of the surrounding roadway surface.

Basis of Payment.

No measurement or payment will be made for the patching work. The Contractor must gain the Engineer's acceptance of the patching work before the Engineer will accept the material represented by the core.

Appenidx B - Method for Obtaining Cores for Determination of Roadway Structure

The Contractor is responsible for obtaining cores in areas that they propose are eligible for compaction price adjustments according to Table 5a in this specification. Table 5a is not applicable for new full-depth pavement box construction. Cores submitted for this process shall be obtained according to the following process.

1. Contact Materials & Research (M&R) personnel to determine if information about the area is already available. If M&R has already obtained cores in the location that is being investigated, the contractor may opt to use the laboratory information for the investigation and not core the area on their own.

2. If M&R does not have information concerning the section of the roadway, the contractor needs to contact M&R to arrange for verification of coring operations. Arrangements shall be made to allow for an individual from M&R to be on the site when the cores are obtained. Cores will be turned over to M&R for evaluation.

3. The Contractor is responsible for providing all traffic control and repairing core holes in accordance to 401699 Appendix A - Repairing Core Holes in Bituminous Asphalt Pavements.

4. Cores are to be taken throughout the entire project for the area in question. Cores will be spaced, from the start of the project in increments determined based on field and project specifics. Cores will be evenly distributed throughout the project location. The cores will be taken in the center of the lane in question.

5. Additional cores may be taken at other locations, if surface conditions indicate that there may be a substantial difference in the underlying section. The location of these cores should be documented and submitted to M&R.

6. Cores shall be full depth and include underlying materials. If there is a stone base included in the pavement section, at a minimum 1 core must have information concerning the thickness of the base. This is determined by augering to the subgrade surface.

7. The calculations used to determine the structural capacity of the roadway is as follows. If the contractor finds, upon starting the coring process, that the areas are of greater thickness than applicable to Table 5a, they may terminate the coring process on their own and retract the request.

Structural Number Calculations

Each pavement box material is assigned a structural coefficient based upon AASHTO design guides. The structural coefficient is used to determine the total strength of the pavement section.

Materials used in older pavement sections are assigned lower structural coefficients to compensate for aging of the materials. The coefficients used to determine the structural number of an existing pavement are:

Existing Material	Structural Coefficient
HMA	0.32
Asphalt Treated Base	0.26
Soil Cement	0.16
Surface Treatment (Tar & Chip)	0.10
GABC	0.14

Existing Material	Structural Coefficient
Concrete	0 - 0.7*

* The Structural Coefficient of Concrete is dependent upon the condition of the concrete. Compressive strengths & ASR analysis are used to determine condition - contact the Engineer if this situation arises.

Newly placed materials use a different set of structural coefficients. They are as follows:

New Material	Structural Coefficient
HMA	0.40
Asphalt Treated Base (BCBC)	0.32
Soil Cement	0.20
GABC	0.14

Example:

Location includes placement of a 1.25" Type C overlay on 2.25" Type B. Existing roadway is cored and is shown to consist of 2" HMA on 7" GABC.

Calculation:

For the Type B lift the calculation would be:

Existing HMA	2 * 0.32 = 0.64
GABC	7 * 0.14 = 0.98
	1.62

For the Type C lift the calculation would be:

Newly Placed B	2.25 * 0.4 = 0.90
Existing HMA	2 * 0.32 = 0.64
GABC	7* 0.14 = 0.98
	2.52

06/05/14

401752 – SAFETY EDGE FOR ROADWAY PAVEMENT

Description:

This work consists of the construction of safety edge(s) along bituminous concrete pavement or P.C.C. pavement in accordance with the details and notes on the Plans and as directed by the Engineer.

Construction Methods:

The safety edge shall not be constructed adjacent to curb or in front of guardrail sections.

In bituminous concrete pavement sections, prior to the construction of the safety edge, the fill or in situ material at the edge of pavement shall be compacted so that it is level with the top of the pavement, prior to the final surface overlay.

In bituminous concrete pavement sections, the contractor shall attach a device to the screed of the paver unit that confines the material at the end of the gate and extrudes the asphalt material in such a way that results in a compacted wedge shape pavement edge of 32 degrees (+/- 2 degrees). Contact shall be maintained between the device and the road shoulder surface. The device shall be manufactured so that it can be easily adjusted to transition at cross roads, driveways and obstructions without stopping the paver unit. The device's shape shall constrain the asphalt and cause compaction, as well as increase the density of the extruded profile.

In bituminous concrete pavement sections, the Transtech Shoulder Wedge Maker, Carlson Safety Edge End Gate or an approved equal shall be used to produce the safety edge. Contact information for these wedge shape compaction devices is listed below:

Transtech Systems, Inc.
1594 State Street
Schenectady, NY 12304
1-800-724-6306
www.transtechsys.com

or

Carlson Paving Products
18425 50th Ave. E
Tacoma, WA 98446
1-253-278-9426
www.carlsonpavingproducts.com

or an approved equal.

In P.C.C. pavement sections, the paver screed shall be modified to provide a chamfer at the end of the P.C.C. pavement in accordance with the details and notes on the Plans, or as directed by the Engineer.

Method of Measurement:

Safety Edge will not be measured for payment.

Basis of Payment:

The cost associated with the construction of safety edge(s), including but not limited to the wedge device, preparation and compaction of the fill or in situ material, and placement of the safety edge in accordance with the Plans and Details shall be incidental to the bituminous concrete pavement or P.C.C. pavement item being placed.

10/15/2013

401800 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 115 GYRATIONS, PG 64-22 (CARBONATE STONE)
401801 - BITUMINOUS CONCRETE, TYPE C, 160 GYRATIONS, PG 64-22 (CARBONATE STONE)
401802 - BITUMINOUS CONCRETE, TYPE C, 205 GYRATIONS, PG 64-22 (CARBONATE STONE)

401803 - BITUMINOUS CONCRETE, TYPE C, 115 GYRATIONS, PG 70-22 (CARBONATE STONE)
401804 - BITUMINOUS CONCRETE, TYPE C, 160 GYRATIONS, PG 70-22 (CARBONATE STONE)
401805 - BITUMINOUS CONCRETE, TYPE C, 205 GYRATIONS, PG 70-22 (CARBONATE STONE)

401806 - BITUMINOUS CONCRETE, TYPE C, 115 GYRATIONS, PG 76-22 (CARBONATE STONE)
401807 - BITUMINOUS CONCRETE, TYPE C, 160 GYRATIONS, PG 76-22 (CARBONATE STONE)
401808 - BITUMINOUS CONCRETE, TYPE C, 205 GYRATIONS, PG 76-22 (CARBONATE STONE)

401809 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 115 GYRATIONS, PG 64-22
401810 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG 64-22
401811 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 205 GYRATIONS, PG 64-22

401812 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 115 GYRATIONS, PG 70-22
401813 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG 70-22
401814 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 205 GYRATIONS, PG 70-22

401815 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 115 GYRATIONS, PG 76-22
401816 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG 76-22
401817 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 205 GYRATIONS, PG 76-22

401818 - BITUMINOUS CONCRETE, SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 115 GYRATIONS, PG 64-22
401819 - BITUMINOUS CONCRETE, SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 160 GYRATIONS, PG 64-22
401820 - BITUMINOUS CONCRETE, SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 205 GYRATIONS, PG 64-22

401821 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22, PATCHING
401822 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG 64-22, PATCHING
401823 - BITUMINOUS CONCRETE, SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 160 GYRATIONS, PG 64-22, PATCHING

401824 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG-64-22, WEDGE
401825 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG-64-22, WEDGE

401826 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 115 GYRATIONS, PG 64-22, (NON-CARBONATE STONE)
401827 -BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22, (NON-CARBONATE STONE)
401828 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 205 GYRATIONS, PG 64-22, (NON-CARBONATE STONE)

401829 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 115 GYRATIONS, PG 70-22, (NON-CARBONATE STONE)
401830 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 70-22, (NON-CARBONATE STONE)
401831 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 205 GYRATIONS, PG 70-22, (NON-CARBONATE STONE)

401832 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 115 GYRATIONS, PG 76-22, (NON-CARBONATE STONE)
401833 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 76-22, (NON-CARBONATE STONE)
401834 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 205 GYRATIONS, PG 76-22, (NON-CARBONATE STONE)

401835 - THIN BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 115 GYRATIONS, PG 64-22
401836 - THIN BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22
401837 - THIN BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 115 GYRATIONS, PG 70-22
401838 - THIN BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 70-22
401839 - THIN BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 115 GYRATIONS, PG 76-22
401840 - THIN BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 76-22

.01 Description:

This specification shall govern the production and construction of bituminous concrete pavement. The following Subsections of the Standard Specifications shall be applicable: 401.01, 401.03 - 401.10, 401.12, and 401.13. All other subsections have been modified herein.

Payment for bituminous concrete shall be in accordance with item 401699. The Contractor shall read and thoroughly understand the requirements of the QA/QC specification as defined in item 401699. It is the responsibility of the Contractor to determine all costs associated with meeting these requirements and to include them in the per ton bids for the various Superpave bituminous concrete items. Payment adjustment factors will be calculated in accordance with the latest version of item 401699.

Bituminous concrete may be produced by one or a combination of several technologies involving asphalt foaming processes and equipment or additives that facilitate the reduction of the temperature at which the mix can be placed and satisfactorily compacted thereby permitting the mix to be produced at reduced temperatures.

.02 Materials:

Use materials conforming to standard specifications 823.

Materials for bituminous concrete shall conform to the requirements of Subsections 823.01, 823.05-823.17, and 823.25 - 823.28 of the Standard Specifications and the following. If the Contractor proposes to use a combination of materials that are not covered by this Specification, the mix design shall be submitted and reviewed by the Engineer 30 calendar days prior to use.

a) **Asphalt Binder:**

Meet the requirements of Superpave performance-grade asphalt binder, as referenced in the Plans, according to M 320 [1], Table 1 and tested according to AASHTO R29 with the following test ranges:

TEST Procedure	AASHTO REFERENCE	SPECIFICATION LIMITS
Temperature, °C	M 320	Per Grade
Original DSR, G*/sin (δ)	T 315	1.00 - 2.20 kPa[1]

Test Procedure	AASHTO Reference	Specification Limits
RTFO DSR, G*/sin (δ)	T 315	>/= 2.20 kPa
PAV DSR, G*/ sin (δ)	T 315	</=5000 kPa
BBR Creep Stiffness, S	T 313	</= 300.0 kPa
BBR m-value	T 313	>/=0.300

Note 1: The exception to M 320 is that the original DSR shall be 1.00 to 2.20 kPa

Substitution of a higher temperature grade will require prior approval by the Engineer.

The highest low temperature grade virgin binder to be used is -22.

Depending on the level of Recycled materials used, the low temperature properties, per T 313, may be different than stated in M 320 or the previous table.

b) **Recycled Materials:**

RAP (Recycled Asphalt Pavement): Bituminous concrete pavement mechanically processed to a homogenous consistency to be recycled through the production plant for use in a new bituminous concrete mixture.

The percentage allowance of recycled materials (recycled asphalt pavement and/or shingles) shall be controlled through the use of the Materials & Research recycled mixture program available through the Materials & Research Section. The program can be used by the Contractor to determine which materials and combinations of materials can be used to meet the specified material on the contract.

If the Contractor proposes to use a combination of materials that are not covered by this program, the mix design shall be submitted and reviewed by the Engineer.

c) **Shingles:**

RAS (Recycled Asphalt Shingles): Materials reclaimed from the shingle manufacturing process such as tabs, punch-outs, and damaged new shingles mechanically broken down with 100% passing the ½ in (12.5 mm) sieve. Shipping, handling, and shredding costs are incidental to the price of Superpave item.

Post-consumer shingles or used shingles are not acceptable. Fiberglass-backed and organic felt-backed shingles shall be kept separate. Both materials shall not be used in the same mixture at the same time. All shingles shall be free of all foreign material and moisture.

The use of Recycled Asphalt Shingles will be considered for 115 gyration mix designs upon demonstration by the producer of adequate blending of the binder verified by laboratory testing on plant produced material.

d) Mineral Aggregate:

Conform to Section 805 and the following criteria. These criteria apply to the combined aggregate blend.

DESIGN ESAL'S (MILLIONS)	COARSE AGGREGATE ANGULARITY[1] (% MIN)		FINE AGGREGATE ANGULARITY[2] (% MIN)		CLAY CONTENT[3] (% - MIN)	FLAT AND ELONGATED [4] (% - MAX)
	≤ 100 MM	> 100 MM	≤ 100 MM	> 100 MM		
< 0.3	55/-	-/-	-	-	40	-
0.3 to < 3	75/-	50/-	40	40	40	
3 to <10	85/80[5]	60/-	45	40	45	
10 < 30	95/90	80/75	45	40	45	
≥30	100/100	100/100	45	45	50	10

[1]Coarse Aggregate Angularity is tested according to ASTM D5821.
[2]Fine Aggregate Angularity is tested according to AASHTO TP-33.
[3]Clay Content is tested according to AASHTO T176.
[4]Flat and Elongated is tested according to ASTM 4791 with a 5:1 aspect ratio.
[5] 85/80 denotes that 85% of the coarse aggregate has one fractured face and 80% has two or more fractured faces.

The following source properties apply to the individual aggregates in the aggregate blend for the proposed JMF.

TEST METHOD	SPECIFICATION LIMITS
Toughness, AASHTO T96 Percent Loss, Maximum	40
Soundness, AASHTO T104 Percent Loss, Maximum for five cycles	20
Deleterious Materials, AASHTO T112 Percent, Maximum	10
Moisture Sensitivity, AASHTO T283 Percent, Minimum	80

For any roadway with a minimum average daily traffic volume (ADT) of 8000 vehicles and a posted speed of 35 mph (60 kph) or greater, the polish value of the composite aggregate blend shall be greater than 8.0 when tested according to Maryland State Highway Administration MSMT 411 B ALaboratory Method of Predicting Frictional Resistance of Polished Aggregates and Pavement Surfaces.@ RAP shall be assigned a value of 5.0. The Contractor shall supply all polish values to the Engineer upon request.

e) **Mineral Filler:**

Conform to AASHTO M17.

f) **Warm Mix Additives:**

For any WMA technology requiring addition of any material by the producer during production, the following information will be submitted with the proposed JMF for review and approval at least 30 calendar days prior to production:

1. WMA technology and/or additive information.
2. WMA technology manufacturer's recommendation for usage.
3. WMA technology target dosage rate and tolerance envelope. Support tolerance envelope with test data demonstrating acceptable mix production properties conforming to all sections of this specification.
4. WMA technology manufacturer's material safety data sheets (MSDS).
5. Documentation of past WMA technology field application including points of contact.

6. Temperature ranges for mixing and compacting.
7. Laboratory test data, samples, and sources of all mix components, and asphalt binder viscosity-temperature relationships.

Follow the manufacturer's recommendation for incorporating additives and WMA technologies into the mix. Comply with the manufacturer's recommendation regarding receiving, storage, and delivery of additives.

If the producer performs blending of the WMA technology in their tank, a separate Quality Control plan shall be submitted by the producer to the Department for review and approval at least 30 calendar days prior to production.

g) **Anti-stripping additives**

Conform to standard specifications Section 829 and blend with the asphalt cement in accordance with this specification. Incorporate anti-stripping additives when the Tensile Strength Ratio (TSR) as determined in accordance with AASHTO T283 is less than 80 or when specified for use by the Engineer.

.03 Bituminous Concrete Production – Quality Control

(a) Process Control - Material Production Quality Control.

Submit through electronic mail a QC Plan from each proposed production plant to the Engineer; no hot-mix asphalt material will be accepted until the Engineer approves the QC Plan. This plan must be submitted to the Engineer on an annual basis for review and approval prior to material production. The Engineer will send a signed copy back to the Contractor stating that it is approved. The approved QC Plan shall govern contractor operations.

The QC Plan shall include actions that will assure all materials and products will conform to the specifications, whether manufactured or processed by the Contractor, or procured from suppliers, subcontractors, or vendors. The Contractor shall perform the inspection and tests required to substantiate product conformance to contract requirements. The Contractor shall document QC inspections and tests, and provide copies to the Engineer when requested. The Contractor shall maintain records of all inspections and tests for at least one year. The records shall include the date, time, and nature of deficiency or deficiencies found; the quantities of material involved until the deficiency was corrected; and the date, time, and nature of corrective actions taken.

In the QC Plan shall detail the type and frequency of inspection, sampling, and testing deemed necessary to measure and control the various properties of material and construction governed by the Specifications. The QC Plan shall include the following elements as a minimum:

- Production Plant - make, type, capacity, and location.
- Production Plant Calibration - components and schedule; address documentation.
- Personnel - include name and telephone number for the following individuals:
- Person responsible for quality control.
- Qualified technician(s) responsible for performing the inspection, sampling, and testing.
- Person who has the authority to make corrective actions on behalf of the Contractor.
- Testing Laboratory - state the frequency of accuracy checks and calibrations of the equipment used for testing; address documentation.
- Load number of QC samples (1-10 if QA sample is not within trucks 1-10)
- Locations where samples will be obtained and the sampling techniques for each test
- Tests to be performed and their normal frequency; the following, at a minimum, shall be conducted:
  - Mixture Temperature: each of the first five trucks, and each load that is sampled for QC or acceptance testing.
  - Gradation analysis of aggregate (and RAP) stockpiles - one washed gradations per week for each aggregate stockpile; RAP: five gradations and asphalt cement contents for dedicated stockpiles where new material is not being added; one gradation and asphalt cement content test per week for stockpiles where material is continually being added to the stockpile.
  - Gradation analysis of non-payment sieves
  - Dust to effective asphalt calculation
  - Moisture content analysis of aggregates - daily.
  - Gradation analysis of the combined aggregate cold feed - one per year per mixture.

  - Bulk specific gravity and absorption of blended material - one per year per mixture.
  - Ignition Oven calibration - one per year per mixture.
  - Hot-Bins: one per year per mixture.
  - Others, as appropriate.
- Procedures for reporting the results of inspection and tests (include schedule).
- Procedures for dealing with non-compliant material or work.
- Presentation of control charts. The contractor shall plot the results of testing on individual control charts for each characteristic. The control charts shall be updated within on working day as test results for each sublot become available. The control charts shall be easily and readily accessible at the plant laboratory. The following parameters shall be plotted from the testing:
  - Asphalt cement content.
  - Volumetrics (air voids, voids in mineral aggregates [VMA])
  - Gradation values for the following sieves:
    - 4.75 mm (#4).
    - 2.36 mm (#8).
    - 0.075 mm (#200).
    - Operational guidelines (trigger points) to address times when the following actions would be considered:
      - Increased frequency of sampling and testing.
      - Plant control/settings/operations change.
      - JMF adjustment.
      - JMF change (See 401644 Section .04(a)(1)).
      - Change in the source of the component materials.
      - Calibration of material production equipment (asphalt pump, belt feeders, etc.).
      - Rejection of material.

When any point of non-compliance with the QC plan, or material not meeting the Specifications, comes to the attention of either the Contractor or the Engineer, the other party shall be notified immediately, and the Contractor shall take appropriate corrective actions. Failure to take corrective actions immediately shall be cause for rejection of material or work by the Engineer.

The following are considered significant violations to the Contractor's QC Plan:

- Using testing equipment that is knowingly out of calibration or is not working properly.
- Reporting false information such as test data, JMF information, or any info requested by DelDOT
- Failure to perform materials testing per their approved QC Plan
- Deviating from AASHTO or DelDOT testing procedures.
- Use of any material or the use of a JMF component in a proportion that exceeds the allowable tolerance as specified in section 04(a)(1) of this specification not listed in the JMF.
- Use of the wrong PG graded asphalt.
- Failure to take corrective action per action points in the Contractors approved QC plan.

The following steps will be taken for violations listed above:

1. First offence: Written notice of violation to the Contractor
2. Second offence: Written notice of violation and forfeiture of any bonus (material production or pavement construction) payment eligibility under 401699 section .03 for that production shift.
3. Third offence: Written notice of violation, forfeiture of bonus payment eligibility, and a 5% deduction of payment based upon contract unit price in addition to any calculated pay adjustment factors per 401699 Section 03.
4. Fourth offence: Written notice of violation, forfeiture of bonus payment eligibility, 50% deduction of payment based upon contract unit price in addition to any calculated payment adjustment factor per 401699 Section 03, and immediate suspension of the Contractor until corrective actions are taken. Corrective actions shall be submitted in writing to the Engineer for approval. The Engineer may request a meeting with the Contractor to discuss proposed changes prior to lifting suspension.

Violations of Contractor QC plans shall be kept on record for a period of 1 year from the date of violation at the Central Lab.

(b) Material Production Test Equipment.

Establish, maintain, and operate a qualified testing laboratory at the production plant site of sufficient size and layout that will accommodate the testing operations of both the Contractor and the Engineer.

Facilities for the use of the Engineer and inspectors shall be a minimum of 600 square feet of floor space conditioned to maintain constant temperature of 77F with two windows and a door equipped with functional locks and latches, located such that plant activities are plainly visible from one window of the building. Work space shall be furnished with illumination, tables, chairs, desks, telephone, and water including drinking water, sanitary facilities, fuel, and power necessary to conduct all necessary tests.

Maintain all the equipment used for handling, preparing, and testing materials in proper operating condition. For any laboratory equipment malfunction, the Contractor shall remedy the situation within one working day or the Engineer may suspend production. In the case of an equipment malfunction, the Engineer may elect to test the material at another qualified testing laboratory while waiting for repairs to equipment.

Maintain minimum calibration records for the referenced equipment:

- SUPERPAVE^{R} Gyratory Compactor: once every year; verified once every month by the Engineer.
- Ovens: once every three months, verified once every month.
- Vacuum Container and Gauge (Rice Bowls): once every three months, verified once every month.
- Balances and Scales: once every year, verified once every month.
- Thermometers: once a year; verified once every month.
- Gyratory Compactor molds and base plates: once every year
- Mechanical Shakers: once every year
- Sieve Verifications: once every year

All calibrations shall be documented and on file for review by the Engineer at any time.

(c) Material Production Test Methods

- AASHTO T312 - Preparing and Determining the Density of Hot Mix Asphalt (HMA) Specimens by Means of the Superpave Gyratory Compactor
- AASHTO T166, Method C (Rapid Method) - Bulk Specific Gravity of Compacted Hot Mix Asphalt (HMA) Using Saturated Surface Dry Specimens
- AASHTO T308 - Determining the Asphalt Binder Content of Hot Mix Asphalt (HMA) by the Ignition Method
- AASHTO T30 - Mechanical Analysis of Extracted Aggregate
- AASHTO T209 - Theoretical Maximum Specific Gravity and Density of Hot Mix Asphalt (HMA)
- ASTM D7227 - Standard Practice for Rapid Drying of Compacted Asphalt Specimens using Vacuum Drying Apparatus

.04 Job Mix Formula (JMF)

Mix Design. Develop and submit a job mix formula for each mixture according to AASHTO R35. Each mix design shall be capable of being produced, placed, and compacted as specified. Assign a unique identification number to each JMF.

a) Development of JMF

Gradation: Use the FHWA Superpave 0.45 Power Chart to define permissible gradations for the specified mixture. Type C shall be either a No.4 (4.75 mm), 3/8" (9.5 mm), or 1/2" (12.5 mm) Nominal Maximum Aggregate Size bituminous concrete. Unless otherwise noted in the Plans, the Type C shall meet the 3/8" (9.5 mm) Nominal Maximum Aggregate Size. Type B bituminous concrete shall be the 3/4" (19.0 mm) Nominal Maximum Aggregate Size and the Bituminous Concrete Base Course (BCBC) shall be the 1" (25.0 mm) Nominal Maximum Aggregate Size. Target values for percent passing each standard sieve for the design aggregate structure shall comply with the Superpave control points and should avoid the restricted zone. Percentages shall be based on the washed gradation of the aggregate according to AASHTO T11.

In addition to the results of the material requirements specified above, the following material properties shall be provided by the contractor: bulk specific gravity Gsb, apparent specific gravity Gsa, and the absorption of the individual aggregate stockpiles to be used, tested according to AASHTO T84 and AASHTO T85 and reported to three decimal places along with the specific gravity of the mineral filler to be used, tested according to AASHTO T100 and reported to three decimal places.

Superpave Gyratory Compactive (SGC) Effort:

The Superpave Gyratory Compaction effort employed throughout mixture design, field quality control, or field quality assurance shall be as indicated below. All mixture specimens tested in the SGC shall be compacted to N_M Height data provided by the SGC shall be employed to calculate volumetric properties at N_I, N_D, and N_M

Superpave Gyratory Compactive (SGC) Effort:

DESIGN TRAFFIC LEVEL (MILLION ESAL'S)	$N_{INITIAL}$	N_{DESIGN}	$N_{MAXIMUM}$
0.3 to < 3	7	75	115
3 to < 30	8	100	160
≥ 30	9	125	205

Volumetric Design Parameters. The design aggregate structure at the target asphalt cement content shall satisfy the volumetric criteria below:

DESIGN ESAL'S (MILLION)	REQUIRED DENSITY (% OF THEORETICAL MAXIMUM SPECIFIC GRAVITY)			VOIDS-IN-MINERAL AGGREGATE (% - MINIMUM) NOMINAL MAX. AGGREGATE (MM)					VOIDS FILLED WITH ASPHALT (%)
	$N_{INITIAL}$	N_{DESIGN}	N_{MAX}	25.0	19.0	9.5	12.5	4.75	
0.3 to < 3	≤ 90.5								65.0 - 78.0
3 to < 10									
10 < 30									
≥ 30	≤ 89.0	96.0	≤ 98.0	12.5	13.5	15.5	14.5	16.5	65.0 - 75.0[1]

Air voids (V_a) at N_{design} shall be 4.0% for all ESAL designs. Air voids (V_a) at N_{max} shall be a minimum of 2.0% for all ESAL designs

The dust to binder ratio for the mix having aggregate gradations above the Primary Control Sieve (PCS) Control Points shall be 0.6-1.2. For aggregate gradations below the PCS Control Points, the dust to binder ratio shall be 0.8-1.6. For the No. 4 (4.75 mm) mix, the dust to binder ratio shall be 0.9-2.0 whether above or below the PCS Control Points.

For 3/8@ (9.5 mm) Nominal Maximum Aggregate Size mixtures, the specified VFA range shall be 73.0% to 76.0% and for 4.75 mm Nominal Maximum Size mixtures, the range shall be 75 % to 78% for design traffic levels $3 million ESALs.

Gradation Control Points:

The combined aggregates shall conform to the gradation requirement specified in the following table when tested according to T-11 and T-27.

TABLE 1

Nominal Maximum Aggregates Size Control Points, Percent Passing										
	25.0 MM		19.0 MM		12.5 MM		9.5 MM		4.75 MM	
SIEVE SIZE	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
37.5 MM	100	-	-	-	-	-	-	-	-	-
25.0 MM	90	100	100	-	-	-	-	-	-	-
19.0 MM	-	90	90	100	100	-	-	-	-	-
12.5 MM	-	-	-	90	90	100	100	-	100	-
9.5 MM	-	-	-	-	-	90	90	100	95	100
4.75 MM	-	-	-	-	-	-	-	90	90	100
2.36 MM	19	45	23	49	28	58	32	67	-	-
1.18 MM	-	-	-	-	-	-	-	-	30	60
0.075 MM	1	7	2	8	2	10	2	10	6	12

Note: The aggregate's gradation for each sieve must fall within the minimum and maximum limits.

Gradation Classification

The Primary Control Sieve (PCS) defines the break point of fine and coarse mixtures. The combined aggregates shall be classified as coarse graded when it passes below the Primary Control Sieve (PCS) control point as defined below. All other gradations shall be classified as fine graded.

PCS CONTROL POINT FOR MIXTURE NOMINAL MAXIMUM AGGREGATES SIZE (% PASSING)					
Nominal maximum Aggregates Size	25.0 mm	19.0 mm	12.5 mm	9.5 mm	4.5 mm
Primary Control Sieve	4.75 mm	4.75 mm	2.36 mm	2.36 mm	1.18 mm
PCS Control Point	40	47	39	47	30-60

Plant Production Tolerances:

Volumeric Property	Superpave Criteria
Air Voids (V_a) at (%) N_m	2.0 (min)
Air Voids (V_a) at N_{design} (%)	6.0 (max)
Voids in Mineral Aggregate (VMA) at N_{design}	
25.0 mm Bituminous Concrete Base Course	-1.5
19.0 mm Type B Hot-Mix	+2.0
12.5 mm Type C Hot-Mix	
9.5 mm Type C Hot-Mix	
4.5 mm Type C Hot-Mix	

The proposed JMF shall include the following:

Submit for approval to the Engineer the following documentation on Pinepave mixture design software prior to starting production of a new mixture:

1. Job mix formula (JMF) design of the component materials and target characteristic values for each mixture proposed for use. The component materials design shall include designating the source and the expected proportion (within 1 percent for the aggregate components and within 0.1 percent for the other components) of each component to be used in order to produce workable bituminous concrete meeting the specified properties. Recycled Asphalt Pavement (RAP) is one individual aggregate component regardless of fractionation size. Recycled Asphalt Shingles (RAS) is a separate component from RAP.

2. The JMF target characteristic values include the mixing temperature range, core temperature range for

gyration, the percentage of the asphalt cement component (both total and virgin), and the percentages of the aggregate amounts retained on the sieves to be addressed by the JMF as shown in Table 1.

3. Plot of the design aggregate structure on the FHWA Superpave 0.45 power chart showing the maximum density line and Superpave control points.

4. Plot of the three trial asphalt binder contents at +/- 0.5% gyratory compaction curves where the percent of maximum specific gravity (% of G_{mm}) is plotted against the log base ten of the number of gyrations (log (N)) showing the applicable criteria for N_i, N_d, and N_m.

5. Plot of the percent asphalt binder by total weight of the mix (P_b) versus the following:

   % of G_{mm} at N_d, VMA at N_d, VFA at N_d, Fines to effective asphalt binder (P_{be}) ratio, and unit weight (kg/m²) at both N_d and N_m.

6. Summary of the consensus property standards test results for the design aggregate structure, summary of the source property standards test results for the individual aggregates in the design aggregate structure, target value of the asphalt binder content, and a table of G_{mm} of the asphalt mixture for the four trial asphalt binder contents determined according to AASHTO T209.

7. Test data with each JMF and tests performed by a Qualified Laboratory on representative materials, verifying the adequacy of the design. Refer to the specifications for each mix type in order to determine the design requirements. The JMF sieve percentage values shall conform to the ranges shown in Table 1.

   For any mixture that has a 20% or greater failure rate on any combined volumetric criteria, the JMF will not be approved for use on Department contracts.

8. Provide raw material of each JMF so NCAT Ignition Oven calibration correction numbers can be established for the Engineers and Contractors ovens. The Engineer shall provide an ignition oven correction number for each JMF.

.05 Approval of JMF

The Engineer will have up to three weeks once the JMF is submitted to review the submitted information.

All submitted JMF's shall correspond to the Pinepave mixture design software. The Engineer, for evaluation of the submitted JMF, will use the first three test samples. These test results acquired during production shall be within the following range compared to the submitted JMF on the Pinepave mixture design software: Gmm: + / -0.030 and Gmb: + / - 0.040

a) **<u>Design Evaluation:</u>**

The Engineer may elect to evaluate the proposed JMF and suitability of all materials through laboratory trial batches. All materials requested by the Engineer shall be provided at the contractor's expense to the Central Laboratory in Dover in a timely manner upon request. To verify the complete mixture design and evaluate the suitability of all materials, the following approximate quantities are required:

5.25 gal (20 liters) of the asphalt binder;
0.13 gal (0.5 liters) sample of liquid heat-stable anti-strip additive;
254 lb. (115 kg) of each coarse aggregate;
154 lb. (70 kg) of each intermediate and fine aggregate;
22 lb. (10 kg) of mineral filler; and
254 lb. (115 kg) of RAP, when applicable.

For more expeditious approval, the Contractor may undertake the following steps:

1. Submit the proper documentation on Pinepave mixture design software.
2. Produce the new mixture for a non-Department project. The Engineer will test the material, by taking three series per section 401800 03(c). The mixture will be approved by the Engineer for Department projects if the test results are within the specifications.

A new JMF is required when any of the following conditions occur:

- A change in the source of any of the aggregate component materials
- A change in the proportion of any aggregate component by more than 5.0%
- A change in the aggregate components resulting in a change in percent passing any sieve as identified in Table 1 by more than 5% of the JMF target.
- A change in the target AC content by more than 0.20% from the JMF target to maintain other Volumetric properties of the approved JMF.
- For any mixture that has a 20% or greater failure rate on any combined volumetric criteria.

Although a new JMF is not required, the Contractor shall inform the Engineer of any proposed changes to an existing JMF. The Contractor shall notify the Engineer by electronic mail of the proposed changes. This notification shall include the total change made from the approved JMF proportions, and the effective time of the change. The Engineer will reply to the proposed changes within one operational day and notify the Contractor of the effective date of the changes.

.06 Construction.

(a) Pavement Construction Test Equipment.

The Contractor shall furnish and use in-place density gauges, and/or coring equipment to meet the requirements of these Specifications.

Weather Limitations.

Place mix only on dry, unfrozen surfaces and only when weather conditions allow for proper production, placement, handling, and compacting. The following table of ambient temperatures for various binder grades and lift thicknesses for placement with the following parameters:

	PG Binder		
			64-22
Lift Thickness (in)	76-22	70-22	
1.50	50F	45F	40F
2.00	40F	38F	35F
3.00	32F	32F	32F

- Minimum surface temperature of 32 degrees F AND
- Minimum production temperature of 275 degrees F AND
- Maximum wind speed of 8 miles per hour

Construction outside of these conditions with WMA technology will be at the discretion of the Engineer.

Compaction:

(b) Pavement Construction - Process Control.

Perform Quality Control of pavement compaction by testing in-place pavement density by the following methods.

- ASTM D2950 Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods; the use of other density gauges shall be as per the manufacturer's recommendations.
- AASHTO T166, Method C (Rapid Method) Bulk Specific Gravity of Compacted Hot Mix Asphalt (HMA) Using Saturated Surface Dry Specimens
- ASTM D7227 - Standard Practice for Rapid Drying of Compacted Asphalt Specimens using Vacuum Drying Apparatus

Cores may be cut on the first day of paving or once after the change of a JMF for gauge calibration. The number of cores obtained for calibration purposes shall not exceed the number of QA samples obtained by the Department for payment. The Contractor may use any method to select locations for the Quality Control calibration cores. Repair all core holes in accordance with 401699 Appendix A.

Method of Measurement:

Method of Measurement will be in accordance with Subsections 401.14 and 401.15 of the Standard Specifications.

Basis of Payment:

All work completed under this item shall be considered for full payment and subsequently modified in accordance with the procedures enumerated under 401699.

Material production quality shall be evaluated per item 401699 - Quality Control/Quality Assurance of Bituminous Concrete .03 (a) Material Production - Tests and Evaluations.

Compaction quality shall be evaluated per Item 401699 - Quality Assurance of Bituminous Concrete .03 (b) Pavement Construction - Tests and Evaluations.

10/25/2013

503001 - PATCHING P.C.C. PAVEMENT, 6' TO 15', TYPE A
503002 - PATCHING P.C.C. PAVEMENT, GREATER THAN 15' TO 100', TYPE B
503006 - DOWEL BARS

Section 503 of the Standard Specification is replaced with the following:

503.01 Description. This work consists of removing and disposing of existing Portland cement concrete pavement and replacing it with new Portland cement concrete pavement. The Engineer will designate the boundaries of each repair. This work is not intended for repairing newly constructed Portland cement concrete pavement or for repairing continuously reinforced concrete pavement. This work shall be completed after any planned partial depth patching. It shall also be completed before any diamond grinding, and before any overlay.

Materials

503.02 Portland Cement Concrete. Portland cement concrete shall conform to Class A, Section 812 and have a minimum compressive strength of 2000 psi in six hours as measured by Sure-Cure Mold test cylinders. The Sure-Cure Mold test cylinders and all associated equipment shall be provided by the Contractor. The concrete will be sampled and tested by the Engineer. The Engineer may also use the concrete maturity meter in accordance with AASHTO T325 to determine compressive strength.

This concrete shall also have material present in the mixture to mitigate alkali-silica reactivity (ASR) as per Section 812. The following parameters shall be adhered to by the contractor-submitted mix design for the Portland cement concrete:

CONCRETE PROPERTY	SPECIFICATION
Water/Cementitious Material Ratio	0.40 (Max.)
Air Content (%)	4 - 7
Slump*	2 - 5"
Synthetic Fibers **	1.5 lb/yd³ min. or as per manufacturer's recommendation

*Slump may be increased up to 8" if a Type F Admixture is utilized. All admixtures utilized in the mixture shall be non-chloride based materials.

** Synthetic fibers shall be alkali resistant polypropylene, polyethylene, or nylon fibers with a minimum length of ½" and meet the requirements of ASTM C1116, Type III.

The Contractor, in order to accomplish 2000 psi compressive strength in six hours, shall establish actual combination of weights and proportion of admixtures as required by the field conditions, ambient temperature, humidity, and wind conditions. If the Contractor, due to unfavorable conditions, is unable to accomplish the desired strength in six hours, they may reschedule to the proper timing for performing the patching work.

503.03 Load Transfer Device. Dowel bars shall conform to AASHTO M 227/M 227M grade 65 (grade 450). The entire length of the dowel shall be pre-coated to conform to AASHTO M254. If the slab is less than 10" thick, the dowels shall be 18" long with a diameter of 1 ¼". If the slab is greater than or equal to 10" thick, the dowels shall be 20" long, with a diameter of 1 ½".

Load transfer assemblies shall be fabricated from corrosion-resistant, coated dowel bars conforming to AASHTO M254. Dowel support baskets shall conform to the requirements of Standard Construction Details or details in the Plans.

503.04 Grout. Epoxy grout, when used for anchoring the dowels in place, shall conform to AASHTO M235. Concrete grout, when used for anchoring the dowels in place, shall be non-shrink grout conforming to the

Corps of Engineers "Specification for Non-Shrink Grout," CRD-C621. The maximum allowable expansion shall be 0.4 percent. The grout shall have a compressive strength no less than 3000 psi at 24 hours when tested according to ASTM C109. The initial set shall be less than 60 minutes when tested under the Corps of Engineers "Method of Test for Time of Setting of Grout Mixtures," CRD-C82.

503.05 Joint Sealants. Hot-poured joint sealant shall conform to the requirements of AASHTO M301 or AASHTO M282.

503.06 Curing Materials. Curing materials shall be as follows:

(1) *Liquid Membrane Compounds.* The material shall conform to the requirements of AASHTO M 148, for Type 2, Class A or B white-pigmented liquid curing compound.
(2) *Polyethylene Sheeting.* Polyethylene sheeting shall conform to the requirements of AASHTO M 171.
(3) *Waterproof Paper.* Waterproof paper shall conform to the requirements of AASHTO M 171.
(4) *Water Cure.* The water shall conform to Section 803.

503.07 Insulating Blankets. Insulation blankets shall be a minimum of 2" thick of fiberglass, rock wool, or other approved commercial insulation material.

CONSTRUCTION METHODS

503.08 Patching Limits. The areas of old pavement to be patched will be indicated on the Plans, or identified by the Engineer.

The limits of the area where the pavement is to be removed and patched will be painted on the existing pavement by the Engineer.

Patches can be either Type 'A' or Type 'B'. A Type 'A' patch is 15' or less in length. A Type 'B' patch is greater than 15' and less than 100' in length and contains load transfer assemblies spaced at a maximum of 15'.

Pavement replacement greater than 100' in length shall be constructed under **Section 501 Portland Cement Concrete Pavement**.

503.09 Patching Pavement. The Engineer will designate the boundaries of the concrete patch. The ends of the patch shall either match or offset by at least 2' the existing joints, any cracks, or patch ends in the immediate adjacent lanes. Transverse boundaries of the concrete patch shall be at least 2' from the existing joint line.

Patch lengths shall be at least 6' and no more than 15' without a load-transfer device. The patch shall be the full width of the existing slab or as noted on the Plans. The patch depth shall be no less than the existing slab.

The entire perimeter of the patch that is adjacent to concrete shall be sawed full depth by a concrete saw equipped with a diamond blade or approved equal of sufficient size to cut the concrete slabs to the required depth along straight and plumb lines. All perimeter cuts shall be plumb and parallel to or normal to the centerline of the roadway. Cutting, removing, and replacing existing hot-mix overlays up to 8" on the concrete shall be considered incidental to this item. Any over cut into the remaining slabs shall be kept to a minimum and shall be sealed (incidental to the sealing of the patch if not overlaid; if overlay is planned, no sealing will be required.). Any existing tie-steel across the patch perimeter line shall be cut. The Contractor may make additional cuts (such as diagonal and slanted cuts) to facilitate the removal of the concrete within the patch boundaries. The additional cuts to facilitate removal shall be incidental to the saw cutting item and will not be measured or paid. Cutting shall not precede the removal operations by more than two days.

The concrete in the repair area shall be removed by the lift-out technique without damaging the remaining concrete slabs or disturbing the base and subgrade. The lift out technique involves drilling holes into the patch to insert lifting hooks, pins, or chains. Improper actions (such as dropping the removed slab on adjacent concrete pavement, damaging the pavement edge due to Contractors methods, or other actions deemed damaging by the Engineer) leading to slab damage, shall be repaired by the Contractor, by an approved method, at no cost to the Department.

When the lift-out technique is not feasible, concrete in the patch area shall be broken by an approved mechanical pavement breaker or jackhammers and removed. The removal of the existing concrete and hot-mix overlay shall be executed with minimal disturbance to the remaining concrete or foundation. Any damage beyond the limits of the patch, caused by the improper actions of the Contractor shall be repaired to the satisfaction of the Engineer at no cost to the Department.

Where the patch is next to the shoulder and removal of the concrete results in a clean, uniform shoulder edge, the Engineer may allow the Contractor to use the shoulder edge as the form for the new concrete. Any portion of the shoulder pavement structure removed or disturbed by the patching operation shall be repaired in kind by the Contractor and the cost shall be incidental to the patching item(s). Saw cutting the joint between the concrete pavement and shoulder may assist in maintaining a clean, uniform shoulder edge. If the adjacent shoulder is concrete, the saw cut will be measured and paid for. If the adjacent shoulder is hot-mix asphalt, no measurement or payment will be made.

503.10 Patch Preparation. After removal of the concrete, the repair area shall be cleaned out with hand tools. Particular attention shall be given to existing longitudinal joint areas due to the possibility of loose concrete where the joint cracked away from the plumb line during the original construction. All vertical faces shall be cleaned of loose and deleterious material, prior to the placement of concrete.

Any base or subgrade that is unstable shall be removed to a maximum depth of 6" as directed by the Engineer. No new base material shall be placed; the excavated area will be filled with the concrete when the patch concrete is placed. The excavation is to be paid for under Item 212001 - Undercut, Excavation, Patching, with the replacement material to be concrete SY-IN paid for under Item 503503 - Patching Concrete.

After the old concrete is removed, the patch areas shall be protected from water intrusion when precipitation is forecast.

Dowels shall be placed to provide load transfer at mid-depth ± 1" of the ends of the patch along the transverse joint at 12" ± 1" on-center spacing, at least 6" from the slab edge. The dowel holes shall be drilled parallel to the profile and centerline of the pavement to an embedment depth of half the dowel bar length. The equipment for drilling holes in the face of the remaining concrete slabs must be capable of producing holes of proper size, depth, and angle. The drill must not crack or spall the remaining concrete. A drill support system shall be used to ensure proper hole alignment.

Dowel holes shall be drilled to a diameter of 1 3/4 for cementitious grout and 1 9/16" for epoxy grout. If the existing concrete breaks during drilling, cut away more concrete or relocate the hole to provide a solid support for the dowel. Fill any unused hole with cement grout or epoxy grout. Any damage caused by the Contractor's technique shall be repaired at no added cost to the Department.

The holes shall be blown clean with compressed air prior to placing the anchoring epoxy or grout material. The anchoring material shall be injected into the back of the hole to provide complete coverage around the dowels without any voids. The dowels, each with a grout retention disk, shall be inserted into the holes with a twisting motion and seated into place by tapping. The disk shall be flush to the face of the existing concrete. The dowels shall be solidly held in proper alignment before placement of the patch concrete.

Dowel placement and joint construction details for contraction joints within the patch area shall conform to the requirements of Standard Construction Details or details in the Plans.

The following are the allowable dowel translations and rotations: Vertical rotation - the difference in depth (vertical position) between the midpoint and the exposed end of the dowel; the allowable tolerance is ¼" of vertical deviation from the true longitudinal axis of the pavement. Horizontal rotation - the difference in lateral position between the midpoint and the exposed end of the dowel; the allowable tolerance is ¼" of horizontal deviation from the true longitudinal axis of the pavement. Longitudinal translation - the longitudinal distance between the exposed end of the dowel and the edge of the patch is 10" with an allowable tolerance of ± 1" .

The dowels at the end of each patch will be paid for under Item 503006-Dowels.

Side forms may be required when the patch is adjacent to a hot mix shoulder and the shoulder is damaged during concrete removal.

Bonding of the transverse and longitudinal sides of the patch to the adjacent concrete slabs shall be prevented by an approved bond-breaking material such as a sheet of plastic over the vertical face or a light coating of a wax based curing compound covering the vertical face.

For existing composite pavements (hot-mix over concrete) that will not be overlaid, a 2" lift of hot-mix shall be placed over the concrete after the concrete has reached strength sufficient to allow opening to traffic.

503.11 Placing Concrete. Portland cement concrete shall be placed according to the requirements of Subsection 501.07. The concrete shall be deposited directly on the foundation and shall be uniformly distributed and spread over the entire foundation. Each patch area shall be cast in one continuous operation.

503.12 Consolidating and Finishing Concrete. The concrete shall be consolidated with an internal vibrator, particularly near the edges, corners, and around the dowels. The vibrator must be capable of visibly affecting the concrete from a distance of 1' from the vibrator head.

Except when a hot-mix surface is required or when an overlay will be placed, the surface of the patch concrete shall be struck off flush with the existing pavement. For patches up to 10' long, the screed shall be placed parallel to the centerline of the roadway. For longer patches, the screed may be placed perpendicular to the centerline of the roadway. The surface of the concrete patch shall be textured to match the surrounding pavement (tining, grooves, etc.), except when an overlay will be placed or diamond grinding will be performed.

The riding surface texture, profile, and cross section of the concrete patches shall meet the following requirements:

When the patch surface will be overlaid with Hot-Mix Asphalt as part of this Contract, the patch shall be broom finished or tined, with the texture applied in a direction perpendicular to the traffic flow. The profile and cross slope shall match the adjacent pavement surface. If the profile in the finished patch area contains excessive surface deviations, the patch is unacceptable. Excessive deviations are surface deviations greater than 1/8" from a reference line between points not greater than 10' apart along the direction of traffic.

When the patch surface will be part of the final surface of the roadway, the patch surface shall be finished to match the texture of the adjacent pavement. The patch surface cross section shall match the preceding and following pavement surfaces. The Engineer may test for excessive deviations with a straightedge, a California-type profilometer, or other surface measuring devices. When tested with a straightedge, excessive deviations are surface deviations greater than 1/8" from a reference line between points not greater than 10' apart along the direction of traffic. When tested with a profilograph, excessive deviations are surface deviations greater than 0.3" above or below a reference line between points not greater than 25' apart along the direction of traffic, when the pavement will not be diamond ground end-to-end after patching. When the pavement will be diamond ground end-to-end after patching, excessive deviations are defined as surface deviations greater than 0.4" above or below a reference line between points not greater than 25' apart along the direction of traffic and less than 0.3" after grinding. The Contractor shall correct unacceptable deviations in the patch areas before starting the end-to-end grinding.

503.13 Curing and Protecting. Curing shall conform to the requirements of Subsections 501.11 and 501.12 and the following:

The patch shall be cured and protected with either a liquid membrane curing compound and polyethylene sheeting or wet burlap and polyethylene sheeting.

When liquid membrane curing compound is used, it shall be applied uniformly upon completion of the patch texturing at a rate of 150 ft^2/gallon and then covered with polyethylene sheeting.

When burlap/polyethylene sheeting is used, the patch shall be covered with a layer of wet burlap immediately after the concrete has achieved initial set, and the wet burlap shall be covered with a polyethylene sheet.

After the curing compound/polyethylene sheeting or burlap/polyethylene sheeting is applied, the patch shall be covered with an approved insulation blanket, and it shall remain in place until the concrete has achieved the design strength. Edges and seams in the insulation shall be secured to prevent penetration of the wind.

503.14 Joints. The transverse and longitudinal joints shall be formed or sawed as shown on the Standard Construction Details Transverse joints within the patch area shall be sawed at the proper time to assure proper cracking at the transverse crack. Cleaning and sealing of the joints with hot poured sealant material shall be completed within 5 days after concrete placement if no overlay is planned.

The non-repaired transverse joints on each side of the patched area shall also be cleaned and resealed. Joints shall be cleaned by mechanical wire brushing or by light sandblasting. Immediately prior to resealing, the joint groove shall receive a final cleaning with compressed air having a minimum pressure of 90 psi .

Repairs to damaged concrete or hot-mix shoulder shall be completed before the patch area is subjected to any traffic loading.

503.15 Defective Work. Concrete which fails to reach the full design strength in the specified 6-hours may be considered defective concrete based upon its structural adequacy.

If the concrete is determined to not be structurally adequate by the Engineer, it is considered defective and it shall be removed and replaced at no additional cost to the Department. If the concrete is determined to be structurally adequate by the Engineer and the concrete can remain in place, the Contractor may accept a prorated payment for the below-specified concrete as referenced below. If the Contractor does not wish to accept the prorated payment, the below-specified concrete shall be removed and replaced at no cost to the Department.

503.16 Method of Measurement. The quantity of Portland cement concrete pavement patch will be measured as the actual number of square yards of concrete patch placed and accepted. The width of measurement will be the full width from outside of the completed patches as constructed, measured parallel to the transverse saw cuts. The length will be the actual length measured parallel to the centerline of the pavement.

The quantity of dowel bars will be measured as the actual number of dowel bars installed and accepted at the ends of each patch. Dowel bars and support assemblies (load transfer assemblies) installed at internal joints in Type B Patches will not be measured but will be considered as incidental to the Contract price per square yard for Item 503002 - Patching P.C.C. Pavement, greater than 15’ to 100', Type B.

503.17 Basis of Payment. The quantity of Portland cement concrete pavement patch will be paid for at the Contract unit price per square yard . Price and payment will constitute full compensation for furnishing, hauling, and placing all materials, including high-early strength concrete; load transfer assembly, and joint filler (where applicable).; for removing, and disposing of existing concrete; for preparing the foundation; for tooling, finishing, curing, sealing of over cuts in non-overlay areas, and protecting the new concrete; for disposing of excess material; and for all labor, equipment, tools, and incidentals required to complete the work. In addition, the price and applicable payment(s) will be based on Type A or Type B Patches.

Price Adjustment for Low Strength Concrete. Prorated payment for concrete as specified in Subsection 503.15 shall be calculated as shown in the following equation:

$$\textit{Prorated Payment} = \frac{\textit{Actual 6-hour Compressive Strength}}{\textit{Specified 6-hour Compressive Strength}} \times (\textit{Quantity of Concrete}^{*}) \times (\textit{Bid Price}^{**})$$

* The quantity for which the low compressive strength results represent.

** Item bid price; not material cost.

NOTE:
If the Engineer directs the Contractor (in writing) to place Portland cement concrete which is in violation to any applicable Specifications, or if any other Department Specification is violated, this Prorated Payment will not be enforced.

The quantity of dowel bars will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for drilling holes, furnishing and installing grout and dowel bars with grout retention disk and for all labor, equipment, tools, and incidentals required to complete the work.

Saw cutting the perimeter of the patch that is adjacent to concrete (including shoulder if applicable) will be measured and paid for under item 762002 - Saw Cutting, Concrete, Full Depth. All other saw cutting, including the joint between the concrete and hot-mix asphalt shoulder, will be incidental to the patching item(s).

Hot-pour sealant, if applicable, will be measure and paid for under item 503501 .

Any damage caused by the lift-out technique of the Contractor, shall be repaired by the Contractor at no cost to the Department.

10/4/06

503503 - PATCHING CONCRETE

Description:

This item consists of furnishing and placing Portland Cement Concrete, conforming to the requirements of Section 503 of the Standard Specifications and/or as modified herein under this Contract. After removal of the existing P.C.C. pavement, if the base material is unsuitable or washed out, the unsuitable material shall be excavated and the void replaced with the same concrete used in the patch area. This additional depth shall not exceed 6 (150 mm) from the bottom of the existing P.C.C. Pavement. Excessive moisture remaining after excavation, shall require construction of a pipe underdrain system, when directed by the Engineer and as shown on the Plans. All excavation below the bottom of existing pavement shall be paid for under the item "Undercut Excavation, Patching".

This item may also be used in areas of composite pavements (hot-mix over concrete) if the Contractor elects to pour concrete patch flush with existing hot-mix pavement to eliminate grade differential. This additional depth shall be as directed by the Engineer, but shall not exceed 6" (150 mm) in depth.

Method of Measurement:

The quantity of concrete patching will be measured as the actual number of square yards per inch of thickness (square meters per 25 mm of thickness) of additional thickness either above or below the existing concrete pavement. The area measured shall be the square yards (square meter) on the surface of the base course and the depth measured in inches (mm) from either top or bottom of the original P.C.C. pavement as determined from the adjacent pavement. The depth shall be as directed by the Engineer, but shall not exceed 6" (150 mm) in measurement or payment.

Basis of Payment:

The quantity of concrete patching will be paid for at the Contract fixed price of $5.65 per square yard per inch of thickness ($6.13 per square meter per 25 mm of thickness). Price and payment will constitute full compensation for furnishing and placing additional depth of concrete as described above, for all labor, tools, equipment, and incidentals to complete the item.

NOTE

Also, under the items 503001 - Patching P.C.C. Pavement, 6 to 20 , Type A and 503000 - Patching P.C.C. Pavement, Greater than 20 to 100 , Type B (503001 - Patching P.C.C. Pavement, 1.8 m to 6 m, Type A and 503002 - Patching P.C.C. Pavement, Greater than 6 m to 30 m, Type B), the Contractor shall be paid for the additional thickness of concrete actually poured in the field above the thickness specified on the P.C.C. Patching Plans at a fixed rate of $5.65 per square yard per inch of thickness ($6.13 per square meter per 25 mm of thickness).

10/06/06

503520 - JOINT REPLACEMENT P.C.C. PAVEMENT - LONGITUDINAL
503521 - JOINT REPLACEMENT P.C.C. PAVEMENT - TRANSVERSE

Description:

The item shall consist of removal of the existing joint material, cleaning, retooling, and sealing the existing P.C.C. pavement transverse and longitudinal joints in accordance with the specifications, Plans and as directed by the Engineer.

Materials:

a. Hot-Poured Joint Sealant for longitudinal joints: Hot-poured joint sealant shall conform to AASHTO M 301 or AASHTO M 282.

b. Preformed Elastomeric Compression Joint Seals for transverse joints: Preformed elastomeric compression joint seals shall conform to the requirements of AASHTO M 220. The lubricant used to install the preformed elastic joint sealant shall be a one-component, polychloroprene compound containing only soluble phenolic resins blended together with anti-oxidants and acid acceptors in an aromatic hydrocarbon solvent mixture and shall have the following physical properties:

   1. Average net weight per liter: 0.94 kg + 5%.
   2. Solids content by weight: 22 to 28%.
   3. Viscosity shall be such that the lubricant performs suitably with the installation equipment.
   4. The lubricant shall remain fluid from -15 to 49°C.
   5. Film strength (ASTM D412): 16 MPa minimum tensile strength, 750% minimum elongation before breaking.
   6. The lubricant shall be stored at a temperature between 10 and 27°C. Any lubricant not used within 270 days of its manufacture shall be unacceptable.

c. Backup Material for hot paved joint sealant: The backup material shall be stitched cotton piping cord, polyethylene backer rod, or approved equal material that is compatible with the sealant to be used and capable of withstanding the required sealant application temperature without melting. The backer rod for silicone sealant shall be expanded closed cell polyethylene foam. Back-up material shall be 25% wider than the nominal width of the joints.

Construction Methods:

Removal of existing joint sealant, sawing and/or refacing of joints, cleaning, shape factor dimensions, backup material and sealant installation shall be in accordance with these specifications.

Sealant Equipment: Proper sealing equipment shall be used for the specific material listed in accordance with the manufacturers recommendations. The equipment for hot applied sealing compounds shall be a melting kettle of a double boiler, indirect heating type, using oil as a heat-transfer medium. The kettle shall have an effective mechanically operated agitator and shall be equipped with a positive thermostatic temperature control which shall be checked for calibration before commencing. Overheating shall not be permitted. The hoses and applicator wand shall be insulated.

Existing Sealant Removal: Any in-place sealant shall be removed from the joint using a vertical cutting edge tool; however, V-shape plow tools will not be permitted. A power driven concrete high pressure water blasting will be permitted.

The sealant shall be removed to the depth required to accommodate any separating and/or backup material used, and to provide the specified depth for the new sealant material to be installed.

Refacing of Joints: Joints shall be sawed or refaced using a power driven concrete saw with diamond or abrasive blades to remove all old sealant from the joint faces to expose new clean concrete and, if required, to cut the joint to the width and depth necessary to provide for an effective shape factor in the joint sealant.

Cleaning Prior to Resealing: Following all sawing, resawing, or refacing operations, the joint faces and opening shall be thoroughly cleaned by sandblasting followed by an oil-free air jet to remove all cuttings or

debris remaining on the faces or in the joint opening. The newly exposed joint faces shall be cleaned by sandblasting. The sandblast joint cleaning operation shall be such that when completed the concrete joint surface which is to receive the new joint sealant shall be free of all tar and asphalt, all old sealant, all discoloration and stain, as well as any and all other forms of contamination of the pore structure--leaving a clean, dry, newly exposed concrete surface.

Immediately prior to the placement of the backup material or compression seals, the joints shall be cleaned with a compressed air stream of at least 100 psi measured at the source. The air compressors used for the purpose described above must be equipped with traps capable of removing moisture and oil from the air.

Under no conditions will the Contractor be permitted to place the sealant if there is dust, moisture, oil, or any other contaminants on that portion of the concrete which is to receive the joint sealant.

The Contractor shall be responsible for protecting the public from hazard or damage during the sandblasting and joint cleaning operations. Rigidly supported plywood sheeting or other suitable material and method used for this purpose shall be subject to the approval of the Engineer.

During all operations, care shall be taken not to damage the subbase, curbs, shoulders, load transfer devices, or pavement. In the event that such damage occurs, it shall be repaired to the satisfaction of the Engineer at no expense to the State.

Limits of Joint Preparation: The work required for the removal of existing joint sealant, widening and/or deepening of the joint openings, if required, refacing of joint faces, and sandblasting of the joint faces should proceed at reasonable production rates. The final stages of joint preparation which includes air pressure cleaning of joints, and placement of separating and/or backup material shall be limited to the length of joint that can be resealed during a day's production.

Installation:

a. Backer Rod for Longitudinal Joints. The diameter of the backup material/bondbreaker shall be such that when placed in the joint it will support the sealant at its design depth, allowing the sealant to achieve the design shape, prevent the sealant from leaking around and underneath it, and allow the sealant to deform freely when the joint expands and contracts.

   The backer rod shall not be stretched during insertion in the joint. when the bottom of the joint opening to be sealed is formed by previously installed expansion joint material (such as at concrete patch locations), a nonreactive adhesive-backed tape shall be inserted in lieu of the backer rod. The tape shall be 1/8" wider than the nominal width of the joints.

b. Longitudinal Joint Sealant. All longitudinal joints in the finished concrete pavement shall be sealed with hot-poured joint sealant to the configuration shown on the Plans.

   All sawed joints to be sealed with hot-poured joint sealant shall utilize an approved bond breaker, sufficiently heat resistant to develop the required parabolic sealant shape and depth.

   Construction joints shall be tooled and sealed as shown on the Plans.

   Hot-poured joint sealant shall be placed in conformance with the manufacturer's recommendations concerning joint cleaning, application, and safe heating temperature.

   For rounded or beveled joints, the sealant shall be installed to a depth as shown in the Standard Construction Details.

   The sealing material shall be applied to each joint opening in accordance with the details shown on the Plans or as directed. Application shall be done in such a manner that the material will not be spilled on the exposed surfaces of the concrete. All excess material on the surface of the concrete pavement shall be removed immediately, and the pavement surface cleaned. The use of sand or similar material as a cover for the seal will not be permitted. Hot-poured joint sealing material shall not be placed when the air temperature in the shade is less than 10°C, unless approved by the Engineer.

c. Transverse Joint Sealant. All sawed transverse joints in finished portland cement concrete pavement shall be sealed with preformed compression seals. The equipment shall be as recommended by the manufacturer of the seal and approved by the Engineer before construction is permitted to start.

Detailed design or configurations of the seals will not be specified. The Contractor shall submit the design details of the proposed seal for the Engineer's approval prior to the seal's delivery to the Project site. This approval must be requested in writing. In addition, the Contractor shall furnish a 1.5 meter sample section of the seal. The manufacturer shall certify that the seals comply with the specifications. Test data must be submitted in writing to the Department to support the certification.

The edges of the transverse joints shall be beveled 45 degrees. Permissible tolerances for the bevels are 3 to 6 mm measured along the pavement surface. Should non-uniform width cracking occur at transverse joints, the Contractor may be required to supply and install wider neoprene seals in accordance with manufacturers recommendations.

Before sealing the joints, the Contractor shall demonstrate that the equipment and procedures for placing the compression seal will provide a satisfactorily sealed joint. The top outer edges of the seal should be in contact with the joint faces. There should should be no tendency for the seal to roll towards its center.

Installation of seals manually will not be permitted. Machine installation will be required. The installation equipment for the elastic joint seal material shall be fabricated for that purpose. The installation equipment shall be capable of installing the seal in the joints, with the vertical axis of the seal being parallel to the joint interfaces, without twisting, curling, or nicking of the seal, and shall ensure against the seal being in tension within the joint.

A lubricant shall be used to install the preformed elastic joint seal. Each lot of the lubricant shall be delivered in containers plainly marked with the manufacturer's name or trademark, lot number, and date of manufacture. The Contractor shall submit the manufacture's certification for approval. The elastic seal shall be installed in the joints with the lubricant covering both sides of the seal over the full area in contact with the sides of the concrete joint. The lubricant may be applied to the concrete or seal, or both.

The seal shall be installed in a compressed condition at a depth of not less than 5 mm but not more than 8 mm below the surface of the pavement. the transverse seal shall be placed first. Splices shall be staggered from longitudinal or adjacent joints by 300 mm. Seals shall not be spliced between adjacent joints or slab edges.

The method of installation shall be such that the joint seal shall not be stretched more than 5% of its minimum theoretical length. The method of installing the transverse joint seal shall be checked for stretching. The check shall consist of installing the seal in five joints of full pavement width, and then removing the seal immediately after installation and checking the length. If the measured length of any of these five seals is less than 95% of the length required to seal the joint, the installation method shall be modified so that stretching greater than 5% no longer occurs. Once sealing operations have started, one joint per hundred shall be removed and checked for stretch in excess of 5%. If a stretched condition is detected, the joint seals on either side shall be removed until the condition disappears. The affected joints, including the checked joints, shall be resealed in a satisfactory manner.

Method of Measurement:

This work shall be measured by the number of linear feet (meters) of joints sealed and accepted.

Basis of Payment:

The number of linear feet of transverse and longitudinal joints cleaned and resealed, measured from end-to-end shall be paid for at the Contract unit price per linear foot (meter) for longitudinal and transverse joint replacement in P.C.C. pavement, which prices and payments shall constitute full compensation for furnishing and placing hot poured joint sealer or compression seal as specified on the Plans or as directed, backup material, for removal and disposal of existing joint sealer, for all joint resawing and refacing, for sandblast cleaning, airblast cleaning, for all labor, tools, equipment, and incidentals necessary to complete the item.

602553 - MECHANICALLY STABILIZED EARTH WALLS, TYPE 1

Description:

The item shall consist of furnishing all materials, fabricating, and constructing mechanically stabilized earth walls to the lines and grades as shown on the Plans and as directed by the Engineer.

It is the intent of these specifications to provide a guide in the acceptance of a proprietary mechanically stabilized earth wall system. Acceptance of a proprietary mechanically stabilized earth wall system will be based on review and approval of design and specifications submitted by the Contractor for his chosen system. Deviations from these specifications must be approved by the Engineer.

The Contractor shall be required to submit Shop Drawings in accordance with the requirements of Section 105 of the Standard Specifications.

Materials:

1. Backfill Material

   A. The material shall have magnesium sulfate soundness loss of less than 30% after 4 cycles as determined by AASHTO T104.

   B. All backfill material shall be reasonably free from organic and deleterious materials. Do not use metallurgical slag.

   C. Granular backfill shall meet gradation limits of AASHTO T 27, as outlined below:

Sieve Size	Percent Passing
4 inches	100
No. 40 mesh sieve	0 - 60
No. 200 mesh sieve	0 - 10

   D. The plasticity index (P.I.) as determined by AASHTO T 90 shall not exceed 6.

   E. The fraction finer than 15 microns as determined by AASHTO T 88 shall not exceed 10 percent.

   F. The material shall exhibit an angle of internal friction of not less than 34 degree as determined by the standard direct shear test in accordance with AASHTO T 236, on the portion finer than the #10 sieve and compacted to 95 percent of AASHTO T 99, method C or D (with oversize correction, as outlined in Note 7, AASHTO T 99) at optimum moisture content.

   G. Resistivity greater than 3000 ohm-cm.

   H. ph range between 5.0 and 10.0.

   I. Chlorides less than 100 ppm.

   J. Sulfates less than 200 ppm.

   K. Sulfides less than 300 ppm.

Backfill not conforming to this specification shall not be used without the written consent of the Engineer.

The Contractor, or the supplier as his agent, shall furnish the Engineer a Certificate of Compliance certifying that the above materials comply with the applicable contract specifications. A copy of all test results performed by the Contractor or his supplier necessary to assure contract compliance shall also be furnished to the Engineer.

The frequency of sampling of select granular backfill necessary to assure gradation control throughout construction shall be as directed by the Engineer.

2. Concrete - Concrete shall be in accordance with Section 602 of the Delaware Standard Specifications.

   A. Cast-in-place concrete above footing - DelDOT Class A (f'c = 4500 psi).

   B. Leveling pad - DelDOT Class B (f'c = 3000 psi).

   C. Face panels - DelDOT Class A (f'c = 4500 psi).

3. Reinforcing Mesh - The reinforcing mesh shall meet the requirement of ASTM A 185 (AASHTO M 55).

   Galvanization - Galvanization shall meet the requirements of ASTM A 123.

4. Reinforcing Steel - Bar reinforcement shall be in accordance with Section 603 of the Delaware Standard Specifications and shall be ASTM A615 Grade 60 (AASHTO M31).

5. Embed loop - Embed loop shall be fabricated of cold drawn steel wire meeting the requirements of ASTM A 82 and welded in accordance with ASTM A 185. Loops shall be galvanized in accordance with ASTM 123.

6. Connector Bar - Connector Bar shall be fabricated of cold drawn steel wire meeting the requirements of ASTM A 82 and galvanized in accordance with ASTM 123.

7. Horizontal and Vertical/Inclined Joints - Geotextile filter fabric and adhesive for covering the rear side of the horizontal and vertical/inclined joints shall be approved by the Engineer.

8. Horizontal Joint - The material to be used in the horizontal joints between facing panels shall be polyethylene pads with a minimum density of 0.946 g/cm^3 in accordance with ASTM D 1505.

9. Alignment Pin - 5/8" min. diameter, mild steel, round, and smooth bar galvanized to meet the requirements of ASTM A 123.

10. Tie Strip - Shop fabricated of hot rolled steel meeting the requirement of ASTM A 570, Grade 50. Galvanization shall meet ASTM A 123.

11. Reinforcing Strip - Hot rolled from bars to the required shape and dimensions physical and mechanical properties shall meet ASTM A 572, Grade 65. Galvanization shall meet ASTM A 123.

12. Fasteners - Bolts and nuts shall be 1/2" diameter hexagonal cap screw, high strength meeting ASTM A 325 (AASHTO M 164), mechanically galvanized. The coating shall meet the thickness, adherence and quality requirements of ASTM A 153 (AASHTO M 232).

Concrete Face Panels:

1. Testing & Inspection - All precast units shall be acceptable when compression test results indicate strength will meet 28 day specifications. Panels utilizing Type I or II cement will be considered acceptable for placement in the wall when 7 day initial strengths exceed 85% of the 28 day requirements. Panels utilizing Type III cement will be considered acceptable for placement in the wall prior to 28 days only when compressive strength test results indicate that the strength meets the 28 day specification.

2. Casting - The panels shall be cast on a flat area, the front face of the panel at the bottom, the back face at the upper part. Coil loop inserts, rebar, PVC pipe and lifting devices shall be set in place to the dimensions and tolerances shown on the drawings prior to casting. The PVC pipe shall be placed in a manner as to insure that it is not bent or bowed. Coil loop inserts shall be set on the rear face. The concrete in each unit shall be placed without interruption and shall be consolidated by the use of an approved vibrator, supplemented by hand tamping as may be necessary to force the concrete into the corners of the forms and prevent the formation of aggregate pockets, air bubbles or cleavage planes. Clear form oil of the same manufacturer shall be used throughout the casting operation.

All coil loop inserts shall be attached to the alignment templates using the bolts provided with the forms. The vertical and horizontal alignment of the coil loop inserts shall be 2 1/4" deep in the finished panel and be free of all concrete or debris, loose or otherwise. No concrete or other debris shall be on the interior surfaces of the coils of the coil loop inserts in the finished panels. Immediately after the alignment template is removed, duct tape shall be placed over the coil loop insert holes in order to prevent debris from entering the holes. This duct tape shall not be removed except by the crew that is assembling the wall. Care shall be taken to insure that the duct tape is not removed during shipping.

3. Curing - The units shall be cured for at least 72 hours. Any panel which does not reach specified strength within 28 days shall be rejected.

4. Removal of forms - The forms shall remain in place until they can be removed without damage to the unit.

5. Concrete Finish - Front - As specified on plans
   Rear - Unformed surface, roughly screeded to eliminate open pockets of aggregate and surface distortions in excess of 1/4".

6. Tolerances -

   A. Panel dimensions shall be within 3/16" except that the lateral position of tie strips shall be within 1".

   B. Panel squareness shall not exceed 1/2" as determined by the difference between the two diagonals.

   C. Panel surface defects on smooth formed surfaces shall not exceed 1/8" per 5 foot length. Surface defects on textured - finished surfaces shall not exceed 5/16" per 5 foot length.

7. Compressive strength - Acceptance of the concrete panels with respect to compressive strength will be determined on a basis of production lots. A production lot is defined as a group of panels representing 40 panels or a single day's production, whichever is less.

   During the production of the concrete panels, the manufacturer shall randomly sample the concrete in accordance with AASHTO T 141. A single compressive strength sample shall consist of a minimum of 4 cylinders randomly selected for every production lot. Cylinders for compressive strength tests shall be 6" x 12" prepared and tested in accordance with AASHTO T 23 and T 22, respectively. For every compressive strength sample, a minimum of 2 cylinders shall be cured in the same manner as the panels and tested at approximately 7 days. The average compressive strength of these cylinders, will determine the initial strength of the concrete. In addition, 2 cylinders shall be cured in accordance with AASHTO T 23 and tested at 28 days. The average compressive strength of these two cylinders, will determine the compressive strength of the production lot.

   If the initial strength test results indicate a compressive strength in excess of 4500 psi, then these test results will be utilized as the compressive strength test results for that production lot and the requirement for testing at 28 days will be waived for that particular production lot.

   Acceptance of a production lot will be made if the compressive strength test result is greater than or equal to 4500 pounds per square inch. If the compressive strength test result is less than 4500 pounds per square inch, the acceptance of the production lot will be based on its meeting the following acceptance criteria in its entirety:

   a. Ninety (90) percent of the compressive strength test results for the overall production shall exceed 4,670 pounds per square inch.

   b. The average of any six (6) consecutive compressive strength test results shall exceed 4,750 pounds per square inch.

   c. No individual compressive strength test result shall fall below 4,050 pounds per square inch.

      If a production lot fails to meet the specified compressive strength requirements, the production lot shall be rejected. The rejection shall prevail unless the manufacturer, at his own expense, obtains

and submits evidence of a type acceptable to the Engineer that the strength and quality of the concrete placed within the panels of the production lot are acceptable. If the evidence consists of tests made on cores taken from the panels within the production lot, the cores shall be obtained and tested in accordance with the requirements of AASHTO T 24.

8. Rejection

Units shall be subject to rejection because of failure to meet any of the requirements specified above. In addition, any or all of the following defects may be sufficient cause for rejection:

A. Defects that indicate imperfect molding.

B. Defects that indicate honeycombed or open texture concrete.

C. Defects in the physical characteristics of the concrete, such as broken or chipped concrete.

D. Stained form face, due to excessive form oil or others.

E. Signs of aggregate segregation.

F. Broken or cracked corners.

G. Tie strips bent or damaged.

H. Lifting inserts not usable.

I. Exposed reinforcing steel.

J. Cracks at the PVC pipe or pin.

K. Panel thickness varying in excess of $\pm$ 3/16" from that shown on the plans.

9. Marking - The date of manufacture, the production lot number and the piece-mark shall be clearly scribed or painted with waterproof paint on the rear face of each panel.

10. Handling, Storage & Shipping - All units shall be handled, stored and shipped in a manner as to eliminate the danger of chipping, discoloration, cracks, fractures and excessive bending stresses. Panels in storage shall be supported on firm blocking to protect the exposed exterior finish.

11. Joints - The minimum width of the fabric sheets shall be:

Vertical/Inclined Joints	18"
Horizontal Joints	18"
All Laps in Fabric	4"

Construction Requirements:

1. Excavation and Backfill

A. The foundation shall be graded level for a width equal to or exceeding the length of the reinforcing strips.
B. The foundation shall be compacted as directed by the Engineer prior to wall construction. Any foundation soils found to be unsuitable shall be removed and replaced, as directed by the Engineer.
C. The surrounding earth embankment shall be constructed simultaneously with the select granular backfill and compacted in lifts at the same elevation, meeting density requirements as stipulated in roadway special provisions.

2. Leveling Pad - At each panel foundation level, an unreinforced concrete leveling pad shall be provided as shown on the Plans. The leveling pad shall be cured a minimum of 12 hours before placement of wall panels. The concrete finish must be smooth and flat and not vary from the design elevation by more than 0.01"(+) and 0.02"(-).

3. Wall erection - Precast concrete panels shall be placed vertically with the aid of a light crane. Panels shall be handled by means of a lifting device set into the upper edge of the panels, and shall be placed in successive horizontal lifts in the sequence shown on the Plans as backfill placement proceeds. As backfill material is placed behind the panels, the panels shall be maintained in vertical position by means of temporary wooden wedges placed in the joint at the junction of the two adjacent panels on the external side of the wall. External bracing is required for the initial lift. Vertical plumbness tolerances and horizontal alignment tolerances shall not exceed 3/4" when measured along a 10' straight edge. The maximum allowable offset in any panel joint shall be 3/4". The overall vertical plumbness tolerance of the wall from top to bottom shall not exceed 1/2" per 10' of wall height.

   Installation of reinforcing mesh/strips shall take place after backfill compaction is complete. Reinforcing mesh/strips shall be placed normal to the face of the wall, unless otherwise shown on the Plans or as directed by the Engineer.

   Recesses at lifting devices in tops of topmost panels shall be grouted flush with an approved grout as directed by the Engineer except where there is a poured concrete coping or parapet.

4. Backfill Placement - Backfill Placement shall closely follow erection of each course of panels. Backfill shall be placed in such a manner as to avoid any damage or disturbance to the wall materials or misalignment of the facing panels. Any wall materials which become damaged or disturbed during backfill placement shall be either removed and replaced at the Contractor's expense or corrected, as directed by the Engineer. Any misalignment or distortion of the wall facing panels due to placement of backfill outside the limits of this specification shall be corrected, as directed by Engineer.

   Backfill shall be compacted to 95 percent of the maximum density as determined by AASHTO T 99 method C or D (with oversize correction, as outlined in Note 7, AASHTO T 99).

   The moisture content of the backfill material prior to and during compaction shall be uniformly distributed throughout each layer. Backfill material shall have a placement moisture content between optimum moisture content and two percentage points below optimum moisture content. Backfill material with a placement moisture content outside the range shall be removed and reworked until the moisture content is uniformly acceptable throughout the entire lift. The optimum moisture content shall be determined in accordance with AASHTO T 99 method C or D (with oversize correction, as outlined in Note 7, AASHTO T 99).

   The maximum lift thickness after compaction shall not exceed 8 inches. The contractor shall decrease this lift thickness, if necessary, to obtain the specified density.

   Compaction within 3'-0" of the backface of the wall facing shall be achieved by at least 3 passes of a lightweight mechanical tamper, roller or vibratory system. No soil density tests shall be taken within this area.

   At the end of each day's operation, the contractor shall slope the last level of backfill away from the wall facing to rapidly direct runoff of rainwater away from the wall face. In addition, the contractor shall not allow surface runoff from adjacent areas to enter the wall construction site.

5. Concrete Barrier - Parapet shall be provided per DelDOT criteria.

6. Internal drainage shall be provided to prevent saturation of the reinforced backfill.

Design Criteria:

1. Factor of Safety - Overturning = 2.0
2. Factor of Safety - Sliding = 1.5
3. Weight of Fill = 120 PCF
4. Equivalent Hydrostatic Pressure = 35 PSF

Method of Measurement:

The area of Mechanically Stabilized Earth Walls to be paid for under this item shall be the number of square feet of the finished front precast panel wall surface area actually constructed based on the approved shop drawings complete in place and accepted. Surfaces of footings, unfinished rear surface of the wall panels, leveling pads, coping, or any wall surfaces covered by the coping are incidental to the item and shall not be measured for payment. Measurements shall be taken prior to placing any backfill material that may cover the finished front wall surface area as these precast panel surfaces are to be included in the measurement for payment.

Basis of Payment:

The payment for the item shall be made as measured above at the contract unit price per Square Foot bid for "Mechanically Stabilized Earth Walls", which price and payment shall constitute full compensation for excavation and for furnishing and fabricating all materials for the walls including concrete facing panels, reinforcing strips or mesh, tie strips, geotextiles, adhesives, fasteners, joint materials and incidentals. Payment shall include furnishing and placement of backfill material, concrete leveling pad and coping, all labor and materials required to prepare wall foundation and/or footing, place the reinforcing strips or mesh, erect the concrete facing panels and construct the concrete coping to the lines and grades shown on the plans.

4/5/13

602646 - SILICONE ACRYLIC CONCRETE SEALER

Description:

This work consists of surface preparation, furnishing all materials, and application of a silicone acrylic concrete sealer to any concrete surface. The work shall be performed as indicated on the Plans, in accordance with these Specifications, and as directed by the Engineer.

Materials:

The concrete sealer shall consist of methyl methacrylate-ethyl acrylate copolymer resins and toning pigments suspended in solution of all times by a chemical suspension agent and solvent. Laminar silicates, titanium dioxides, and inorganic oxides may be used for toning pigments. Use of vegetable or marine oils, paraffin materials, stearates or organic pigments in the formulation shall not be permitted.

The Sealer shall be opaque, non-film forming, and penetrating silicone acrylic compound. The sealer shall pass NCHRP 244 Series-2, salt spray resistance requirements. The materials must be local OTC-VOC compliant.

The contractor shall provide Materials and Research Section one (1) quart sample from each batch of the silicone acrylic sealer compound supplied for chemical identification and testing.

The manufacturer shall supply a Materials Safety Data Sheet and a letter of certificate compliance of batch & lot of each shipment of the concrete sealer materials. The contractor shall also provide a manufacturer analysis report of the materials used with the specified batch shipped to the job site.

The color of the compound shall be off white (Federal Color #37925 of FED-STD-595B) or as specified on the plans.

Surface Preparation:

All new concrete surfaces, texturing, saw cutting, repointing and grooving shall be completed before the surface is prepared for sealer. All concrete that is to be sealed shall be cured for at least 28 days after casting or for the length of time specified in the manufacturer's instruction, which ever is longer. After 28 days, concrete surface shall be lightly sand or shot blasted, followed by vacuum cleaning in accordance with ASTM D 4258 & SSPC-SP-13 requirement to completely remove any applied curing compound, and to make surface lightly rough for penetration of sealer.

For existing concrete, all previous sealers and paints, all salt, efflorescence, laitance, and other foreign matter, and all loose material shall be completely removed using one or a combination of different preparation methods as specified in ASTM D-4258 and SSPC-SP 13.

In addition, both new and existing concrete shall receive a high pressure (3000-5000 psi) water washing at a flow of more than 4 gallons per minute, with zero degree of rotary nozzle. The contractor shall also allow the surface to dry for a minimum of 24 hours prior to the coating application after high-pressure washing. All surface preparation work shall be completed and approved by the Engineer before sealer the application can commence.

Construction Methods:

The sealer shall be used as supplied by the manufacturers without thinning or alteration unless specifically required in the manufacturer's instructions and verified by Engineer.

The silicone acrylic concrete sealer shall be applied to all exposed concrete surfaces as shown on the plans.

Concrete curing compounds, form release agents, and concrete hardeners may not be compatible with recommended coatings. Check for compatibility by applying a test patch of the recommended coating system, covering at least 20 to 30 square feet.

The concrete sealer material shall be applied using coverage rate and equipment in accordance with the manufacturer's recommendations.

A minimum of two coats shall be applied; all applications shall be performed under dry conditions with application-spread rate as recommended by the manufacturers.

The sealer shall be applied within the ambient temperature range as recommended by the manufacturer, when no rain is expected within a minimum of 12 hours following the application, and there are no high winds that would cause an improper application. If rain has preceded the application, the surface shall be allowed to dry at least 24 hours before waterproofing application begins.

Follow manufacturers recommendation for coating thickness. No drips, runs, or sags will be allowed during application. Natural bristle brush, roller, or spray can be used to perform the application. Follow manufacturers recommendation during application. No thinning of materials is permitted; all application procedures, and drying time between coats must be as per manufacturers recommendations.

The Contractor shall perform surface preparation and application of the concrete sealer material so as not to endanger any private and/or public property, pedestrians, workmen, and vehicles on, beneath or adjacent to the structure.

Method of Measurement:

The quantity of "Silicone Acrylic Concrete Sealer" will be measured by the square feet of area treated and accepted.

Basis of Payment:

The quantity of "Silicone Acrylic Concrete Sealer" will be paid for at the Contract unit price per square foot. Price and payment will constitute full compensation for furnishing all materials, furnishing and removing scaffolding as required, surface preparation, application of the concrete sealer material, disposal of discarded materials, and for all labor, tools, equipment, and all necessary incidentals to complete the work.

2/1/07

605510 - PREFABRICATED EXPANSION JOINT SYSTEM 2"
605511 - PREFABRICATED EXPANSION JOINT SYSTEM 3"
605512 - PREFABRICATED EXPANSION JOINT SYSTEM 4"
605513 - PREFABRICATED EXPANSION JOINT SYSTEM 5"
605647 - PREFABRICATED EXPANSION JOINT SYSTEM 1 1/2"
605730 - PREFABRICATED EXPANSION JOINT SYSTEM, 1"

Description:

This work consists of furnishing of all materials and necessary labor to fabricate, assemble, construct and install prefabricated strip seal expansion joint systems of the size(s) specified on the Plans, including extrusions, neoprene strip seal, angles, studs, and sliding plates on roadway and/or sidewalks as specified on the Plans, in accordance with these Specifications.

Materials:

Steel members of the types, size and configurations shown on the plans shall conform to AASHTO M 270/M 270M Grade 36 (Grade 250) or Grade 50 (Grade 345) or Grade 50W (Grade 345W), unless specified otherwise on the Plans. All steel of the joint system shall be painted with the 3 coat urethane paint system with a minimum total thickness of 9 mils (225 µm), and all screws shall be stainless steel ASTM A276, Type 304.

The elastomeric material shall be 100% virgin Polychloroprene (Neoprene). The strip seal shall be an extruded neoprene material meeting the requirements of AASHTO M 220 modified to omit the recovery test. The elastomeric material shall have the following physical properties as determined by applicable ASTM tests:

ASTM Standard	Physical Properties	Performance Requirements
D2240 (Modified)	Hardness	60±7 points, Durometer (Type A)
D412	Tensile Strength	2000 psi (13.8 MPa), min.
	Ultimate Elongation	250%, min.
D395 (Method B)	Compressive Set 70 hr. @ 212 F (100 C).	40%, max.
D573	Compressive Set 212 F (100 C)	40%, max.
D1630	Abrasion Resistance	Index of 200 or greater Permissible
D1149	Oxone Resistance 20 percent strain 300 pphm in air, 70h @ 140 F (60 C) (wiped) with tolune to remove surface contamination)	No cracks
D471	Oil Swell, ASTM Oil #3, 70 h @ 212 F (100 C), Weight change	45%, max.
D2240	Low Temperature Stiffening max. 7 days @ 14 F (-10 C)	+15 points Durometer (Type A)

Construction Methods:

Installation of the prefabricated expansion joint system, to include strip seal, steel extrusion and application of adhesives, shall be in accordance with the manufacturer's written recommendations and instructions and as specified herein. Special tools for insertion of seals shall be provided by the manufacturer as may be required. The Contractor shall make arrangements for a technical representative of the manufacturer to be available for advice and inspection during construction of strip seals to ensure satisfactory installation. The strip seal shall be furnished in one piece for the full length of the joint.

Welding shall conform to all applicable requirements of AWS D1.5, including qualifications of welders. Shop drawings and welding procedures must be submitted to the Bridge Engineer for approval prior to any fabrication. Welds at mitered joints in steel extrusions and between steel extrusions and plates and between studs and plates shall be tested by magnetic particle tests methods by a testing laboratory approved by the State. All welds, fabrication and testing will be visually inspected by the Department or its approved representative. The Contractor shall submit the manufacturer's certification for quality of materials and the result of welding inspection to the Engineer. Mill test reports must be supplied for all steel. Where, in the opinion of the Engineer, welds are defective, they shall be rewelded or repaired in a manner acceptable to the Engineer.

The installation procedure as described here, shall be adhered to unless modified by the Engineer.

The prefabricated sealing system shall be shop assembled as a unit including the neoprene strip seal, and preset prior to shipment, using prestressing bolts and adjustable temporary connections between positioning steel members. The opening of the joint shall be set at the width required for the seal at a temperature of 68 F (20 C).

The prefabricated joint assembly shall be positioned and attached to the structure by anchorages. Width adjustments shall be made at the discretion of the Engineer and manufacturer's representative. All movements due to shrinkage, creep, mid-slab deflections, and other factors shall be considered.

The prefabricated joint shall be set normal to the grade and the deck concrete slab graded to meet flush with the edge of the joint plates.

Before placing the deck slab, the anchorage attached to the abutment backwall, or adjacent steel or concrete stringers shall be released by loosening the bolts in the slotted anchorage connections. The prestressing bolts and adjustable temporary connections shall remain in place. After the deck slab has cured the width of joint shall be checked and again adjusted if necessary. The released anchorage shall be tightened, welded and the prestressing bolts and temporary connections removed. The backwall or deck on this side of the joint may then be poured after sealing the openings left by removal of prestressing bolts.

Method of Measurement:

The quantity of the specified size(s) prefabricated expansion joint system will be measured as the actual number of the linear feet (linear meters) furnished and installed, measured along the centerlines of the slab joints.

Basis of Payment:

The quantity of prefabricated expansion joint system will be paid for at the Contract price per linear foot (linear meter). Price and payment will constitute full compensation for fabricating, furnishing, and installing all materials, labor, equipment and all else necessary therefor and incidental thereto.

Payment for erection angles and other components not specifically part of the prefabricated strip seal joint system shall be included in Prefabricated Expansion Joint System.

10/29/01

614589 - STEEL CASING PIPE, 10"
614602 - STEEL CASING PIPE, 16"
614603 - STEEL CASING PIPE, 20"
614605 - STEEL CASING PIPE, 12"
614660 - STEEL CASING PIPE, 24"
614661 - STEEL CASING PIPE, 26"
614662 - STEEL CASING PIPE, 28"
614663 - STEEL CASING PIPE, 32"
614678 - STEEL CASING PIPE, 14"
614744 - STEEL CASING PIPE, 18"
614746 - STEEL CASING PIPE, 48"
614777 - STEEL CASING PIPE, 6"
614778 - STEEL CASING PIPE, 8"
614783 - STEEL CASING PIPE, 30"
614825 - STEEL CASING PIPE, 36"

Description:

This work consists of furnishing all materials and encasing existing and/or proposed facilities such as water main pipe, sanitary sewer pipe, or telephone/electric duct as applicable to the Contract with steel pipe of specified diameter in accordance with the details, notes on the Plans and as directed by the Engineer.

Materials and Construction Methods:

Casing pipe shall be A-53 grade B black steel pipe with 3/8" (9 mm) wall thickness for pipes 30" (750 mm) diameter and less, and 1/2" (13 mm) wall thickness for pipes larger than 30" (750 mm) diameter, and shall conform to the requirements of API-5L, Grade B. Casing pipe shall be bituminous coated inside and outside, and joints shall be welded in accordance with requirements of AWWA C-206. After welding or cutting the pipe, the welded and cut section shall be recoated with bituminous material to the satisfaction of the Engineer or the Owner of the Utility.

The pipe/duct being encased shall be supported by treated lumber, or other device, sitting on the bottom of the casing pipe or other device as shown on the Plans and/or as directed by the Engineer. Space between the casing pipe and the pipe/duct being encased shall be closed with 12" (300 mm) thick Class B concrete at each end of the casing pipe or closed by an alternative method if shown on the Plans.

As shown on the Plans or as directed by the Engineer, a galvanized steel pipe of 1" (25 mm) diameter shall be installed through the concrete seal at the bottom of the down grade end of the casing pipe for draining the entrapped water.

Method Measurement:

The quantity of steel casing pipe will be measured as the actual number of linear feet (linear meters) of each size placed and accepted. Measurement will be made along the centerline from end to end of the steel casing pipe.

Basis of Payment:

The quantity of steel casing pipe will be paid for at the Contract unit price per linear foot (linear meter) for each size of casing pipe. Price and payment will constitute full compensation for furnishing all materials, welding, coating, closing the ends with concrete, galvanized steel pipe for drainage, backfill Borrow Type C, backfilling; and for all labor, equipment, tools and incidentals necessary to complete the work.

For pipe under 24" (600 mm), internal diameter, the excavation (excluding rock), backfill and backfilling shall be included in the price for this item unless otherwise excavation has been included in the pipe item being encased. For pipe of internal diameter 24" (600 mm) and over, payment for excavation and backfill shall be in accordance with Section 208. Furnishing of borrow type C for pipe with inside diameter of 24" (600 mm) and over will be paid for under Section 210.

8/28/01

617515 - HEADWALL

Description:

This work consists of furnishing and placing a concrete drainage headwall as shown on the Plans.

Materials:

Materials shall conform to the requirements of Section 612, 812 and 824 of the Standard Specifications.

Construction Methods:

Concrete headwalls shall be placed in conformance with the details, dimensions, and notes as shown in the details found in the Plans and at the location shown on the Plans.

Method of Measurement and Basis of Payment:

The quantity of headwalls will be measured and paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing, hauling, and installing materials, including concrete and bar reinforcement; for excavating, backfilling, and compacting; for cribbing, shoring, and sheeting; and for all labor, equipment, tools, and incidentals required to complete the work.

617517 - HEADWALL, SPECIAL TYPE I

Description:

This item consists of furnishing materials and constructing headwalls HW-01 and HW-02 in accordance with notes and details on the Plans, these specifications, and as directed by the Engineer. It includes excavation, placing of pipe, concrete masonry, reinforcing and forms, in conformity with the standard sheet, and these specifications.

Materials:

Materials shall conform to the requirements of Section 612, 812 and 824 of the Standard Specifications.

Construction Methods:

Concrete headwalls shall be placed in conformance with the details, dimensions, and notes as shown in the details found in the Plans and at the location shown on the Plans.

Excavation. The Contractor shall excavate to the required depth. The foundation upon which the structure is to be placed shall be compacted to a firm and level surface.

Headwall Structure. Headwall structure shall be poured in place or pre-cast. If the headwall structures are pre-cast, the Contractor shall design the lifting lugs, and all hardware required to transport and install the structure. For cast-in-place structures, steel reinforcing shall be continuous through cold joints and keyways.

Submittals. Working drawings for precast structures, including rebar schedules, shall be submitted for review and acceptance in accordance with Section 105 of the Standard Specifications. Rebar schedules for cast-in-place structures shall be submitted for review and acceptance in accordance with Section 105.

Method of Measurement:

The quantity of headwalls to be paid for under this item shall be the actual number of headwalls constructed in accordance with these special provisions, complete in place and accepted.

Basis of Payment:

The quantity of headwalls as determined above shall be paid for at the Contract unit price for "Headwall, Special Type I", complete in place. Price and payment shall constitute full compensation for furnishing, hauling, and installing materials, including concrete and bar reinforcement; for excavating, backfilling, and compacting; for cribbing, shoring, and sheeting; and for all labor, equipment, tools, and incidentals required to complete the work.

5/7/14

619519 - DYNAMIC PILE TESTING BY CONTRACTOR

Description:

This item shall consist of furnishing all materials, equipment, access, and qualified personnel necessary to perform all high-strain dynamic testing and monitoring of driven piles at the locations designated on the Plans or as directed by the Engineer. The work shall also include analysis and report preparation in accordance with this Special Provision.

Note: This Special Provision replaces Special Provision 619500 - Dynamic Pile Testing By DelDOT.

Materials and Construction Methods:

All equipment, testing and reporting procedures shall be provided and performed in strict accordance with ASTM D4945 - *Standard Test Method for High-Strain Dynamic Testing of Piles*.

The Contractor shall engage the services of a specialty subcontractor experienced in high-strain dynamic monitoring of driven piles to perform dynamic testing and to evaluate and report results to the Department. The specialty subcontractor shall have at least five (5) years of documented experience in the performance and interpretation of dynamic pile testing. The subcontractor's field engineer or technician, who will be operating the instrumentation and collecting the data, shall have documented experience on at least ten (10) prior projects with similar pile requirements. The field engineer or technician responsible for operating the instrumentation shall be fully capable of understanding and interpreting the data being collected during driving. The specialty subcontractor for dynamic testing shall be selected by the Contractor and submitted for approval by the Engineer a minimum of 10 working days prior to the work beginning. Approval will be based on qualifications and applicable previous experience on other projects.

The Contractor shall provide DelDOT reasonable inspection access along the full length and circumference of all piles prepared for instrumentation attachment prior to the piles being lifted and located in the leads.

Dynamic monitoring instrumentation, including all gages and cables, shall not be installed on the pile until the pile has been lifted and aligned in the leads and the hammer and helmet have been properly set.

Anticipated pile splices shall be made prior to the start of driving so that no splices will be required during the dynamic testing.

The specialty subcontractor shall perform dynamic testing during the entire initial drive and restrike of all piles so designated on the Plans or as otherwise directed by the Engineer. The dynamic testing firm shall continuously monitor the tensile and compressive stresses during driving to ensure that the permissible stress limits provided by the Engineer are not exceeded during driving. Should the driving operation result in stresses that approach or exceed the permissible limits, the dynamic testing firm's equipment operator shall immediately have the hammer stroke reduced or the driving operation stopped in order to prevent pile damage. If non-axial driving is indicated by dynamic test measurements, pile driving shall be stopped immediately and the Contractor shall realign the driving system or take other corrective action, as necessary, before resuming driving.

If the top of pile is damaged or becomes deformed at any time during the dynamic testing of the piles, pile driving shall be stopped and the damaged area cut off in accordance with Section 619 of the Standard Specifications. The remaining pile section shall be properly prepared for gauge installation and inspected by the Department prior to the continuation of driving.

All dynamically tested piles shall be driven to an adequate depth to achieve the minimum tip elevation and the minimum initial driving resistance specified by the Engineer. Should the field data indicate the hammer system is not transferring to the pile the full energy anticipated at the end of initial drive, the Contractor shall increase the hammer stroke and/or driving resistance until the minimum initial drive capacity is displayed on the dynamic testing apparatus. However, in no case, shall the permissible stress limits be exceeded.

The Contractor shall maintain a minimum distance of 1 foot (300 mm) between the pile monitoring gages and the ground surface, water surface, or pile template. If additional ground penetration is required, the driving shall be halted, the gages removed and the pile spliced before proceeding with additional driving and

monitoring. Prior to splicing, the pile splice segment shall be properly prepared for gage installation in accordance with ASTM D4945 and made accessible to DelDOT for inspection. After the pile has been properly spliced and the hammer and leads have been reset, the gages shall be reattached to the new pile segment and the drive continued.

Restriking of all test piles, and certain production piles selected by the Engineer, shall be dynamically tested by the Contractor. The Contractor shall wait up to five (5) calendar days after the completion of initial driving before dynamically testing the restrike of any given pile, unless otherwise specified on the Plans or as directed by the Engineer.

Prior to restrike, the Contractor shall mark the pile in 1 (25 mm) increments for more accurate measurement of pile movement during restrike. The Department may elect to monitor the pile movement more precisely by utilizing a survey level. In such cases, the Contractor shall not proceed with the restrike prior to the Department obtaining its requested survey data. The maximum total number of hammer blows required during restrike will be 30 or the maximum total penetration will be 6 (150 mm), whichever occurs first.

All restrikes shall be performed using the same pile hammer, helmet, and compressed cushion material used to install the piles during initial driving. The pile hammer shall be fully warmed up and operated at full stroke, or as otherwise specified by the Engineer, during the pile restrike. The warm-up procedure shall consist of a minimum of 20 blows of the hammer at full stroke at locations other than the piles to be restruck.

If for any reason, the pile hammer malfunctions, the helmet fails, the cushioning materials fail, or any other component of the pile driving system does not function properly during the pile restrike, the Contractor shall wait up to five (5) calendar days and perform additional restrikes at no additional cost to the Department until the pile driving system operates properly through a complete continuous restrike procedure.

Reporting

The Dynamic Testing Consultant shall prepare a written report presenting the results of the test pile program in accordance with the requirements of ASTM D4945 including specific discussion of the pile capacity obtained from the dynamic testing, the performance of the hammer and driving system, driving stress levels, and pile integrity. The following data shall also be provided in the report for the full length of driving at intervals of not more than 10 hammer blows: bearing capacity from the Case Goble method, bearing capacity from at least one additional recognized method, input and reflection values of force and velocity, maximum transferred energy, maximum compressive stress, maximum tensile stress, blows per minute, values of upward and downward traveling force wave, ram stroke, pile penetration depth and corresponding blow sequence.

CAPWAP analyses shall be performed for all initial drives and restrikes of dynamically tested piles. A minimum of one (1) CAPWAP analysis shall be performed for a representative blow near the end of each initial drive and a minimum of two (2) representative blows shall be analyzed towards the beginning of the restrike. The Engineer may request, at no additional cost, an average of one additional CAPWAP analysis per initial drive or restrike at selected pile penetration depths.

Within three (3) working days of the completion of each dynamic test, the Contractor's specialty subcontractor shall submit to the Department a report meeting the requirements of this Special Provision that is signed and sealed by a Professional Engineer licensed in the State of Delaware. In addition to the raw data and ASTM D4945 requirements, the report shall include detailed results of the CAPWAP analyses including, but not limited to, all extrema tables; pile profile and pile model tables; simulated load test curves for the tip and top of the pile; the soil parameters used in the analysis by matching the measured and computed values of forces, velocities, and displacements; and static resistance distribution along the length of the pile, in a format approved by the Engineer.

All raw data and computer analyses shall be made available in electronic format to the Department for additional analysis.

The Engineer shall furnish to the Contractor production pile driving criteria and recommended pile order lengths within three (3) working days of receiving complete and acceptable high-strain dynamic testing reports for all associated test piles within the subject pile group.

Method of Measurement:

The quantity of Dynamic Pile Testing By Contractor will be measured and paid on an Each basis upon receipt and acceptance of the associated dynamic testing report(s). Each initial drive and each restrike dynamically monitored by the Contractor shall be measured as separate units. In other words, one pile dynamically monitored during initial drive and restrike shall be measured as a quantity of two (2) Each.

Basis of Payment:

Payment for Dynamic Pile Testing By Contractor authorized and found acceptable by the Engineer will be made at the Contract unit price per Each for Item 619519. Price and Payment will constitute full compensation for furnishing tools, labor, specialty subcontractor, materials, equipment, analyses, reports, and incidental work required to perform high-strain dynamic pile testing during initial driving and restrikes including providing inspection access to the Department.

10/22/07

708505 - JUNCTION BOX, SPECIAL

Description:

This item consists of furnishing materials and constructing a junction box in accordance with notes and details on the Plans, these specifications, and as directed by the Engineer. It includes excavation, placing of pipe, concrete masonry, reinforcing and forms, in conformity with the standard sheet, and these specifications.

Materials:

Materials used in the construction of the junction box shall conform to the applicable Subsections of Section 708 of the Standard Specifications. Concrete shall conform to Class B, Section 812, Portland Cement Concrete, of these Special Provisions.

Construction Methods:

Construction methods shall conform to the applicable Subsections of Section 708 of the Standard Specifications.

Method of Measurement:

The number of junction boxes to be paid for under this item shall be the actual number of junction boxes constructed in accordance with these special provisions, complete in place and accepted.

Basis of Payment:

The number of junction boxes as determined above shall be paid for at the contract unit price for "Junction Box Special", complete in place, which price and payment shall constitute full compensation for furnishing and placing all materials, including bar reinforcement; for all excavation and backfilling around the structures, for the disposal of surplus materials; and for all labor, equipment, tools, and incidentals necessary to complete the item.

8/15/05

710501 - CONVERTING EXISTING CATCH BASIN TO MANHOLE

Description:

This work consist of furnishing all materials, and constructing a manhole from an existing catch basin in accordance with the locations, notes and details shown on the Plans, and as directed by the Engineer.

Materials and Construction Methods:

Materials and construction methods shall conform to the applicable requirements of Section 708 of the Standard Specifications, and as specified on the Plans.

Portland Cement Concrete shall meet the requirements of Class B, Section 812 of the Standard Specifications.

Method of Measurement:

The quantity of catch basins converted to manholes will be measured as the number of catch basins converted to manholes and accepted.

Basis of Payment:

The quantity of catch basins converted to manholes will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for constructing the manhole from the existing catch basin, for all materials including reinforcing steel, cover & frames and for all labor, equipment, tools, and incidentals necessary to complete the item. The cost for salvaging and delivering gratings to the location as specified on the Plans shall be included in the unit price bid for the item.

7/9/02

712531 - CHANNEL BED FILL

Description:

Furnish and place Channel Bed Fill to the limits specified in the construction plan set.

Materials:

Provide aggregate material meeting the following requirements:

Provide natural, rounded, unwashed and uncrushed aggregate material meeting the gradation of Table 1 when tested in accordance with AASHTO T-11 and T-27.

a. Aggregate material meeting this requirement may be located within the excavation area of the project. The Contractor may salvage this material at his/her discretion by separating and stockpiling the material meeting the requirements of Table 1 and Notes 1&2.
b. Angular quarried aggregate is unacceptable.
c. The cost of salvaging and stockpiling existing material and removing excess stockpiled material is incidental to 712531 – Channel Bed Fill.

Table 1

Percent Passing	Light [3]	Medium [4]	Heavy
5-inch	100	90-100 [1]	Gradation to be noted on plan sheets
1-inch	100 [1]	0-20[2]	
3/4-inch	30-70		
3/8-inch	0-10 [2]		

Notes:
[1] Salvaged materials may contain material exceeding this size and be acceptable.
[2] Salvaged materials may contain up to 20% passing the 3/8-inch sieve but not to exceed 10% passing the #200 sieve when tested in accordance with T-11.
[3] Unless noted otherwise on plan sheets, Light gradation shall be used in locations in Sussex County
[4] Unless noted otherwise on plan sheets, Medium gradation shall be used in locations in Kent and New Castle Counties.

Method of Measurement:

Quantity of Channel Bed Fill will be measured by cubic yards of material acceptably placed.

Basis of Payment:

The quantity of Channel Bed Fill will be paid for at the Contract unit price per cubic yard. Price and Payment will constitute full compensation for all labor, equipment, and other incidentals required to salvage, stockpile, maintain, furnish, haul, place, and remove and dispose of all material necessary to complete the work.

Excavation of existing streambed material will be paid under its respective item.

4/10/12

715500 - UNDERDRAIN OUTLET PIPE, 6
715504 - UNDERDRAIN OUTLET PIPE, 8

Description:

This work consists of furnishing and placing underdrain outlet pipe in accordance with the locations, notes and details shown on the Plans and as directed by the Engineer.

Materials and Construction Methods:

The materials and construction methods for underdrain outlet pipe shall conform to the applicable requirements of Section 715 of the Standard Specifications, except there shall be no requirements for filter fabric and Del. No. 8 stone around the pipe and the pipe shall not be perforated. The material for underdrain outlet pipe shall be the same as for perforated pipe underdrains.

The installed under drain outlet pipe shall be video inspected in accordance with Subsection 715.07 of the Standard Specifications.

Method of Measurement:

The quantity of underdrain outlet pipe will be measured from end to end in linear feet (linear meters) of pipe completed and accepted.

Basis of Payment:

The quantity of underdrain outlet pipe will be paid for at the Contract unit price per linear foot (linear meter) of the diameter as specified on the Plans. Price and payment will constitute full compensation for furnishing all materials, excavation and backfilling, connectors, bolts to block outlet opening to prevent small animals from entering, video inspection for all labor, tools, equipment and incidentals to complete the item.

10/29/01

718511 - CURB/SIDEWALK OPENING

Description:

This work consists of furnishing all materials and constructing curb/sidewalk openings at the location(s) as called for on the Plans and in accordance with the Standard Construction Details

Materials:

Portland Cement Concrete Class B shall conform to the requirements of Section 812 of the Standard Specifications.

Construction Methods:

Excavation or fill embankment shall be made to the required height and compacted to a firm and even surface. After the subbase is compacted to the satisfaction of the Engineer, the concrete forms shall be constructed. Curing of the concrete shall conform to the applicable requirements of Section 501 of the Standard Specifications.

Method of Measurement:

The quantity of curb/sidewalk openings will be measured as the actual number of installed in place and accepted.

Basis of Payment:

The quantity of curb/sidewalk openings will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for excavation, concrete, rebar reinforcement, furnishing and installing trench, backfill, and for all equipment, labor, tools and incidentals necessary to complete the work.

6/13/2012

720512 - P.C.C. SAFETY BARRIER PERMANENT, DOUBLE FACE
720529 - P.C.C. SAFETY BARRIER PERMANENT, SINGLE FACE
720587 - P.C.C. SAFETY BARRIER PERMANENT, DOUBLE FACE, MODIFIED

Description:

This work consists of furnishing all materials and constructing permanent portland cement concrete safety barrier in accordance with the locations, details, notes shown on the Plans, and/or as directed by the Engineer.

Materials:

Material shall conform to the requirements listed on the Plans, and as noted herein. Portland cement concrete shall be 4500 psi (30 MPa) minimum and shall conform to the material requirements of Class A, Section 812, Portland Cement Concrete of the Standard Specifications.

Bar reinforcement shall be epoxy coated meeting the requirements Section 604 Grade 60 (Grade 400).

Construction Methods:

Construction shall conform with the applicable subsections of Sections 602 and 603 of the Standard Specifications, and details shown on the Plans.

The Contractor shall have the option of constructing the permanent safety barriers by selecting Cast-In-Place, or Pre-Cast, or Slip-form methods. The Contractor shall submit his/her plans for the selected method to the Department's Materials and Research Section for approval. In case of selecting the Slip-form method, the Contractor shall be able to demonstrate his/her ability to successfully accomplish the item by his/her past involvement in doing such work. Slip-form plans shall show the sawing of 3 (75 mm) deep contraction joints every 10 - 20 (3 m - 6 m) as determined by the Engineer. The joints shall be sawed within 2-24 hours after placement of concrete depending upon the weather conditions.

Method of Measurement:

The quantity of permanent portland cement safety barrier will be measured by the linear foot (linear meter) along the toe of the barrier, installed in place and accepted.

Basis of Payment:

The quantity of portland cement safety barrier will be paid for at the Contract unit price per linear foot (linear meter) for each type of barrier. Price and payment will constitute full compensation for all material, formwork, sawing of joints, reinforcement bars, and concrete all complete in place and accepted, for all labor, equipment, tools and incidentals necessary to complete the work. Payment for this item includes excavation and the P.C.C. footer portion of the barrier included in this item.

10/29/01

720585 - GUARDRAIL END TREATMENT ATTENUATOR, TYPE 1 - 31
720586 - GUARDRAIL END TREATMENT ATTENUATOR, TYPE 2 - 31
720588 - GUARDRAIL END TREATMENT ATTENUATOR, TYPE 3 - 31

Description:

This work consists of furnishing and installing an impact attenuating guardrail end treatment in accordance with the locations, notes and details on the Plans, the Standard Construction Details, these Special Provisions, and as directed by the Engineer.

Materials:

The end treatment system shall meet the requirements of NCHRP Report No. 350 Test Level 3. The Guardrail End Treatment, Type 1 shall be designed for installation parallel to the roadway. The Guardrail End Treatment, Type 2 shall be designed for installation with the end flared back from the roadway. The Guardrail End Treatment, Type 3 shall be designed for installation where 2 runs of guardrail come together.

The entire end treatment shall be designed for quick and easy replacement after an impact.

Guardrail End Treatment Attenuator Type 1 shall have a minimum of 2 square feet (0.2 square meters) of yellow retroreflective material on the nose. Guardrail End Treatment Attenuator, Type 2 and Type 3 shall have a minimum of 3 square feet (0.3 square meters) of yellow retroreflective material on the nose.

The Contractor shall submit shop drawings, the manufacturer's certification, and the manufacturer's installation instructions to the Engineer. Installation cannot begin until these submissions have been approved by the Engineer.

Construction Methods:

The end treatment system shall be fabricated and installed in accordance with the manufacturer's recommendations and details shown on the Plans.

The end treatment system shall be installed so that there is no rigid object projecting more 4 (100 mm) above ground level in that portion of the attenuator impacted and broken away by an errant vehicle. It is the intent that the errant vehicle not be snagged by an embedded component of the end treatment attenuator.

The grading between the edge of pavement and the end treatment shall be 10:1 or flatter for the length of the end treatment.

Reflectorized washers are not to be used on attenuators unless specified and/or approved by the manufacturer.

The Guardrail End Treatment Attenuator, Type 1 shall be installed with steel tubes and soil plates for the first 4 (min.) wood post. As an alternate, the first 4 (min.) post may be hinged, breakaway steel post if the manufacturer's specifications permit.

Unless otherwise noted on the Plans, the Guardrail End Treatment Attenuator, Type 1 shall be installed with a 25:1 taper beginning 50' (15 m) from the end of the end treatment.

Method of Measurement:

The quantity of guardrail end treatment attenuators will be measured as the number of each type fabricated, installed and accepted.

Note: All guardrail end treatment attenuators will be considered as 50 feet (15 meters) long. The 50' (15 m) length will begin at the center of the nose post and extend back along the attenuator and guardrail to which it is attached. Any guardrail within the 50' (15 m) length will be considered as part of the guardrail end treatment attenuator and not be measured separately. Measurement for the guardrail will begin 50' (15 m) from the center of the nose post of the attenuator.

Basis of Payment:

The quantity of guardrail end treatment attenuators will be paid for at the Contract unit price per each type of guardrail end treatment attenuator. Price and payment will constitute full compensation for furnishing all materials, fabrication and installation and for all materials, labor, equipment, tools and incidentals required to complete the work.

Note: When this item is completely installed, the Contractor may notify the Engineer and request acceptance. The Engineer will make an inspection of the installation and the Contractor shall correct any deficiencies. Once the corrective work is completed to the satisfaction of the Engineer, the installation will be accepted and the Contractor will be relieved from the responsibility for this item. If this item is damaged before the final acceptance of the project, and the damage is not the result of the Contractor's negligence, the Engineer will notify the Contractor to make repairs, and the Contractor will make repairs at the unit price bid (in the case of complete replacement) or at a negotiated price (in the case of partial replacement or repair). Damage caused by the Contractor shall be repaired at no cost to the Department.

8/12/2013

727507 - BRIDGE SAFETY FENCE

Description:

The work consists of furnishing all materials and constructing bridge safety fence in accordance with these specifications, notes and details on the Plans and as directed by the Engineer.

Materials:

All material shall meet the applicable requirements of Section 727 and shall be as noted below unless shown otherwise on the Plans:

Fabric shall be #9 Gage (3.76 mm Dia.) having a 1" Diamond Mesh with top and bottom selvage to be knuckled. Fabric shall be a continuous across all joints (Aluminum Alloy 6061-T94).

All posts, braces, fittings and hardware shall be Aluminum Alloy 6061-T6, unless noted otherwise on the Plans.

All base plates shall be Aluminum Alloy 6061-T6. Aluminum surfaces placed in contact with concrete shall be given a heavy coat of Aluminum Pigmented Alkaline Resistant Bituminous Paint equal to Federal Specifications TT-C-001079a.

Material for anchor bolts shall be ASTM. A276, Type 302 or A36 Steel may be used for the embedded portion.

Construction Methods:

Construction methods shall conform to the applicable requirements of Section 727 of the Standard Specifications, notes and details on the Plans, and as described herein.

All longitudinal rails shall be parallel to the top of parapet. All posts shall be set normal to the top of parapet for roadway grades 6% or less; and for grades over 6% posts shall be set plumb.

The chain link fence shall be true to line, taut and shall comply with the best practice for fence construction of this type. Parts and rails shall be permanently positioned before fabric is placed. Any defects uncovered during the process of inspection of welds on base plates and/or poles and/or elsewhere shall be repaired or replaced at the sole expense of the Contractor.

Method of Measurement:

The quantity of bridge safety fence will be measured in linear (feet)meters along the line of the fence from end to end. Any anti-climb shields or other appurtenances shall not be measured for payment but shall be included in the linear meter cost of the bridge safety fence.

Basis of Payment:

The quantity of bridge safety fence will be paid for at the Contract unit price per linear foot(meter). Price and payment will constitute full compensation for furnishing and placing all materials including posts, rails, anti-climb shields, all accessories; for all labor, tools, equipment and necessary incidentals to complete the work.

6/11/99

727552 – RESOURCE PROTECTION FENCE

Description:

This work consists of furnishing all materials, erecting resource protection fence at location(s) as noted on the Plans or as directed, relocating if required and maintaining/repairing during the construction period. The resource protection fence shall be removed and disposed of after no longer required as determined by the Engineer.

Materials:

A. Submit source of supply for all fencing materials including the posts for approval by the Engineer prior to installation.

B. *Resource Protection Fence:*
   1. 4' (1.2 m) high, U.V. stabilized high visibility orange, high density polyethylene.
   2. Standard mesh opening size of approximately 1 1/2" (38 mm).

C. *Fence Post:*
   1. Length sufficient for 18" (450 mm) embedment in the ground.
      a. Oak wood, a minimum of 2" (50 mm) square.
      b. T-Section steel 1.25" x 1.00" (32 mm x 25 mm).
   2. If the fence is to be installed on bituminous and/or concrete surface, use posts that can be anchored by placing sand bags at their base without damaging pavement.

D. *Bottom Rail Edging:*
   1. If the fence is to be installed along a pedestrian sidewalk, provide bottom rail edging of wood or metal for cane detection.

E. *Protection Signs:*
   1. Protection signs shall be provided by the Engineer and installed by the Contractor. The Contractor shall pick up the signs from the DelDOT sign shop and deliver to the project without any damage to the materials.

Construction Methods:

A. The Contractor shall stakeout the location of the resource protection fence for approval by the Engineer prior to installation. Resource protection fence shall be installed by hand. Grubbing shall not be permitted for the installation of resource protection fence. Where clearing is necessary for fence installation, vegetation shall be cut flush with the ground. Vegetation disturbance shall be kept to a minimum when installing resource protection fence.

B. Space posts no more than 10' (3 meters).
   1. Alternate spacing may be approved only if specified by the fence manufacturer.

C. Use 8" (200 mm) self-locking nylon safety ties for securing the fence to the post.

D. Signs shall be located along the fence facing the construction work area. Signs shall be located no more than 100 feet apart and a minimum of two signs shall be installed along a continuous fence segment. The top and bottom of the signs shall be secured to the top of the fence posts with 8" (200 mm) self-locking nylon safety ties using the existing holes in the sign.

E. Near streams, resource protection fence shall be installed so as not to interfere with base flow. If necessary, a gap in the fencing shall be created such that the resource protection fence terminates at the top of bank on both the right and left stream banks.

F. Install bottom rail edging for cane detection must be at least 6 inches above the surface of the sidewalk or pathway, with the bottom of the edging a maximum of 2.5 inches above the surface.

G. Maintain, repair, or replace resource protection fence as necessary when damaged, missing, or worn out.

H. The resource protection fence shall be removed when the Engineer determines that it is no longer required, typically at the very end of the construction contract. Removal of the resource protection fence shall be done by hand and vegetation disturbance shall be kept to a minimum. Removal shall be incidental to the item. Signs shall be salvaged and returned to the DelDOT sign shop. All other fencing materials shall be disposed of by the Contractor.

Method of Measurement:

The quantity of resource protection fence will be measured as the actual number of linear feet (meters) of resource protection fence furnished, installed and accepted.

Basis of Payment:

The quantity of resource protection fence will be paid for at the Contract unit price per linear foot (meter). Price and payment will constitute full compensation for furnishing, placing, maintaining, clearing, pick-up and delivery of sign materials, salvaging and drop-off of sign materials, removal and disposal of the fence and related accessories, furnishing all labor, equipment, tools and all incidentals necessary to complete the work. Stolen or damaged resource protection fencing and signs shall be replaced at the Contractor's expense.

03/24/11

727555 - RIGHT-OF-WAY MARKER, CAPPED REBAR

Description:

Furnish necessary materials and labor to set at the locations shown on the Plans, and as directed by the Engineer.

Materials:

Provide Right-of-Way Marker, Capped Rebar constructed in accordance with the details shown in the Standard Construction Details using materials specified in:

Bar Reinforcement	Section 603
Aluminum 2" Flat Survey Marker for Rebar	As Submitted and approved by Engineer

Construction Methods:

A. Exact location to be set by a Delaware Professional Land Surveyor in accordance with the plans or as directed by the Engineer;
B. Place Rebar in a vertical position at depth shown on the plans;
C. Place Aluminum 2" flat survey marker on rebar taking care not to move the location of the rebar.

Method of Measurement:

Right-of-Way Marker, Capped Rebar will be measured as the actual number of Right-of-Way Marker, Capped Rebar set and accepted.

Basis of Payment:

The quantity of Right-of-Way Marker, Capped Rebar will be paid for at the Contract unit price per Each. Price and payment will constitute full compensation for furnishing all materials required and setting the Right-of-Way Marker, Capped Rebar by a Delaware Professional Land Surveyor and any incidentals necessary to complete the item. Existing Right-of-Way Marker, Capped Rebar damaged will be replaced as required by Subsection 107.09 of the Standard Specifications and will be repaired, replaced, and set at the Contractor's expense.

9/15/11

734531- STREAMBANK SEED MIX

Description:

As per Section 734 – Seeding.

Materials:

Add the following after the end of 734.04 of the Standard Specifications:

Streambank Seed Mix:

Species Name Common / *(Latin)*	Max. % Weed Seeds	Min % Purity	Min % Germination	Seeding Rate lb/Ac
Turf Type Tall Fescue (*Lolium arundinacea;* formerly *Festuca arundinacea*)	0.5	98	90	200
Perennial Ryegrass (*Lolium perenne*)	0.4	90	90	20
Redtop (*Agrostis alba*)	0.75	95	90	40
Annual Rye *(Lolium multiflorum)*	0.15	98	90	15
			Total Seed Quantity (lb/Ac)	**275**

Construction Methods:

As per Section 734 Seeding with changes to methods as shown on the Plans.

The calendar dates for seeding shall be March 1 to October 31 in New Castle and Kent Counties. The calendar dates for seeding shall be March 1 to November 15 in Sussex County.

No temporary grass seeding will be substituted for this mix.

All other aspects and conditions of Section 734 – Seeding shall apply.

Method of Measurement:

As per Section 734 – Seeding.

Basis of Payment:

As per Section 734 – Seeding.

7/10/12

734551 – NATIVE GRASS SEEDING: NO MOW MIX

Description:

This work consists of furnishing and placing seed and straw mulch.

Materials:

Add the following after the end of 734.04 of the Standard Specifications:

Native Grass Seeding: No Mow Mix:

Species Name Common / *(Latin)*	Max. % Weed Seeds	Min % Purity	Min % Germination	Seeding Rate lb/Ac
Annual Rye *(Lolium multiflorum)*	0.15	98	90	30
Little Bluestem *(Schizachyrium scoparium* var. *scoparium (*formerly *Andropogon scoparius*))	1.00	80	70	40
Deertongue (*Dichanthelium clandestinum* (formerly *Panicum clandestinum*))	1.00	95	60	30
Switchgrass *(Panicum virgatum)*	1.00	95	70	20
Indian Grass *(Sorghastrum nutans)*	1.00	85	75	30
			Total Seed Quantity (lb/ac)	**150**

All seed shall be fresh, clean, from new crop seed, and delivered to the site in original unopened tagged packages in accordance with the Delaware Code and respective State laws.

Small Grain Straw: Straw for mulching shall be from oats, wheat, rye, or other approved grain crops that are free from noxious weeds, mold, or other objectionable material. Straw mulch shall be in an air-dry condition and shall be suitable for placing with an approved mechanical blower.

Construction Methods:

As per Section 734 Seeding with changes to methods as shown on the Plans.

Application of the Native Grass Seeding: No Mow Mix shall only occur between the following dates:

September 1 st to November 15 th .

Low-pressure tires or equipment shall be used in preparation of the seed bed and on seeding equipment.

No Lime or Fertilizer shall be added to the Native Grass Seeding: No Mow Mix.

Small grain straw shall be uniformly and evenly applied immediately after seed has been placed. An approved mechanical blower shall be used to apply the straw. Straw mulch applied by blowers shall provide a loose depth of not less than 1/2 nor more than 2". Ninety-five percent of the blown and shredded straw mulch shall be 6" or more in length when in place.

Straw mulch shall be applied uniformly and evenly across the seeded area at the rate of 4,000 lb/ac and secured by one of the following methods:

1. *Crimping Method.* This method of incorporating the straw into the ground shall be accomplished with the use of crimping device that produces horizontally oriented indentation. Straw mulch shall be incorporated into the soil to a minimum depth of 2" (50 mm). The crimping device shall be approved by the Engineer.
2. *Tracking Method.* This method may be used on all sites mulched with straw and shall involve the use of steel-cleat track-type equipment driving up and down the slopes producing horizontally oriented indentations with the cleats. Cleats shall be capable of incorporating the straw mulch into the soil to a minimum depth of 1 1/2" (40 mm). The equipment used and the method of tracking shall be approved by the Engineer.
3. *Discing Method.* This method shall only be used if specified on the plans and shall involve the use of a disc or harrow to mix the straw into the soil. Straw mulch shall be incorporated into the soil to the depths specified on the plans and to a minimum depth of 3" (76 mm) if not specified on the plans. The discing device shall be as specified on the plans and approved by the Engineer.

Add the following at the end of Section 734.07:

Acceptance of 734551 – Native Grass Seeding: No Mow Mix shall be made at time of placement, provided the seed and straw are mixed and placed as specified herein and as directed on the Plans.

Add the following at the end of Section 734.08:

No Maintenance Bond is required for this work.

All other aspects and conditions of Section 734 – Seeding shall apply.

Method of Measurement:

As per Section 734 – Seeding.

Basis of Payment:

As per Section 734 – Seeding.

7/10/12

734553 - WETLAND MITIGATION GRASS SEEDING

Description:

As per Section 734 – Seeding.

Materials:

Add the following after the end of 734.04 of the Standard Specifications:

Wetland Mitigation Grass Seeding:

Species Name Common / *(Latin)*	**Max. % Weed Seeds**	**Min % Purity**	**Min % Germination**	**Seeding Rate lb/Ac**
Redtop (*Agrostis alba* / *Agrostis gigantea*)	0.15	95	90	30
Indian Grass *(Sorghastrum nutans)*	1.00	85	75	20
Deertongue (*Dichanthelium clandestinum* - formerly *Panicum clandestinum*)	1.00	95	60	20
Switchgrass *(Panicum virgatum)*	1.00	95	70	40
Total Seed Quantity (lb/Ac)				**110**

All seed shall be fresh, clean, from new crop seed, and delivered to the site in original unopened tagged packages in accordance with the Delaware Code and respective State laws.

Construction Methods:

As per Section 734 Seeding with changes to methods as shown on the Plans.

Application of the Wetland Mitigation Grass Seeding shall only occur between the following dates:

September 1 st to November 15 th .

Low-pressure tires or equipment shall be used in preparation of the seed bed and on seeding equipment.

No Lime or Fertilizer shall be added to the Wetland Mitigation Grass Seeding.

Add the following at the end of Section 734.06:

Acceptance of 734553 – Wetland Mitigation Grass Seeding shall be made at time of placement, provided the seed is mixed and placed as specified and as directed on the Plans.

Add the following at the end of Section 734.07:

No Maintenance Bond is required for this work.

All other aspects and conditions of Section 734 – Seeding shall apply.

Method of Measurement:

As per Section 734 – Seeding.

Basis of Payment:

As per Section 734 – Seeding.

7/10/12

735535 - SOIL RETENTION BLANKET MULCH, TYPE 5
735536 - SOIL RETENTION BLANKET MULCH, TYPE 6
735537 - SOIL RETENTION BLANKET MULCH, TYPE 7

Description:

This work consists of furnishing, placing and anchoring soil retention blanket mulch over seeded areas in accordance with notes and details on the Plans, these specifications and direction of the Engineer.

Materials:

The blanket mulch shall be one of the pre-approved products listed in the Approved Product List (APL) at the time of bid, for the type(s) of mulch required on the Plans.

Pre-approval procedures and the current APL may be obtained by writing to the Stormwater Engineer, Delaware Department of Transportation, P. O. Box 778, Dover, DE 19903 or calling (302) 760-2177 or viewing DelDOT's web page at **www.deldot.net/business**. The Contractor shall submit an 8" x 8" (200 mm x 200 mm) sample to the Stormwater Engineer to verify pre-approval. Also, the Contractor shall submit manufacturer's literature, including installation recommendations, to the Engineer.

The products on the APL have been used extensively on DelDOT projects with satisfactory results and/or have received satisfactory evaluations by the NTPEP (National Transportation Product Evaluation Program).

Soil Retention Blanket Mulch, Types 5, generally referred to as erosion control blankets (ECB), shall be composed entirely of 100% biodegradable material.

Soil Retention Blanket Mulch, Types 6 and 7, generally referred to as turf reinforcement mats (TRM), shall be composed of mostly non-degradable material.

In order for a product to be added to DelDOT's Approved Product List and be eligible for use in DelDOT's construction and maintenance works, the product must meet the above guidelines and receive a satisfactory evaluation by NTPEP. The Department will remove products from the APL when field performance is unsatisfactory.

Types of Soil Retention Blanket Mulch Application

Type 5. Top-soiled grass swale at maximum design shear stress less than or equal to 2 pounds per square foot (96 Pascals)
Type 6. Top-soiled grass swale at maximum design shear stress greater than 2 pounds per square foot (96 Pascals) and less than or equal to 6 pounds per square foot (287 Pascals)
Type 7. Top-soiled grass swale at maximum design shear stress greater than 6 pounds per square foot (287 Pascals) and less than or equal to 8 pounds per square foot (383 Pascals)

Construction Methods. The soil retention blanket mulch, shall be placed immediately after seeding operations have been completed or as approved by the Engineer, but in no case shall this period exceed 24 hours from the completion of the seeding operation. Prior to seeding and mulching, the area to be mulched shall be tracked, free of ruts, rocks or clods over 1 1/2 inches (40 millimeters) in maximum dimension and all sticks or other foreign materials which will prevent the close contact of the blanket with the soil. If as a result of rain, the prepared bed becomes crusted or eroded or if any eroded areas, ruts or depressions exist for any reason, the Contractor shall retrack and reseed the eroded areas.

Except for sprayed blanket mulch installation and anchorage of the soil retention blanket mulch shall be in accordance with notes and details in the Plans and the following DelDOT Standard Construction Details:

Standard No. E-9 for rolled blankets under Type 5
Standard No. E-25 for blankets under Types 6 and 7

Should the installation requirements of the manufacturer be more stringent than the above, the manufacturer's requirements shall govern.

Sprayed blanket mulches shall be applied as per the manufacturer's instructions and recommended rate. No application shall be permitted if rain is anticipated within 24 hours as determined by the Engineer.

Method of Measurement:

The quantity of soil retention blanket mulch will be measured in square yards (meters) of each type soil retention blanket mulch installed and accepted. Measurements for calculating the number of square yards (meters) will be made along the surface of the area covered. Overlaps of materials of any kind will not be measured.

Basis of Payment:

The quantity of soil retention blanket mulch will be paid for at the contract unit price per square yard (meter) per each type. Price and payment will constitute full compensation for furnishing and placing all materials; for all methods of anchorage and securement; for repairing any loose or raised pins or pegs or any loose, torn, or undermined fabric; and for all labor, equipment, tools, and incidentals required to complete the work.

1/29/2013

737523 - PLANTINGS

The requirements of Section 737 shall be followed except as modified below:

Subsection 737.07 Peat Moss and Peat Humus.

Add the following:

(c) Composed leaf mulch free of wood, metallic substances, glass or other contaminates may be used in lieu of peat moss or peat humus.

Subsection 737.10 Stakes, Guys, and Related Materials.

Delete paragraphs (e),(f) and (h).

Subsection 737.16 Planting.

Delete paragraph (d).

Add the following:

Wire baskets shall be cut away and removed from the top half of the root ball.

Section 737.17 Plant Establishment.

Delete this subsection in its entirety and add the following:

The plant establishment period for all planting shall begin immediately after all planting and replacements (as specified under Section 737.16, Planting) are complete and acceptable to the Engineer. The plant establishment period will consist of one full growing season during which time the Contractor shall be responsible for all work necessary to keep the plants in a live and healthy condition. A growing season is defined as the period from May 1 through September 30. If the Contractor completes all planting (as specified under Planting) by May 1, the inspection will be held on or about October 1 of that year. In the event the Contractor does not complete all planting by May 1, the inspection will be held on or about October 1 of the following year. All replacement plant material determined to be necessary at the inspection must then be approved at the replacement plant source by October 15. At this time, the Engineer will direct the Contractor to replace those plants determined to be dead or unhealthy by December 1. The Contractor will notify the Engineer in writing that all replacement planting has been accomplished. The Engineer will conduct an inspection within 15 days after such notification to determine the acceptability of the replacements. If all replacements are determined satisfactory by the Engineer, the Contractor will be relieved of all further responsibility for care and replacement.

All planting areas shall be kept free of weeds and grass during the life of the Contract. The Contractor may utilize a pre- or post-emergent herbicide to control such grass and broadleaf weeds incidental to the cost of planting and be totally responsible for the proper use and placement of any such herbicide. As requested in writing by the Engineer, the Contractor shall be responsible to weed within all plant beds and within the saucer limits of individual plants, beginning 10 calendar days after the date of notification. The Contractor shall prune and apply insecticides or fungicides as required, repair or replace stakes and guy wires, tighten guy cable or wire and repair plant saucer washouts when and as specified by the Engineer.

Any plants that settle below or rise above the desired finished grades shall be reset at the proper grades. All replacements shall be plants of the same kind, size and quality as originally specified in the Contract and they shall be furnished, planted, mulched, guyed, watered, etc. as specified herein for new plant material.

If dead or unhealthy plants are discovered, they shall be removed within 10 calendar days and replaced with the next appropriate planting season. The Contractor shall be responsible for all damage incurred to plant material, tree protection, wire or staking regardless of the cause.

The cost of the above described work shall be incidental to Section **737**, Planting. The Contractor shall water all plants as required to sustain them in a healthy condition. The Contractor shall give 24 hours written notice to the Engineer prior to each watering.

Subsection 737.18 Method of Measurement.

Delete the paragraph in its entirety and insert the following:

The quantity of planting will not be measured.

Subsection 737.19 Basis of Payment.

Delete the first two paragraphs in their entirety and insert the following:

The quantity of planting will be paid for at the Contract lump sum. Price and payment will constitute full compensation for furnishing and placing all materials, including plants, soil mixes, and mulch; for protecting plants after digging and prior to planting; for staking, excavating plant pits, pruning, wrapping, and guying; for all watering until final acceptance, for the cultural care of the plants until the completion and acceptance of all landscape work; for disposing of excess and waste materials; for replacement planting; for cleanup; for repairs to plant material, tree protection, wire, or staking due to fire, theft, vehicular damage, or acts of vandalism; for repairs to damaged grassed, planted, or other landscaped area due to the Contractor's operations; for ensuring that topsoil meets the sieve analysis, acidity, and organic matter requirements; for applying sufficient materials to fertilizer that originally failed to meet the specified analysis; for using pre- or post-emergent herbicide to control grass and weeds; for the work outlined under Subsection 737.17; and for all labor, equipment, tools and incidentals required to complete the work.

The breakout sheet attached to the proposal shows all plant material proposed for this Contract. The Contractor shall fill in the per each unit price and the cost (unit price times the proposed quantity) for each species and size listed. The lump sum price bid for item 737523 - Planting shall be the sum of the total cost for all species and sizes listed. The completed typewritten breakout sheet shall be attached to the bid proposal. Failure to submit the breakout sheet with the Bid Proposal will result in the Bid Proposal being declared non-responsive and rejected.

The Department reserves the right to delete from the Contract the furnishing and installing of one or more of the species and/or sizes listed and the right to add or subtract from the quantity of each species and size listed. The lump sum to be paid will be adjusted in accordance with the Contractor's unit prices as required above. There will be no extra compensation to the Contractor if such additions and/or deletion are made.

Payment for the planting as described above may be processed if, in the opinion of the Engineer all work required, except that specified under Subsection 737.17 is satisfactorily completed. No partial payment will be made for any living plant until and unless planted in accordance with these specifications. No additional payment will be made for using plants larger than specified.

5/11/05

743552 – PEDESTRIAN CHANNELIZING BARRICADE SYSTEM

Description:

Furnish, place, relocate, and maintain a pedestrian channelizing barricade system in accordance with the requirements of the Americans with Disabilities Act (ADA), the Delaware Manual on Uniform Traffic Control Devices (DE MUTCD), these specifications, the plans and details, and as directed by the Engineer.

Materials:

Furnish a pedestrian channelizing barricade system meeting the National Cooperative Highway Research Program (NCHRP) Report 350 or the Manual for Assessing Safety Hardware (MASH) Test Level 2 certification. The approved system must have been tested as a barricade in accordance with the NCHRP 350 and/or MASH testing criteria. Submit a copy of the FHWA certification letter and associated documentation to the Engineer prior to acceptance by the Department and prior to installation of the device on the project.

A. *Barricade Rails:*
   1. Manufactured from high density polyethylene (HDPE) with UV inhibitors.
   2. Barricade rails must accommodate a minimum of 7 3/4" (197 mm) wide retroreflective sheeting on both sides of the rails.
      a. Use white prismatic and fluorescent orange retroreflective sheeting where the white and fluorescent orange colors are placed at 45-degree angles.

B. *Barricade supports:*
   1. Manufactured from high density polyethylene (HDPE) with UV inhibitors and internally ballasted.
      a. Use ballast material in accordance with manufacturer recommendations.

Construction Methods:

Construct the barricade with continuous delineation along the designated walkway for use as a channelization device.

A. Assemble the barricade without hardware and in accordance with manufacturer's recommendations.
B. Provide continuous upper and lower rails for hand or cane trailing.
   1. Install upper rail of barricade a minimum 36" (1 m) above the ground, measured from the ground to the top of the upper rail.
   2. Install lower rail of the barricade a minimum of 1 ½" (38 mm) above the ground, measured from the ground to the bottom of the lower rail.
C. No portion of the barrier structure or supports may extend into the walkway more than 3/4" (19 mm) further than the common plane formed by the upper and lower rails.
D. Ensure that barricade joints are smooth and snag-resistant to accommodate safe hand trailing.
E. Provide accommodations for attachment of audible information devices.
F. Pedestrian channelizing barricades cannot be used as road closure barricades or provide positive protection between the temporary walkway and vehicular traffic.
G. Remove pedestrian channelizing when it is no longer needed.
   1. Dispose of all materials in accordance with Subsection 106.09

Method of Measurement:

Pedestrian channelizing barricade will be measured along the linear centerline of the barricade in units of linear feet per day (LF/DY), acceptably installed, maintained, removed and completed as specified

Basis of Payment:

Pedestrian channelizing barricade will be paid for at the contract unit price bid per linear feet per day for the item Pedestrian Channelizing Barricade. Price and payment includes full compensation for providing certification, furnishing, placing, maintaining, and relocating the barricades as required, all labor, equipment, tools, and all incidentals necessary to complete the work. Replace barricades stolen or damaged at no cost to the Department.

2/23/12

744500 - CONDUIT JUNCTION WELL, TYPE 6, PRECAST POLYMER CONCRETE
744506 - CONDUIT JUNCTION WELL, TYPE 7, PRECAST POLYMER CONCRETE
744507 - CONDUIT JUNCTION WELL, TYPE 8, PRECAST POLYMER CONCRETE
744508 - CONDUIT JUNCTION WELL, TYPE 9, PRECAST POLYMER CONCRETE
744509 - CONDUIT JUNCTION WELL, TYPE 10, PRECAST POLYMER CONCRETE
744520 - CONDUIT JUNCTION WELL, TYPE 1, PRECAST CONCRETE
744523 - CONDUIT JUNCTION WELL, TYPE 4, PRECAST CONCRETE
744524 - CONDUIT JUNCTION WELL, TYPE 5, PRECAST CONCRETE
744530 - CONDUIT JUNCTION WELL, TYPE 11, PRECAST CONCRETE/POLYMER LID-FRAME
744531 - CONDUIT JUNCTION WELL, TYPE 14, PRECAST CONCRETE/POLYMER LID-FRAME
744532 - CONDUIT JUNCTION WELL, TYPE 15, PRECAST CONCRETE/POLYMER LID-FRAME

Description:

This work consists of supplying, constructing and installing conduit junction wells as shown on the applicable Plan Sheets or Standard Construction details

Materials:

Concrete shall conform to Section 812, Class B of the Standard Specifications.

Castings shall conform to Section 708.05 of the Standard Specifications.

Frames and lids shall be in accordance with Sections 708 and 744 of the Standard Specifications.

All required hardware and wire for Bonding and Grounding as shown on the Standard Construction or applicable Plan details.

Types 6, 7, 8 and 10 are precast polymer concrete stackable boxes with no base.

Precast polymer concrete is reinforced by heavy-weave fiberglass with a compressive strength of 9,000-15,000 psi, impact energy of 30-72 ft. lbs. and a tensile strength of 800-1,100 psi. Precast polymer concrete should be tested according to the requirements of ASTM Method D-543, Section 7, Procedure 1 for chemical resistance.

All precast polymer concrete covers shall be the heavy-duty type with a design load of 15,000 lbs. over a 10" square. The coefficient of friction should be greater than 0.5. The precast polymer concrete cover logo shall bear the inscription "DelDOT" (Types 6, 8, and 10) or "DelDOT TRAFFIC FIBER OPTICS" (Type 7).

Types 11, 14, and 15 are precast polymer frame and lids installed on a precast concrete base. Precast polymer concrete frame and lids shall be the heavy-duty nonconductive type with a design load of 15,000 lbs. over a 10" square. The coefficient of friction should be greater than 0.5. The precast polymer concrete lid logo shall bear the inscription "DelDOT ELECTRIC"(Types 11, 14, and 15)

Construction Methods:

The conduit junction well shall conform to the dimensions shown on the Standard Construction or applicable Plan Details, or on the manufacturer's specifications and shall be built so as to ensure that the cast iron frame and lid or polymer concrete box and cover are set level with the surrounding surface when constructed within pavement, sidewalks, pedestrian curb ramps, etc., and set above grade and graded to drain away from the junction well when constructed in unpaved areas. More than one conduit may extend into the well and shall conform to the dimensions shown on the applicable plan sheets or Standard Construction Details. A stone base shall be built for all types of junction wells. Grounding and bonding of the units shall be performed as shown on the plans or Standard Construction details.

Method of Measurement:

The quantity of junction wells shall be the actual number of conduit junction wells by type, that are supplied, constructed, complete in place, and accepted, including cast iron frames and lids with grounding lugs, precast polymer concrete frame and covers, or precast polymer concrete covers, stone base, bonding, grounding, and splicing if required. Frames and lids or precast polymer concrete covers must be installed prior to acceptance of this item.

Payment for all conduits extending into the junction well shall be included in the items for conduit installation.

The length of ALL conduits within a junction well shall conform to the Standard Construction or applicable Plan Details or as directed by Engineer. Payment for cutting existing conduit as directed by Engineer, where a junction well is replaced with a larger type of junction well is included in the bid price. The removal and replacement of cables within the conduits to be shortened shall be handled under other items of this contract.

Basis of Payment:

Payment for conduit junction wells as measured above shall be made at the Contract unit price per each junction well of the type indicated, completely installed and constructed, including excavation, backfilling, and stone base. Price and payment will constitute full compensation for all labor, equipment, tools, and incidentals required to complete the work.

2/29/12

744544 – ADJUST OR REPAIR EXISTING CONDUIT JUNCTION WELL

Description:

This work consists of adjusting or repairing existing conduit junction wells, including furnishing all materials, in accordance with this specification, notes and details on the applicable Plans, the Standard Construction Details, and as directed by the Engineer. If Bonding and Grounding of the unit is required, that work will be paid for under "Bonding and Grounding Existing Junction Well".

Materials:

Portland cement concrete shall conform to the requirements of Section 812, Class B.
Mortar shall conform to the requirements of Section 611.
Brick shall conform to the requirements of Section 611.
Concrete block shall conform to the requirements of Section 819.

Construction Methods:

Repair of conduit junction wells includes repairing/patching the masonry walls and resetting existing frames and lids or precast polymer concrete covers.

Adjusting involves raising the elevation of the frame and lid to match the grade of the surrounding area.

Method of Measurement:

The quantity of conduit junction wells adjusted or repaired will be measured as the actual number of conduit junction wells adjusted or repaired and accepted. If a new frame and lid or precast polymer concrete cover is needed, it will be supplied under a separate item.

Basis of Payment:

The quantity of conduit junction wells will be paid for at the Contract unit price per each junction well. Price and payment will constitute full compensation for excavating, backfilling, compacting and disposing of excess materials, for furnishing and placing all materials and for all labor equipment, tools and incidentals required to complete the work.

2/29/12

745601 – FURNISH & INSTALL UP TO 3" FLEXIBLE METALLIC-LIQUIDTIGHT CONDUIT
745602 - FURNISH & INSTALL UP TO 4" SCHEDULE 80 HDPE CONDUIT (BORE)
745603 - FURNISH & INSTALL UP TO 4" SCHEDULE 80 PVC CONDUIT (OPEN CUT)
745604 - FURNISH & INSTALL UP TO 4" SCHEDULE 80 PVC CONDUIT (TRENCH)
745605 - FURNISH & INSTALL UP TO 4" SCHEDULE 80 PVC CONDUIT (ON STRUCTURE)
745606 - FURNISH & INSTALL UP TO 4" GALVANIZED STEEL CONDUIT (TRENCH)
745607 - FURNISH & INSTALL UP TO 4" GALVANIZED STEEL CONDUIT (BORE)
745608 - FURNISH & INSTALL UP TO 4" GALVANIZED STEEL CONDUIT (OPEN CUT)
745609 - FURNISH & INSTALL UP TO 4" GALVANIZED STEEL CONDUIT (ON STRUCTURE)
745610 - FURNISH & INSTALL UP TO 4" NONMETALLIC POLE RISER SHIELD

Description:

Furnish and install HDPE, PVC, or Galvanized steel conduits of any size less than or equal to 4 inches in diameter (3 inches or less for Flexible Metallic Liquidtight Conduit) as described below.

Materials:

All conduits shall be UL listed.

HDPE Conduit - 4" or less diameter, high density polyethylene (HDPE) schedule 80, smooth wall conduit with permanently pre-lubricated lining, meeting ASTM D2447, ASTM D3035 and NEMA TC7 specifications.

PVC Conduit - 4" or less diameter, schedule 80 rigid polyvinyl chloride (PVC) conduit, meeting Commercial Standard CS-272-65 (PVC), ASTM D-1785 and U.C. Standard 651 specifications.

Galvanized Steel Conduit - 4" or less diameter, rigid galvanized steel conduit meeting National Electric Code 2002, Article 344.

Nonmetallic Pole Riser Shield – 4" diameter or less nonmetallic pole riser shield with belled ends meeting NEMA TC-19 specifications.

Flexible Metallic-Liquidtight Conduit – meets National Electric Code 2002, Article 350

Weatherhead for galvanized or PVC conduit – material shall match the adjoining conduit

Insulated grounding bushing with knockouts - meet or exceed UL 514 B

Condulets for conduit sizes - material shall match the adjoining conduit

Anchors - A 307, Galvanized per A 153

One hole conduit hangers - Steel City Series 6H or 6H-B, CADDY CD3B Rigid Conduit Hanger, or approved equal

End caps - material shall match the adjoining conduit

LONG sweep sections for conduit sizes - material shall match the adjoining conduit, and shall be manufactured 90 degree sweeping bends.

Construction Methods:

General Installation Requirements - The Department has the right to reject any installation method proposed for a given work site. PVC shall not be installed under existing pavement unless it is on a continuous roll or with the Engineer's written approval.

Conduit installed underground shall be installed in a straight line between terminal points. In straight runs, junction well spacing shall be no more than 600 feet for fiber optic conduit or no more than 300 feet for copper in conduit, or as directed by the Engineer. If bends are required during installation, they must be manufactured sweeping bends. The Engineer will be consulted before any bends are installed to ensure that the proper arc is provided.

Conduit shall have a minimum cover as measured from the finished grade of 24 inches and a maximum cover of 48 inches.

The opening shall be filled half way with the cover material, and tamped down firmly before filling in the remainder of the opening. Additional lifts shall be used as required to install the metallic warning tape at the specified depth. All cover material shall be free of rocks, debris, vegetation or other deleterious material that may damage the conduit. An underground utility warning tape shall be installed as specified in this section and the remainder of the fill shall be added, tamping down the top layer.

Conduit not terminated to a base or in a junction well shall be terminated 2 feet beyond the edge of the pavement unless otherwise directed by the Engineer, and properly capped. Tape is NOT an approved method. Conduit shall not extend more than 3 inches inside a junction well. See Standard Construction Details or applicable Plan Details for typical methods of termination.

All underground conduits shall be marked in the ground with a metallic warning tape. The marking tape shall be buried directly above the conduit run that it identifies, at a depth of approximately 12 inches below final grade. The tape identifying ALL conduits shall be at least 6 inches wide, and have a minimum thickness of 3 mils and 500 percent elongation.

The color of the metallic warning tape identifying fiber optic cable should be bright orange (preferably AULCC orange), and shall read "WARNING - OPTICAL CABLE" or other wording approved by the Engineer that conveys the same message. The color of the tape identifying all other cables shall be bright red, and shall read "WARNING —BURIED ELECTRIC BELOW" or other wording approved by the Engineer that conveys the same message.

Using conduit tools, rigid metallic conduit shall be cut, reamed, and threaded. The thread length shall be as necessary to ensure that the sections of conduits when screwed into a coupling and tightened correctly will butt together and the joint will be watertight. A three-piece threaded union, as approved by the Engineer, shall be used to join two threaded lengths of conduit in the case where a standard coupling will not work. A threaded union shall not be used in a conduit run that is to be driven. At no time is a threadless coupling or a split-bolt coupling to be used for direct buried conduit.

All lengths of HDPE conduit shall be connected with irreversible fusion couplings. Mechanical and removable couplings will not be accepted.

All lengths of PVC conduit shall be connected by one conduit end fitting inside the flared end of the other conduit section. If this is not possible, then a coupling may be used. Regardless of how connection is made, all joints shall be sealed with the appropriate epoxy to ensure that the two conduit pieces bond to one another to form a solid waterproof link. Using conduit tools, the conduit shall be cut and prepared. If approved by the Engineer, a coupler module may be used where conduit segments do not align properly to allow the flared end of one conduit segment to mate with the normal end of the other segment.

Sealed end caps (with knockouts if empty) shall be placed on the ends of all conduits, after compressed air has been used to clear all foreign matter.

If not already pre-installed by the manufacturer, a polyester or polypropylene pulling rope or tape (fish wire) with a minimum rated strength of 1250 pounds shall be installed in each conduit for future use. In instances where the Contractor installs the cable, the fish wire may be eliminated.

All PVC and HDPE conduits shall have a continuous metallic trace wire installed for the entire length of the conduit run for all fiber installations.

Installation Of Conduit Under Existing Pavement, Directional Bore -

Directional bore shall be used for installation of conduits under existing pavement with a conduit diameter

not less than 1-1/2". The size of a bore shall not exceed the outside diameter of the conduit by more than 1 inch. If it does, cement grout shall be pumped into the void. **Only HDPE and/or Galvanized Steel conduit may be installed by Directional Bore methods.**

Installation Of Conduit Under Existing Pavement, Open Cut -

Installation by sawcutting the full pavement depth and removing the existing pavement with an excavator or by hand methods, shall be used only for conduits not less than 1-1/2" diameter. The Engineer must first approve all open cutting of roadways. The width and length of open cut and patch restoration materials shall be as shown on the plan details. The Contractor shall be responsible for the removal of all cut pavement and surplus excavation, and for the replacement and correction of any damaged pavement outside the sawcut limits after the conduit(s) are installed. Asphalt pavement, concrete, base course, sawcutting, and/or borrow from an outside source as required to restore the roadway will be paid for separately under their respective bid items.

Installation Of Conduit Under Existing Pavement, Unpaved Trench -

Trenching or other approved method shall be used for installation of conduit in unpaved trench or under new pavement. Backfill in conduit trenches shall be compacted thoroughly as it is being placed. At the discretion of the Engineer, sod, that must be removed for the placement of conduit, shall be removed either by the use of an approved sod cutter and then replaced, or 6 inches of topsoil shall be placed and the surface seeded in accordance with Section 734001 - Seeding. In areas where new pavement is to be placed or in areas where total reconstruction is taking place, sodding or seeding may not be required by the Engineer. Sodding and/or topsoil from an outside source if required will be paid for separately under their respective bid items. Seeding is considered incidental to the conduit item.

Installation Of Conduit On Structure -

Conduit installed on structure shall consist of drilling anchors into concrete, brick, stone, steel or wood and mounting the conduit with the proper clamps or hangers. The conduit shall be attached to the structure by use of one-hole conduit hangers and approved anchors not more than 36 inches apart. Any 90-degree turns in the conduit run shall be accomplished by placing the proper size and type manufactured sweeping bends for the application needed.

Installation of Nonmetallic Riser Shield or Flexible Metallic Liquidtight Conduit -

Riser Shield and/or Flexible Metallic Liquidtight Conduit installed on wood poles, metal poles, structures, and/or mast arms shall be installed in a straight line. The conduit, when attached to poles, shall be attached with 2-hole straps spaced not more than 36 inches apart with the top-most strap being 12 inches from the weatherhead and the lower-most being 12 inches from the condulet. A weatherhead matching the diameter of the conduit shall be installed on the upper end of the conduit. A condulet of the same size as the conduit being installed, but not smaller than 2 inches shall be placed 48 inches above finished grade. Install two, 2-hole straps of the proper size, evenly spaced below the condulet. Nonmetallic pole risers (U-guard) shall be installed on poles to allow interduct to be connected directly to messenger cable. The underground conduit shall be as close to the base of the pole as possible. If the nonmetallic pole riser or metallic liquidtight conduit is not the same size as the conduit, an adapter shall be used at no additional cost to the Department. The nonmetallic pole riser or metallic liquidtight conduit shall be attached to the pole with 1/4" x 1-1/2" galvanized lag bolts with washers. Lag bolts will be used every 36 inches on BOTH sides of the nonmetallic pole riser or liquidtight conduit, and in the top most and bottom most set of slots. Flexible metallic liquidtight conduit shown on the plans to be installed on mast arms or on metal structure shall also include stainless steel banding placed at a maximum of 5 feet intervals.

Method of Measurement:

The quantity of conduit or riser shield installed as specified, shall be measured as the number of linear feet of each conduit or riser shield installed as specified, complete in place, and accepted.

The length of each conduit installed under existing pavement by a directional bore or by open cutting the pavement shall be measured along the path of the bore or open cut, from the point that cannot be trenched to the point that trenching can resume. The length of any conduit that is reduced or divided (with a junction well or conduit body) shall be measured as part of the larger conduit.

Basis of Payment:

The quantity of conduit or riser shield will be paid for at the Contract unit price per linear foot. Price and payment shall include full compensation for furnishing all conduit and/or riser shield materials, equipment, labor, and incidentals necessary to complete the item.

For conduit installed by Directional Bore, the linear foot payment also includes excavation and backfilling for Bore Equipment, placing the conduit, caps if required, and all other requirements and incidentals listed in the body of this specification.

For conduit installed by Open Cutting existing pavement, the linear foot payment also includes excavating, backfilling, placing the conduit, disposal of excess materials, and all other requirements and incidentals listed in the body of this specification.

For conduit installed in an Unpaved Trench, the linear foot payment also includes excavating, removal of sod if required, backfilling, placing the conduit, disposal of excess materials, replacing excavated on-site sod if required, seeding if required, and all other requirements and incidentals listed in the body of this specification. Sod and/or topsoil furnished from an outside source, will be paid for separately.

For conduit installed on a structure, the linear foot payment also includes furnishing and installing anchors and hangers, removal of excess materials, and all other requirements and incidentals listed in the body of this specification.

For riser shield or flexible metallic conduit installed on poles, mast arms, or structures the linear foot payment also includes furnishing and installing straps, weatherhead, condulet, lag bolts and washers, any other required mounting hardware, and all other requirements and incidentals listed in the body of this specification.

2/29/12

746507 – INSTALLATION OF STEEL POLE (LESS THAN 40')
746528 - INSTALLATION OF STEEL POLE (EQUAL TO OR GREATER THAN 40')
746697 - INSTALLATION OF WOOD POLE
746815 - INSTALLATION OF LUMINAIRE
746831 - INSTALLATION OF PEDESTAL POLE
746928 – INSTALLATION OF STEEL MAST ARM POLE WITH SINGLE OR TWIN MAST ARM UP TO 70'
746942 - INSTALLATION OF LIGHTING POLE WITH ARM AND LUMINAIRE

Description:

This work consists of installing the specified type of pole on an existing pole base (or ground mounted for wood pole) in accordance with the locations, notes, and details on the Plans and as directed by the Engineer.

Materials:

Unless specified otherwise, the steel mast arm(s), steel pole, pedestal pole, wood pole, lighting pole, luminaire, and all necessary hardware shall be furnished by the Department. These materials can be obtained from the Department's Dover Sign Shop. The Contractor shall inform the Department two working days prior to picking up the pole, and other related hardware. Where pole installation is part of the work of relocating an existing pole on a project, the pole and related hardware shall be that which is removed from the existing pole site.

Construction Methods:

General -

Prior to erecting a pole, the Contractor shall be sure that there is a sufficient length of anchor bolt to permit the anchor bolt to extend at least flush with the top of the top nut when that nut is tightened in place. If this condition does not exist, the Contractor shall not erect the pole and shall notify and await instructions from the Engineer.

Connection of the mast arm(s) or other required assembly shall be performed by the Contractor according to his selected installation methods.

The Contractor shall make special note of any aerial utilities within the area and coordinate his work accordingly.

All conduit caps or knockouts are to be removed from the conduit, which extends from the pole base and grounding insulated bushings installed. A #6 Copper ground wire shall be installed between the ¾" ground rod clamp and the grounding insulated bushings, and to the lug or stud in the metal pole or pedestal. On the multi-section steel camera poles, the #6 copper ground wire shall continue up to the top of the upper section of the pole from the grounding insulated bushing to a bonding lug attached to the camera mounting bolts. At no time shall the #6 wire be installed between the leveling nut and the pole.

Steel Mast Arm Pole or Steel Pole –

The steel pole shall be erected by a suitable hoisting device as approved by the Engineer. The Contractor shall insure that the hoisting device is rated for the weight and reach necessary. The Contractor shall use the equipment to raise the pole into position, place the pole on the anchor bolts, and shall hold the pole in place until the nuts have been installed and tightened on the anchor bolts in accordance with the applicable Plan sheets or Standard Construction Details.

On all steel pole installations a proper nut as shown on the plan details shall be used under the base of the pole and a proper nut shall be used above the base of the pole. Once the pole is set, the anchor bolt nuts shall be adjusted and tightened to properly position the pole as indicated on the applicable Plan sheets or Standard Construction Details. Once the pole is set in place, properly canted, and the nuts tightened, and the ground wire connected, the area between the base of the pole and the top of the foundation shall be formed and grouted as indicated on the applicable Plan sheets or Standard Construction Details. The anchor bolt covers and hand hole cover shall be placed on the pole after the pole has been erected in place.

Pedestal Pole -

The pedestal pole shall be erected by hand. Once the pedestal is set in place, properly plumbed, the nuts tightened, and the ground wire connected, the contractor shall place the hand hole cover on the pedestal.

Wood Pole –

This work consists of installing wood poles with a butt plate and #6 bare copper ground wire from the butt plate to the top of the pole. A ground rod may be used in place of the butt plate. The pole shall be located as shown on the Plans and as directed by the Engineer.

The pole shall be erected in a hole at least 6 feet deep or the height of the pole divided by 6, whichever is larger. The hole shall be dug in such a manner as to preclude over-sizing the diameter.

Sufficient earth shall be placed in the hole to fill it completely and provide a ridge around the hole after it has been properly filled. During refill, the earth shall be placed in layers not to exceed one foot and shall be well tamped with a power tamper.

The pole shall be set vertically in all directions, unless otherwise specified.

Copper coated fasteners shall be placed not more than 3 feet apart on the ground wire.

The ground rod, if utilized, shall be driven vertically into the ground, shall extend 4 inches above ground level and shall be fastened to ground wire with ground clamp. Ground rods shall be a minimum of 10 feet in length. Butt plates and/or ground rods will be incidental to this bid item. The Ground Wire will be paid for under its respective item.

Lighting Pole with Arm and Luminaire –

This work consists of installing lighting poles, arms and luminaires on an existing base.

Electrical connection of the luminaire is also included. To make the connection, the Contractor shall furnish the following materials:

- Connector kits shall be of waterproof, molded synthetic rubber suitable for burial in the ground or exposure to sunlight. The cable connection shall be compression type, applied by means of a compression tool. Connectors shall be 600-volt, fabricated from high strength copper alloy, quick disconnect, in-line connectors, fused for ungrounded conductor and non-fused for neutral at each pole.
- #8 AWG wire
- Split bolt connectors
- Electrical tape

These materials, other than the #8 wire, are to be included in the price bid for this item. The wire will be paid under its respective item. The unit shall be attached to the existing service cable and tested. On wood poles, if the service cable is not available, a 5 foot tail shall be left at the pole end of the mast arm. On metal poles, the electrical connections and grounding of pole will be made in the base. If the service cable is not available, a 5 foot tail shall be left in the pole base.

Installation of the pole and arm shall be as specified under **Steel Mast Arm Pole** above.

Installation of Luminaire –

This item includes picking up the luminaire unit at the DelDOT sign shop, transporting it to the specified location and installing it on an existing pole to provide a fully functioning overhead light. The materials for connecting the luminaire (as listed above under "**Lighting Pole with Arm and Luminaire")** are also to be furnished as part of this item. These materials, other than the #8 wire, are to be included in the price bid for this item. The wire will be paid under its respective item. The unit shall be attached to the existing service cable and tested. On wood poles, if the service cable is not available, a 5 foot tail shall be left at the pole end of the mast arm. On metal poles, the electrical connections and grounding of pole will be made in the base. If the service cable is not available, a 5 foot tail shall be left in the pole base.

Method of Measurement:

The quantity of poles will be measured on a per each basis as the number of poles installed as specified, complete and accepted under the applicable bid item listed above.
"Installation of Luminaire" will also be paid on a per each basis if the unit is being installed as a replacement or on a previously installed existing pole.

Basis of Payment:

General - Price and payment per each pole type shall include full compensation for picking up the materials at the DelDOT Sign Shop, transporting and setting the poles, and for all labor, tools, equipment, and incidentals necessary to complete the item.

Steel Mast Arm Pole or Steel Pole – In addition to the general statement, note that #6 Ground Wire will be paid for separately under its respective item. Any required fasteners for the ground are considered incidental to the Steel Pole being installed.

Pedestal Pole – As noted in general above

Wood Pole – In addition to the general statement, payment includes excavating the hole, furnishing and installing the butt plate or ground rod, and furnishing and installing fasteners for the ground wire.

Lighting Pole with Arm and Luminaire – In addition to the general statement, payment includes furnishing the listed materials, connecting, and testing the luminaire to result in a fully functioning light pole assembly. #8 wire will be paid for separately under its respective item.

Installation of Luminaire – This item includes picking up a luminaire, furnishing the listed materials, transporting, installing, and testing each luminaire. The item will be used for payment only when the luminaire is being installed as a replacement and/or on a previously installed pole. Luminaires installed as part of an entire light pole assembly are included for payment under the item titled "**Lighting Pole with Arm and Luminaire" (Item 746942).**

2/29/12

746511 - CABLES, 1/#4 AWG
746512 - CABLES, 1/#6 AWG
746513 - CABLES, 1/#8 AWG
746514 - CABLES, 1/#10 AWG
746515 - INSULATED GROUND CABLE, 1/#6
746527 - CABLES, 1/#2 AWG
746543 - CABLES, 1/#9 AWG
746546 - CABLES, 1/#12 AWG
746564 - INSULATED GROUND CABLE, 1/#4
746565 - CABLES, 1/#3/0 AWG
746566 - CABLES, 1/#1 AWG
746567 - CABLES, 1/#1/0 AWG
746577 - INSULATED GROUND CABLE, 1/#8
746598 - INSULATED GROUND CABLE, 1/#2
746605 - INSULATED GROUND CABLE, 1/#10
746622 - CABLES, 1/#4/0 AWG
746658 - INSULATED GROUND CABLE, 1/#1/0
746690 - INSULATED GROUND CABLE 1/#12
746817 - CABLES, 1/#2/0 AWG
746861 - INSULATED GROUND CABLES, 1/350 KCMIL

Description:

This work consists of furnishing all cables of the size(s) required by the Contract in accordance with the notes and details shown on the Plans and/or as directed by the Engineer.

Materials and Construction Methods:

All wire(s) to be used in this contract shall be manufactured in conformance with the National Electrical Code, insulated for 600 volts, and be of the type USE and/or RHW.

Method of Measurement:

The quantity of cables will be measured as the number of linear feet (linear meters) of each size along the longitudinal axis of each cable.

Basis of Payment:

The quantity of cables will be paid for at the Contract price per linear foot (linear meter). Price and payment will constitute full compensation for furnishing the cables.

No separate payment will be made for furnishing the connector kits with #10 AWG wiring of the type as indicated on the plan for the lighting standards as shall be included in the items for lighting standards.

9/09/2010

746517 - ALUMINUM LIGHTING STANDARD WITH SINGLE DAVIT ARM, 30' POLE
746518 - ALUMINUM LIGHTING STANDARD WITH SINGLE DAVIT ARM, 35' POLE
746519 - ALUMINUM LIGHTING STANDARD WITH SINGLE DAVIT ARM, 40' POLE
746520 - ALUMINUM LIGHTING STANDARD WITH DOUBLE DAVIT ARM, 30' POLE
746521 - ALUMINUM LIGHTING STANDARD WITH DOUBLE DAVIT ARM, 35' POLE
746522 - ALUMINUM LIGHTING STANDARD WITH DOUBLE DAVIT ARM, 40' POLE
746618 - ALUMINUM LIGHTING STANDARD WITH SINGLE DAVIT ARM, 45' POLE

Description:

The work consists of furnishing and installing Aluminum Lighting Standard with Single Davit Arm and/or Aluminum Lighting Standard Pole with Double Davit Arms, breakaway transformer base, luminaires, in accordance with the details on the Plans, and/or as directed by the Engineer to make a functional street lighting system. The foundation will be provided under other items in the contract.

Materials and Construction Methods:

All materials shall be of the best quality and free from all defects. No materials shall be installed until approved by the Engineer. Any material not specifically covered in these specifications shall be in accordance with accepted standards and as directed by the Engineer. Any materials deemed unsatisfactory by the Engineer, shall be replaced by the Contractor.

Lighting standards shall meet or exceed the requirements of the latest edition of AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals" based on 90 mph (145 km/hr) wind loads, luminaire weight of 70 lb (32 kg) and luminaire projected area of 3 ft^2 ($0.3m^2$). Computations confirming conformance with AASHTO Specifications, with the year of the edition specified, shall be submitted to the Delaware Department of Transportation.

All electrical materials shall conform to the requirements of the National Electrical Code of the national Fire Protection Association, and shall conform to all local and special laws and/or ordinances governing such installations. Where these requirements do not govern, and where not otherwise specified, electrical materials shall conform to the Standardization Rules of the Institute of Electrical and Electronic Engineers.

Shop drawings and catalog cuts for all electrical and related materials shall be submitted by the Contractor for approval.

The bolts are to be supplied by the Contractor. The bolts will be installed using a template, and set so that luminaire arm is perpendicular to the roadway.

Anchor bolts, nuts, couplings, washers, and cap screws shall be of carbon steel conforming to the requirements of ASTM A307, and hot-dip galvanized in accordance with AASHTO M 232/M 232M..

New aluminum lighting standards shall consist of a tapered aluminum shaft having a base welded to the lower end. The pole shaft, pole extensions, and davit arms shall each be spun from one piece of seamless tubing, the strut and arm plates shall be extruded, all of which conform to the requirements of ASTM B221 aluminum alloy 6063-T6. The shaft shall have no circumferential welds, except at the lower end joining the shaft to the base and shall conform to the dimensions listed in the chart below. The shaft shall contain an internal vibration dampening device positioned approximately 2/3 the height of the pole. The top of the lighting standard shaft shall be drilled for two 1/2" (13 mm) lockbolts to secure the davit bracket to the lighting standard shaft. If the pole is not placed on a transformer base, it will have one 3" x 5" (75 mm x 125 mm) handhole which after pole is set should face so that maintainer may view oncoming traffic.

HEIGHT OF POLE	DAVIT ARM LENGTH	OUTER DIAMETER	WALL THICKNESS
30' (9 m)	10' (3.0 m)	10" (250 mm)	0.156" (3.96 mm)
	12' (3.6 m)	10" (250 mm)	0.156" (3.96 mm)
	15' (4.6 m)	10" (250 mm)	0.156" (3.96 mm)

HEIGHT OF POLE	DAVIT ARM LENGTH	OUTER DIAMETER	WALL THICKNESS
	20' (6.1 m)	10" (250 mm)	0.156" (3.96 mm)
35' (10.5 m)	10' (3.0 m)	10" (250 mm)	0.156" (3.96 mm)
	12' (3.6 m)	10" (250 mm)	0.156" (3.96 mm)
	15' (4.6 m)	10" (250 mm)	0.156" (3.96 mm)
	20' (6.1 m)	10" (250 mm)	0.188" (4.78 mm)
40' (12 m)	10' (3.0 m)	10" (250 mm)	0.188" (4.78 mm)
	12' (3.6 m)	10" (250 mm)	0.188" (4.78 mm)
	15' (4.6 m)	10" (250 mm)	0.188" (4.78 mm)
	20' (6.1 m)	10" (250 mm)	0.219" (5.56 mm)
45' (13.5 m)	10' (3.0 m)	10" (250 mm)	0.188" (4.78 mm)
	12' (3.6 m)	10" (250 mm)	0.188" (4.78 mm
	15' (4.6 m)	10" (250 mm)	0.188" (4.78 mm)
	20' (6.1 m)	10" (250 mm)	0.250" (6.35 mm)

Bracket arms shall be of the davit type consisting of an aluminum shaft having the outer diameter and wall thickness as listed in the table above. The davit arm shall be designed to slip over the top of the lighting standard shaft for a distance of at least 12" (300 mm). The luminaire end of the davit arm shall be fitted with a 2" (50 mm) NPS aluminum pipe not less than 6" (150 mm) long. The height of the lighting standards will be determined by the Contractor to provide a nominal mounting height as shown on the Plans. The length of the davit arm will be as shown on the Plans or 12' (3.6 m) if not specified elsewhere. Davit arm less than 10' (3.0 m) long shall not be used without written permission from the Chief Traffic Engineer.

Each lighting standard shall be provided with a permanent tag which shall be 2" x 4" (50 mm by 100 mm) fabricated from clear anodized 1/16" (1.6 mm) thick aluminum. The edge shall be smooth and corners rounded and the tag shall be curved to fit the light standard shaft. Tags shall be secured to shafts by means of four (4) 1/8" (3 mm) diameter 18-8 stainless steel round head drive screws of self-tapping screws. The embossed identifying letters and/or numerals shall be not less than 3/4" (19 mm) high with stroke of not less than 3/16" (4.8 mm). Identifying letters and/or numerals shall be designated on the Plans.

Transformer Base: Transformer bases, when required, shall conform to the latest edition of AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaire and Traffic Signals".

Before any work, begins the Contractor shall submit documents showing that the breakaway device meets the current AASHTO Breakaway Design.

For breakaway installations, the standard shall electrically disconnect from the supply wire at the foundation when knocked down by an errant vehicle or from some other cause.

Luminaire: The luminaire shall have a precision die cast aluminum housing with an optical assembly, a removable mounting door and of wattage and type as specified on the Plans. The luminaire shall be of the multi-voltage ballast regulator type.

The refractor of the optical assembly shall be attached to the luminaire housing thru a hinge and latch arrangement. The optical assembly shall consist of a highly polished aluminum reflector, and a heat resistant shatter resistant borosilicate glass refractor. The refractor door shall be tightly sealed with an

appropriate gasket. The latch for the refractor door shall be of sufficient size to enable easy handling and constructed of rust resistant materials; the latch shall produce an audible click when it is properly locked.

The luminaire shall be equipped with a porcelain, corrosion resistant socket. The socket shall be easily adjustable to give one of twelve different light distributions; such adjustments shall be accomplished through adjusting not more than two screws within the optical assembly. The socket in this installation shall be preset to provide a distribution pattern as indicated on the Plans or type III distribution pattern of luminaire if not indicated.

The luminaire shall have a 2 bolt slipfitting suitable for mounting on 1/2" to 2" (13 mm to 50 mm) pipe. The luminaire shall be designed with a leveling pad and capable of being adjusted ±5 degrees for proper leveling.

The luminaire shall be completely wired so that it shall require only the connection of the power supply cables to a terminal block for energizing the entire fixture.

In order to provide for normal exchange of air between the inside and outside of the optical system, a ventilating channel shall be provided.The channel shall contain a charcoal filter which will prevent the entrance of flying insects and other small animal life forms, as well as provide a cleaning action on the air to remove smoke and dust particles.

All major electrical components, including ballast and the photoelectric control, shall be mounted on a removable door assembly and connected to the fixture electrically through a quick disconnect plug. The removal of the door shall be accomplished by loosening the captive screw and unplugging the quick disconnect plug. The luminaire shall employ solderless push-on type connectors for all wiring connections to facilitate the replacement of any component.

The unit shall contain an integral ballast capable of maintaining the wattage of the H.P.S. lamp throughout the life of the lamp. The ballast and the photoelectric control shall be suitable for operating the units in the wattage as shown on the Plans. The wattage of the luminaires for this Contract are listed on the quantity sheet.

No luminaire shall be installed until the lamp socket position has been inspected and approved by the Engineer. If no light distribution pattern is given the socket position shall produce a light pattern as indicated on the Plans, then type III as designated in the specification for the luminaire. All luminaires shall be adjusted up or down on the slipfitter to provide maximum light on the roadway to be lighted. The connections between the luminaire and service cable shall be made with a connector kit using #10 AWG single wire. Installation of the connector kit shall be in accordance with the manufacturers recommendations.

The Contractor shall furnish and install one or more of the following luminaires or an approved equal as specified on the Plans and/or as required by the Utility owner.

STANDARD MATERIALS

LUMINAIRE 400 Watt High Pressure Sodium Roadway, with Photo Cell Receptacle and Field Replaceable 9110-60-25 Regulated Multi-voltage Ballast, Type III Light Pattern, or as shown on Plans, 1 1/2" - 2" (38 mm - 50 mm) Slipfitter

Cooper/Crouse Hinds OVY Swing-down	Cat. #OVY40SWW3ET4
GE M-400A Power/Door	Cat. #M4AR40S0A2GMN32
or Approved Equal.	

LUMINAIRE 250 Watt High Pressure Sodium Roadway, with Photo Cell Receptacle and Field Replaceable 9110-60-26 Regulated Multi-Voltage Ballast, Type III Light Pattern, or as shown on Plans, 38 mm - 50 mm Slipfitter

Cooper/Crouse-Hinds OVY Swing-down	Cat. #OVY25SWW3ET4
GE M-250 A2 Power/Door	Cat. #M2AR25S0A2GMS32
or Approved Equal.	

LUMINAIRE 100 Watt High Pressure Sodium Roadway, with Photo Cell Receptacle and Field Replaceable 9110-60-27 120V Regulator Ballast, Type II Light Pattern, or as shown on Plans, 1 1/4" - 2" (32 mm - 50 mm) Slipfitter

Cooper/Crouse-Hinds OVX Swing-down	Cat. #OVX10SK22ET4
GE M-250A2 Power/Door	Cat. #M24R10S1M1AMS21
or Approved Equal.	

LUMINAIRE 70 Watt High Pressure Sodium Alley/Security, 120V with Normal Power Factor Ballast, Photo Cell, 9110-60-28 Lamp and Type II Acrylic Lens for Mounting on 1 1/4" - 2" (32 mm or 50 mm) Bracket (Not Included)

Cooper/Crouse Hinds RMA (Specify Less Bracket w/Type II Lens)	Cat. #RMA70SR222LV5
GE Type 201 SA (Specify Less Bracket w/Type II Lens)	Cat. #SAM07S1N5S4LV5ALC
or Approved Equal.	

LUMINAIRE 70 Watt High Pressure Sodium Black Colonial, with 120V Photo Cell Receptacle, 120V Reactor 9110-69-34 Ballast, Type III Acrylic Lens, Black Finish with 3" (75 mm) Slipfitter

Cooper/Crouse-Hinds	Cat. #LXF70SR2334
GE TC 100	Cat. #T10R07S1N2AMS3BL
ITT American Rev.	Cat. #47-570E3-6
or Approved Equal.	

Installations of Lighting Standards: Lighting Standards shall be installed and located in accordance with the Plans, to provide continuously aligned lighting.

The bracket arms shall be set perpendicular to the edge of the roadway unless otherwise ordered or specified. If necessary aluminum shims may be used to plumb the pole.

Method of Measurement:

The quantity of aluminum lighting standards with single on double davit arms of the size(s) specified will be measured as the actual number installed and accepted.

Basis of Payment:

The quantity of aluminum lighting standards with single or double davit arms will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing all materials including concrete, labor, equipment, hardware, anchor bolts, washers, shims and nuts, supply and installation of the transformer base, supply and installation of poles and davit arm(s), and supply and installation of the luminaires. This price will also include all miscellaneous hardware, connector kits, and wiring from the supply cables to the luminaire(s), labor, tools, equipment, and incidentals necessary to complete the work.

6/25/13

746553 - POLE BASE, SPECIAL

Description:

This work consists of furnishing all materials including anchor bolts and constructing pole base(s) in accordance with the notes and details on Plans and as directed by the Engineer.

Materials and Construction Methods:

All materials required for constructing the pole base shall conform to the applicable requirements of Section 746 of the Standard Specifications, the Standard Construction Details, and notes on the Plans.

If size and material requirements for anchor bolts are not shown on the Plans, the Contractor shall submit shop drawings with this information for approval. In general, the anchor bolts with nuts, etc. shall satisfy AASHTO design specifications and meet the requirements of ASTM A687 for studs and ASTM A563 Grade DH for nuts.

Construction method shall be performed in accordance with the applicable requirements of Section 746.

Method of Measurement and Basis of Payment:

Method of Measurement and Basis of Payment will be in accordance with Subsections 746.04 and 746.05 respectively.

1/9/03

746590 - FURNISH & INSTALL GROUND ROD

Description:

This item consists of furnishing and installing ground rods at locations shown on the plans or as directed by the Engineer. The item will be used only when an individual ground rod is to be replaced or added as a singular item. Costs for Ground Rods installed as part of other items (Pole Bases, Junction Wells, Metered Service Pedestals, etc.) will not be paid separately, but will be included in those respective pay items.

Material:

Each Ground Rod shall be copper clad, approved by the Underwriter's Laboratory and be supplied with approved clamps for connecting the grounding conductor to the rod. The Ground Rod shall be ¾" Diameter and shall have a minimum length of 10', unless detailed otherwise in the contract documents.

Construction Methods:

When installing the Ground Rod, a length of at least 8 feet shall be embedded into undisturbed soil. Measure the ground resistance of each rod before connecting the rod to the grounding conductor. If the measured resistance exceeds 25 ohms, exothermically weld a 10 ft. extension to the top of the first rod and drive to its full depth. Measure the earth resistance again. If it still exceeds 25 ohms, contact the engineer for instruction.

Where rock is encountered and an acceptable earth ground cannot be accomplished by driving as described above, the Engineer may direct the use of a grounding grid. Direct buried rods are exothermically welded end to end to bond lighting standards and structures in continuous series to some point where an acceptable ground can be obtained.

Maintain continuity of the equipment grounding system throughout the project.
Connection to equipment grounding systems shall be made with suitable lugs at all grounding bushings specified, and at the ground lugs in lighting or traffic signal structure access holes or in a breakaway base. Make connections to ground rods as specified in the contract documents. Connections to neutral grounding systems shall be made with grounding lugs.

Measurement and Payment:

Ground Rods will be paid on a per each 10 ft. length. Price and payment includes furnishing, installing, labor, grounding lugs, welding, excavation, backfill, and connecting the ground rod as shown on the plans, standard details, or as directed by the Engineer.

2/29/12

746594 - LUMINAIRE (HPS) 250 WATT

Description:

This work consists of furnishing and installing a 250 Watt high pressure sodium fixture on a pole, in accordance with these specifications and as shown on the Plans.

Materials:

The complete luminaire shall be a 250 Watt high pressure sodium type powered from a nominal 240 or 277 volt, 60 hertz source. The luminaire shall have a heavy-duty die-cast aluminum housing with an electrocoat gray finish and a hinged and removable door assembly with a heat/impact resistant glass prismatic lens. The luminaire shall be provided with internal two-inch slipfitter mounting and photocell control. The luminaire shall be provided with a shorting cap. The ballast shall be a multi-tap (120/208/240/277 volt) auto-regulating type, capable of starting and operating the lamp down to temperatures of 78 F (28 C). The optical assembly shall be sealed with a perimeter gasket and activated charcoal filter. The luminaire shall be cutoff, with a Type III distribution. The luminaire shall be one of the following, or an approved equal:

Manufacturer	Model	Catalog Number
Cooper	OVF Swing-down with cutoff optics	OVF25SWN3DT4
GE	M-400A Power/Door with cutoff optics	MDAC25S0A2GMC31

or Approved Equal.

The luminaire shall have a NEMA-approved decal attached to the housing, which shall be readily visible from the ground. The decal shall be yellow (to indicate HPS lamp) and shall display '25' (to indicate 250 Watts).

Construction Methods:

The luminaire shall have a 2 bolt slipfitter suitable for mounting on a 1.25"–2" mounting arm. The luminaire shall be designed with a leveling pad and capable of being adjusted +3 degrees for proper leveling.

The luminaire shall be completely wired so that it shall require only the connection of the power supply cables to a terminal block for energizing the entire fixture.

No luminaire shall be installed until the lamp socket position has been inspected and approved by the Engineer. All luminaires shall be adjusted up or down on the slipfitter to provide maximum light on the roadway to be lighted. The connections between the luminaire and service cable shall be made with a connector kit using #10 AWG single wire. Installation of the connector kit shall be in accordance with the manufacturer's recommendations.

Method of Measurement:

The quantity of 250 Watt (HPS) luminaires will be measured as the actual number of luminaires provided complete in place and accepted.

Basis of Payment:

The quantity of 250 Watt (HPS) luminaires will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing all materials, and for all labor, tools, equipment, and incidentals necessary to complete the item installation.

2/28/13

746653 - ELECTRICAL TESTING

Description:

This work consists of furnishing all materials, equipment, tools, and labor necessary to perform electrical testing in accordance with these special provisions, notes and details on the plans, and as directed by the Engineer.

When this item is required to test a highway lighting system constructed as part of the Contract, the item shall also include a one year warranty of the highway lighting system. The highway lighting system is understood to include all items of work performed under this Contract to provide lighting of roadways, bikepaths, parking lots, signs, etc.

Construction Methods:

Ground Resistance Testing

The ground resistance shall be measured with a three-terminal, fall-of-potential, direct-reading, battery-powered earth tester with a 0.50 to 500 ohm scale or digital read-out. The 25 ohm reading shall be approximately at mid scale.

The test shall be performed according to the manufacturer's instructions and OSHA requirements. The test shall be performed when the soil is dry. The Contractor shall not add any chemical or salt solutions to any portion of the grounding system. All grounding rods and foundation grounds to be tested shall be installed a minimum of ten days prior to testing unless otherwise determined by the Engineer in the field.

Two auxiliary copper clad ground rods shall be driven into the ground at a minimum distance of 3 feet (one meter). The lateral spacing for each test rod shall be given in writing on the test report form and the spacing shall be approved by the Engineer.

Each ground rod or foundation ground shall be isolated with the bond wires disconnected when the test is being performed. The resistance to ground shall be 25 ohms or less.

Unless noted otherwise on the plans, there shall be two ground resistance tests performed under this item of work.

System Testing

Insulation from ground and roadway lighting circuits shall be tested as follows:

(1) Insulation from Ground. All underground circuits shall be tested for resistance to ground with a megger both before and after the conduit and wiring have been buried and all ground rods have been installed and connected. No circuit shall measure less than 10 megohms to ground. Circuits that fail will be inspected, repaired, and retested.

(2) Roadway Lighting Circuits. The Contractor shall connect field wiring to the load center terminals. The entire lighting system shall be energized for ten consecutive days for ten hours each day at the time directed by the Engineer prior to initial acceptance. Failures occurring during this test period shall be corrected. The Contractor shall repair or replace any equipment, components, or system that fails during this test. A retest shall be performed on the repaired portion at the Engineer's direction.

All tests shall be performed in the presence of the Engineer, and test results shall be written, dated, and given to the Engineer for approval.

Highway Lighting System Warranty:

The Contractor shall secure the manufacturer’s warranties and/or guarantees on electrical and/or mechanical equipment. These warranties and/or guarantees shall be submitted to the Department upon final acceptance of the completed highway lighting system. In addition to the manufacturer’s warranties and/or guarantees, the Contractor shall warrant to the Department the complete, installed highway lighting system

to be free of defects, as hereafter defined, for one calendar year beginning at the initial acceptance of the highway lighting system by the Department. The initial acceptance of the highway lighting system will occur upon the satisfactory correction of all deficiencies noted in the lighting system during the final inspection of the project.

The highway lighting system will be considered defective if any of the following conditions are discovered by visual inspection or by inspection with testing equipment within the warranty period:

1. Defective lamps or ballasts.
2. Failure to operate, in whole or in part.
3. Power wire grounding less than ten mega-ohms.
4. Shifts in pole/foundation alignment.
5. Short circuits or open circuits anywhere within the system.
6. Deterioration of finishes, plating, or paint not normal and customary in the environment in which the equipment is installed.
7. Settlement of trench backfill.
8. Defective fuses.
9. Defective or improperly installed splices.

These conditions listed shall not be considered all inclusive.

The highway lighting system is comprised of all Contract items for lighting, including but not limited to conduits, junction wells, cables, load centers, transformers, cabinet pads, pole bases, poles, high mast poles, light standards with and without davit arms, luminaires, sign lighting, service installations, and reworked/relocated existing lighting facilities.

There will be initial and periodic highway lighting system performance inspections after the Contractor has completed all the work. The initial inspection, to be conducted during the final construction inspection, will be to determine if the initial performance requirements are met. Periodic reviews will be conducted at monthly intervals through the warranty period to determine the sustained ability of the highway lighting system to meet the stated performance requirements.

The Department review team will be responsible for evaluating the highway lighting system within the project limits for both day and night acceptability considering all the possible defects listed above. If the highway lighting system is considered defective because of abnormal operation or deterioration (as listed above), the Department will require repair or replacement of the defective portion at its sole option.

All defective areas, which may include all highway lighting systems and components within the project limits, identified by the Department during initial or periodic inspections shall be repaired by the Contractor in accordance with this Section. All highway lighting system repair shall begin immediately following the notice to the Contractor of the lighting system defect unless weather limitations prevent the corrective work. The Department shall be given notification before the Contractor begins corrective work and shall be allowed full inspection of all operations and provided safe access to the areas being repaired.

If at any time during the warranty period, the highway lighting system or any portion thereof is rendered defective as a result of other than a manufacturing design or construction defect, the Department will repair, replace or revise said system at its sole option. The Contractor will not be held responsible for the cost to correct failures due to design defects in the highway lighting system.

Method of Measurement:

The quantity of electrical testing will not be measured.

Basis of Payment:

The quantity of testing will be paid for at the Contract lump sum price. Price and payment will constitute full compensation for furnishing all testing equipment, including ground rods; performing the tests; preparing the reports; and for all labor, equipment, tools, and incidentals required to complete the work. For highway lighting systems, price and payment will also constitute full compensation for providing the warranties.

5/24/02

746843 - POLE BASE, TYPE 1
746844 - POLE BASE, TYPE 2
746845 - POLE BASE, TYPE 2A
746846 - POLE BASE, TYPE 2B
746847 - POLE BASE, TYPE 3
746848 - POLE BASE, TYPE 3A
746849 - POLE BASE, TYPE 3B
746850 - POLE BASE, TYPE 4
746851 - POLE BASE, TYPE 5
746852 - POLE BASE, TYPE 6

Description:

This work consists of constructing and furnishing round or square pole bases Types 1, 2, 2A, 2B, 3, 3A, 3B, 4, 5, and 6 for poles in accordance with the Standard Construction Details and at locations as directed by the Engineer.

Materials:

The concrete for pole bases shall conform to Section 812, Class B.

Bar reinforcement shall meet the requirements of Section 603 Grade 60.

Ground rods shall be copper clad, approved by the Underwriter's Laboratory and be supplied with approved clamps for connecting the grounding conductor to the rod.

Conduit for sweeps shall meet the requirements for galvanized rigid steel conduit in Section 745.

Anchor bolts will be supplied by the same entity that supplies the poles. This is the case for all poles base types, with the exception of Type 4. For Type 4, drop-ins are used for breakaway and the Contractor will supply the anchor bolts for Type 4. The anchor bolts and nuts for Types 5 and 6 shall not be hot-dipped galvanized and these anchor bolts and nuts shall meet the requirements of AASHTO M 314. Anchor bolts shall have a minimum yield strength of 55,000 psi (380,000 kPa).

Construction Methods:

The bases shall conform to the dimensions as indicated on the Standard Construction Details. A ground rod shall be installed as shown. A minimum of 8 feet (2.5 m) of the ground rod must be driven into undisturbed soil.

If a utility or a right-of-way conflict is found when a Type 2 or Type 3 base is specified in the Plans, an alternate base of equivalent strength may be used as directed by the Engineer. A Type 2 base has two equivalents, namely Types 2A and 2B. A Type 3 base has two equivalents, namely Types 3A and 3B.

Though the contract calls for the use of a round pole base, the Contractor may use a square base at its discretion.

The end of the conduit sweeps in the ground shall be extended outside the concrete and any forms or sheeting by 12 inches (300 mm) and capped or connected to the existing conduit. If the conduit is to be capped underground for future use, it must be sealed with a galvanized threaded conduit plug. Tape is NOT an approved conduit plug. The location of the conduits shall be marked on the base with arrows drawn in the wet concrete within 6 inches (150 mm) of the outer edge.

Excavation for the pole bases may not exceed the dimension of the foundation by more than 12 inches (300 mm) in any one direction. If a form is used in the excavation more than 18 inches (450 mm) below the ground surface, it is necessary that the area between the form and excavation be filled with Borrow Type C and tamped on all sides in continuous, horizontal layers not to exceed 68 inches (200150 mm) in depth, loose measurement.

Where a pole base is to be placed in existing concrete pavement such as a sidewalk, the concrete shall be saw cut in a square pattern or removed to the nearest joint. In other pavement material, a round hole may be cut using an appropriate tool. Any damage to the existing pavement shall be repaired at the Contractor's expense and shall meet the approval of the Engineer. Any removal or replacement of any type of pavement under this item shall be an incidental cost to this item.

The bases shall be edged and have a broom finish.

Where water or highly unstable material is encountered during the excavation for the pole base, pole base sheeting may be required and the following steps shall apply:

1. The condition exists in the upper half of the excavation. Stop all work until the Bridge Design Section reviews the condition.

2. The condition exists below the upper half of the excavation:
   a. For a proposed Type 4 Base, increase the depth to 4 feet (1.2 m).
   b. For a proposed Type 5 Base, substitute a Type 1 Base.
   c. For a proposed Type 1, 2, or 3 Pole Base, substitute a Type 3A Pole Base for all but a Type 3B Pole Base. The depth of the base shall be as determined in (e) below, or 9 feet (2.7 m), whichever is greater.
   d. For a proposed Type 6 Pole Base, substitute a Type 2 Pole base and increase the depth in accordance with (e) below.
   e. Determine the depth of the base, which would be in the unsatisfactory area. Multiply that depth by 0.7 and add the result to the original required depth of the base to obtain the final depth of the base. The reinforcing bars shall be extended using the required pattern to match the final depth in accordance with the requirements of Section 603.07 of the Standard Specifications.

Method of Measurement:

The quantity of pole bases will be measured as the actual number of bases constructed, complete in place and accepted. Concrete, excavation and backfilling around the base, ground rods, and the two conduit sweeps in the base are included in this item.

Furnishing Borrow Type C backfill material will be measured and paid for separately by the cubic yard (cubic meter).

Payment for any additional sweeps shall be paid for separately under the appropriate conduit items. The Contractor's use of square base rather than a specified round base shall not result in any additional cost to the Department.

Basis of Payment:

Borrow Type C will be paid for under Section 210. No payment for Borrow Type C backfill material placed outside of the vertical plans located 18" (450 mm) outside of the neat line perimeter of the vertical face of the pole base foundation.

Any increase in the vertical dimension required herein shall be paid for separately under Item 746614, Pole Base Extension; another item of this contract.

The quantity of pole bases will be paid for at the Contract unit price for each pole base type. If an alternate pole base type is selected by the Engineer, payment will be the Contract unit price for the alternate selected. Price and payment will constitute full compensation for furnishing and placing all materials including concrete, ground rods, and a minimum of two conduit sweeps extending into the base; for excavating, backfilling and compacting around the base; for repairs to damaged existing pavement; for removal or replacement of pavement; and for all labor, equipment, tools, and incidentals required to complete the work.

3/1/12

746888 - ALUMINUM LIGHTING SINGLE DAVIT ARM, 8' ARM SPREAD
746889 - ALUMINUM LIGHTING SINGLE DAVIT ARM, 12' ARM SPREAD
746890 - ALUMINUM LIGHTING SINGLE DAVIT ARM, 15' ARM SPREAD

Description:

The work consists of furnishing and installing Aluminum Lighting Single Davit Arms in accordance with the Contract Details, as shown on the Plans, and/or as directed by the Engineer to make a functional roadway lighting system.

Materials and Construction Methods:

All materials shall be of the best quality and free from all defects. No materials shall be installed until approved by the Engineer. Any material not specifically covered in these specifications shall be in accordance with accepted standards and as directed by the Engineer. Any materials deemed unsatisfactory by the Engineer, shall be replaced by the Contractor.

Lighting davit arms, used in conjunction with lighting poles specified under separate special provisions in the Contract, shall meet or exceed the requirements of the latest edition of AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals" based on wind loads applicable for New Castle County. Computations confirming conformance with latest edition of AASHTO Specifications, with the year of the edition specified, shall be submitted to the Delaware Department of Transportation for approval.

The davit arms shall each be spun from one piece of seamless tubing, the strut and arm plates shall be extruded, all of which conform to the requirements of ASTM B221 aluminum alloy 6063-T6.

Nominal Luminaire Mounting Height	Nominal Davit Arm Spread	Outer Diameter at bottom of davit arm **	Wall Thickness
30'			
	12'	6" (bottom)	0.188"
	15'	6" (bottom)	0.188"

Arms shall be of the davit type consisting of an aluminum shaft having the outer diameter and wall thickness as listed in the table above. The luminaire end of the davit arm shall be fitted with a 2" (50 mm) NPS aluminum pipe with nominal length of 8 inches.

Shop drawings and catalog cuts for all electrical and related materials shall be submitted to DelDOT for approval.

Nuts, couplings, washers, and cap screws shall be of carbon steel conforming to the requirements of ASTM A307, and hot-dip galvanized in accordance with AASHTO M 232/M 232M.

Method of Measurement:

The quantity of aluminum lighting single davit arms will be measured as the actual number installed and accepted.

Basis of Payment:

The quantity of aluminum lighting single davit arms will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing and installing davit arm, including all materials, labor, equipment, washers, shims, nuts, and all other connection hardware necessary for the supply and installation of davit arm(s). The price will also include all miscellaneous hardware, labor, tools, equipment, and incidentals necessary to complete the work.

11/2/11

746906 - FURNISH & INSTALL 4-CONDUCTOR #18 AWG SHIELDED OPTICOM CABLE
746907 - FURNISH & INSTALL 1-CONDUCTOR #2 AWG STRANDED COPPER
746908 - FURNISH & INSTALL 1-CONDUCTOR #4 AWG STRANDED COPPER
746909 - FURNISH & INSTALL 1-CONDUCTOR #6 AWG STRANDED COPPER
746910 - FURNISH & INSTALL 1-CONDUCTOR #8 AWG STRANDED COPPER
746911 - FURNISH & INSTALL 1-CONDUCTOR #10 AWG STRANDED COPPER
746912 - FURNISH & INSTALL 1-CONDUCTOR #14 AWG STRANDED COPPER
746913 - FURNISH & INSTALL 2-CONDUCTOR #14 AWG ALUMINUM SHIELDED COPPER
746914 - FURNISH & INSTALL #6 BARE STRANDED COPPER GROUND
746915 - FURNISH & INSTALL #8/2 WIRE UF W/GROUND
746916 - FURNISH & INSTALL #8/3 WIRE UF W/GROUND
746918 - FURNISH & INSTALL #2/0 AWG STRANDED COPPER
746919 - FURNISH & INSTALL #4/0 AWG STRANDED COPPER
746920 - FURNISH & INSTALL 14/4 TRAFFIC CONTROL CABLE
746921 - FURNISH & INSTALL 14/9 TRAFFIC CONTROL CABLE
746922 - FURNISH & INSTALL 14/16 TRAFFIC CONTROL CABLE

Description:

The pay items listed above include furnishing, installing, and splicing if approved, the various types and sizes of cable in conduit, or overhead and lashed to a span wire. All conduit installation will be paid for under their respective items.

Materials:

Cable - All electrical cables shall be manufactured in conformance with the National Electrical Code, 600-Volt, UL approved.

1. Stranded or solid, single conductor copper cables shall be XLP Insulated; USE or RHW rated

2. Type UF cable shall include ground and the number and size of conductors as shown on the plans. Use cable conforming to ANSI/UL 493.

3. 14/4, 14/9, 14/16 AWG Solid copper conductor Traffic Signal cable shall conform to IMSA Specification Number 19-1. Provide wire size and number of conductors as shown on the plans or as directed by the Engineer. Additional material requirements for Traffic Signal Cables are as follow:
   a. If requested, the Contractor shall provide independent test results to verify specification compliance. Costs of testing are incidental to the Cable item being supplied.
   b. All cables shall be supplied on reels with each reel containing one continuous length of cable.
   c. Color code to be used as established by IMSA Specifications. In addition to IMSA, DelDOT requires that individual tracers contrast with the base color to allow easy identification between each base color and the same base color plus tracer.
      To test for sufficient color contrast, remove the sheath for a length of 6 inches. All filler material and tapes shall be removed for the same length. All conductors of the same base color will be placed side by side and all other conductors will be hidden. The conductors will be held against a white or ivory surface and viewed from a distance of 6 feet. The base color, tracer, and tracer color must be identified within a period of three seconds after being placed in position. The same test for contrast will also be made for base colors. If either the base color or tracer color test fails, the material will be rejected.
   d. The tracer line width shall not exceed 3/20 inch when measured perpendicular to the edge of the line. Also, the total width of tracer lines on a conductor may not be equal to or greater than one-half the total circumference of the conductor.

4. Aluminum Shielded Cable shall be shielded two conductor controlled capacitance cable enclosed in an aluminized polyester shield within a polyethylene jacket, rated to 600 volts. The two conductors are AWG # 14 stranded copper. Cable shall meet IMSA 50-2. Referred to as “Home-run Cable”.

5. Opticom Cable – must meet the manufacturer’s recommended specifications

Splicing Materials –

1. Insulating (rubber) tape shall be of the self-bonding type and shall be 3M Company, Inc. (Cat. No. 130C, 2228); Plymouth Rubber (Cat. No. 2212); Permacel (Cat. No. 253, P280), or an approved equal.

2. Jacket (plastic) Tape shall be of the waterproof type and shall be 3M Company, Inc. (Cat. No. 33); Plymouth Rubber (Cat. No. 3117); Permacel (Cat. No. P29), or an approved equal.

3. For overhead traffic control cable splices:
   Wire Nuts – Ideal 74B or 76B, 3M Highland H-33, or approved equal

Cable Installation

Installation in Conduit:

This work consists of installing various types, sizes, and number of communications or electrical cable(s) in existing conduits, which may or may not contain an existing communications or electrical cable(s) or wire(s). Conduits may be located underground, within mast arms, on wood poles, or on metal poles. The number of cables to be pulled through each conduit will be as shown on the plans or as directed by the Engineer.

Construction Methods:

All cable must be transported by and unreeled from a cable trailer(s). The laying of reels on the ground and subsequent removal of wire or cable from this position is prohibited. Avoid damaging cable insulation when removing cable from drums or reels, or during installation of the cable.

Hand pulling methods are required for conduit sizes of 1-1/2" or less and are **preferred** for all other sizes. Dynamometer is recommended for use when pulling other than by hand.

Prior to installation, **written approval by the Engineer is required** for the use of any power-assisted methods of pulling communications or electrical cable(s) or wire(s) into conduit. A short piece of material that will part if the strain exceeds the amount specified below shall be used between the pulling grip and the pulling medium, unless industry standards require less:

150 lbs. for all pulls up through 12 pair communications cable; and
300 lbs. for all larger cables

Any and all cable(s) pulled into any conduit without the use of an acceptable pulling grip, Kellems or equal, and without the use of a strain release element or by using methods which may have or did result in pulling forces in excess of strain release material, or using methods which may have or did result in pulling forces in excess of those set forth herein or prescribed by industry standards are **unacceptable.**

Any and all unacceptable cable(s) shall be removed and replaced with new cable(s) using correct methods at no cost to the Department.

The installation of cable(s) in existing conduits shall be accomplished by pulling the cable(s) through the conduits. If required, pulling lubricant of the type recommended by the cable manufacturer will be used. The cable(s) shall be prepared for pulling by reeling them from their respective reels as they enter the conduit or by taking sufficient length from the reel(s) to comprise the set to be pulled. Care shall be taken to avoid damaging insulation and to eliminate any twists or kinks and to marry the cables in a straight lay. Care shall also be taken to prevent entry of moisture into the cable at all times during installation. Cable ends will be sealed using rubber tape and painted with a sealing type of waterproof compound until final splices are made.

The cable(s) shall be hand fed into the conduit. When, in the opinion of the Engineer, additional radius is required to prevent damage to the cable(s) a sleeve shall be used. There shall be no additional payment made for sleeves or their use.

Underground cable runs shall be started at one terminal point and shall be continuous without splices to the final terminal point except for “Home Run Cable” to “Loop Detector Wire”. Opticom cable shall not be spliced in any application.

Additional cable(s) shall be left and arranged in a neat and orderly manner as noted:

1. When pulled through junction wells, 6 feet of copper cable, supported on cable rack assemblies
2. At the control box and other splice locations, 6 feet of cable, neatly arranged and laced with cable ties

When cable already exists in a conduit, the Contractor shall ensure that the placement of a fish does not damage or entangle the existing wire or cable(s). The lead end of a fish shall contain a blunt terminal. Bending and/or taping the end of the fish shall not be satisfactory nor shall any termination which contains rough edges or any sort of hook that might engage an existing wire or cable when the fish is extracted.

Where two or more wires occupy the same conduit, they shall be drawn in together and kept parallel to each other by means of a pulling head. Phase legs shall be arranged circumferentially and in sequence around the neutral wires.

All conduit ends shall be duct sealed after cable installations.

Installation on Span Wire Overhead:

This work consists of installing electrical cable on an existing span wire.

Construction Methods:

All electrical cable must be transported by and unreeled from a cable trailer(s). The laying of reels on the ground and subsequent removal of wire or cable from this position is prohibited. Avoid damaging cable insulation when removing cable from drums or reels, or during installation of the cable.

The electrical cable will not be spliced at the top of the pole but will continue on to be taped onto the span wire. The electrical cable shall be oriented so water will not run along its length and run into the steel pole. The electrical cable shall be installed on the underside of the span wire with no crossover or wraps around the span wire. The electrical cable shall be pulled tight without any kinks and the jacket (plastic) tape wrapped tight around the span wire and electrical cable at least six wraps every twelve to fourteen inches.

At each signal head location, there will be a loop of signal cable 36 inches long.

Splicing:

Traffic Control Cable and Single Conductor Stranded Wire :

General – Traffic signal cable splicing shall only be made above ground in pole hand-holes, transformer bases or on span wire at the signal head. Underground traffic control cable splices (except between loop detector wire and "home-run" cable) or splices in between conduit runs are prohibited. After cables have been installed and pending permanent splicing, the end of each section of cable in the control box and at all splice locations shall be carefully sealed, using rubber tape, and painted with a sealing type of waterproof compound. The circuit number of all cables and wires shall be identified by color coded tape attached to each of the cables and wires in the control box and at all splice locations. The color coded tape shall be secured to the cable or wire with nylon cable ties. Any splices found to be faulty within 90 days of installation shall be remade at the Contractor's expense. Insulation from each conductor to be spliced shall be removed to expose ½ inch of copper. Use of any tool or method which might nick the conductor is prohibited. Each conductor not being spliced shall be inspected and trimmed so that the conductor does not extend beyond the insulation. After each conductor to be spliced is connected, all conductors both used and not used shall be returned to their original configuration before the insulation was removed and then sealed as specified.

Individual cables shall not extend beyond the splice of the last signal head for each signal phase.

Shielded Opticom cable shall not be spliced.

Shielded Aluminum Cable ("Home-Run cable") may be spliced only with the loop detector wire in a junction well. No splicing of the "home-run cable" outside of this junction well is permitted.

Overhead - Conductors to be electrically connected shall be placed side by side with the exposed copper aligned. The copper shall then be twisted clockwise with pliers until a good mechanical connection shall be

effected. A proper size wire nut shall be installed and hand tightened. If necessary to cover all the copper, minor trimming may be done. The copper splice shall be 5/16 inch long when trimmed. Care shall be taken to ensure that no insulation is caught up in the copper area of the splice. It is essential that the splice be kept dry. Therefore, care must be taken during taping and by placement of the completed splice to prevent water from entering the splice between or around the cables.

1. **Termination of cable (Butt Splice) -** The sheath of each cable shall be removed as necessary. When all conductors to be joined have been completed, the splice shall be prepared for taping. The cables shall be placed in a butt position and all wires and wire nuts shall be positioned to ensure that no shorts exist and that the splice area is reduced to as small a diameter as possible. Taping shall begin with rubber tape two inches over the intact sheath. Taping shall proceed toward the other cable overlapping half of the tape width until a point two inches on the other cable sheath has been reached. Taping shall then be repeated in the other direction starting one tape width wider than the previous wrap. Where necessary to cover all areas of the splice, overlapping shall be increased. Every area of the splice shall have rubber tape at least four layers (two fully overlapped passes) deep. The rubber tape shall be covered with plastic tape applied in the same fashion.

2. **Taps or Tee Splices -** The sheath of the through cable shall be removed for a distance of 8 inches centered on the point of splice. The sheath of the branch cable(s) shall be removed for a distance of 4 inches. The through cable conductors which are to be joined to the conductors of the branch cable(s) are to be separated out from the others and cut. No other conductors shall be cut for any purpose. Depending upon the need, the branch cable(s) may be placed beside one of the through cables and the splicing proceed or the through cable may be doubled back so that the parts of the through cable and the branch cable(s) are placed side by side. When all conductors to be joined have been completed, the splice shall be prepared for taping. The cables shall be placed in approximately their final position and an inspection for shorts shall be made. After all wire nuts and wires are properly positioned, taping shall begin on the through cable 2 inches from the end for the sheath. It shall proceed with 1/2 inch width overlap across the splice area and onto the other through sheath for a distance of 2 inches. The taping shall start at the end point and return back across the splice to the branch cable(s). It shall proceed along the branch cable(s) and onto the sheath for a distance of one inch. A return along the branch back to the main cable shall be made and the remaining part of the splice shall be taped continuing as before. Every area of the splice shall have rubber tape at least four layers (two fully overlapped passes) deep. The cables shall be placed in their final position and taped with two fully overlapped passes of plastic tape. Plastic tape need not cover the interior areas covered by the rubber tape. The splice shall be placed so that the branch cable(s) enters the splice from below to prevent water from flowing along the branch cable(s) into the splice area.

3. **Termination End of Cable –** Dead ended cables shall have 3" of sheath removed. Each individual cable shall be rubber taped then bundled and re-taped with vinyl tape and coated with waterproofing compound.

Method of Measurement:

The quantity of cable will be measured as the actual number of linear feet of cable furnished and pulled through conduits (underground, in mast arms, or on poles) or installed on a span wire in accordance with these specifications, complete in place, and accepted.

All required cable slack left at termination points or in junction wells shall be measured as part of this item.

Basis of Payment:

The quantity of cable furnished and pulled through all conduit (underground, in mast arms, or on poles) or furnished and installed on a span wire will be paid for at the Contract unit price per linear foot of the applicable pay item. Splice installations and all costs related to the splice shall be incidental to the linear foot payment of the cable being spliced. Price and payment will constitute full compensation for all labor, equipment, tools, materials, material testing, splicing, taping, and incidentals required to complete the work as specified above.

746924 - FURNISH & INSTALL LOOP WIRE 1-CONDUCTOR #14 AWG ENCASED IN ¼" FLEXIBLE TUBING IN A LOOP SAWCUT

Description:

Sawcut and seal existing pavement, furnish and install loop detector wire, aluminum shielded "home-run" cable, as shown on the Plans.

Materials:

1. **1-conductor #14 AWG Cable in ¼" Flexible Tubing -** shall consist of cable preinstalled in a polyethylene (PE) plastic duct meeting IMSA 51-5. Cable shall be rated for 600 volts. The cable shall have a temperature tolerance range of at least - 65 to + 176 degrees Fahrenheit. The conductor is AWG #14 stranded copper. Outside diameter of the cable is 0.25 inches. Referred to as "loop wire"

2. **2-conductor #14 AWG Aluminum Shielded Cable –** see specifications for furnish and install cable. Referred to as "home-run cable".

3. **Flexible embedding sealer** - a cold poured, resilient type epoxy joint sealer, Bondo P 606 or Duracote D115 for concrete or asphalt pavement or E Poxy Industry 36 1 for concrete or E Poxy Industry11 1 for asphalt pavement, or approved equal. A sealer accelerant or retarder may be added per the manufacturers specifications.

4. **Backer Rod -** 5/8" closed cell foam

5. **Tape –** Vinyl electrical tape shall have a PVC base with rubber based pressure sensitive adhesive. The tape shall be a minimum 7 mils thick and be UL listed and marked per UL Standard 510 as flame retardant and cold resistant. It shall be compatible with synthetic cable insulations, jackets and splicing compounds and rated for wire and cable splices up to 600-volts.

6. For splices in Junction Well (see plan detail):

   a. Dual Wall Heat Shrink Tubing – Heat-shrink tubing shall be medium or heavy wall thickness, irradiated polyolefin tubing containing an adhesive mastic inner wall. Minimum wall thickness prior to contraction shall be 40 mils. When heated, the inner wall shall melt and fill all crevices and interstices of the object being covered while the outer wall shrinks to form a waterproof insulation. Each end of the heat-shrink tube or the open end of the end cap of heat-shrink tubing shall, after contraction, overlap the conductor insulation at least one and one-half inches. Heat-shrink tubing shall conform to the requirements in UL Standard 468D and ANSI C119.1, for extruded insulated tubing at 600 V.

   b. Soldering iron with Rosin Core solder

   c. Splicing Kit- In-line barrel type design, resin encapsulating compound kit with UL486 rating. Suitable for use in wet or direct buried locations. Resin encapsulating compounds shall be acceptable for use at 16 degrees C.

Construction Methods:

Loop Wire Installation:

The pavement saw cut shall be 5/8" wide and up to 3½" deep. It shall be "wet-cut" in the directions and sizes specified on the Plans, Standard Details or as directed by the Engineer. Contractor shall remove sharp edges in the saw cut and round the corners.

The saw cut shall be blown out with compressed air to remove all dust, water and particles of loose material prior to sealing.

The loop detector wire will then be installed using blunt tools so as to prevent damage to the polyethylene outer cover. One end of a loop detector wire shall be tagged to indicate start ("S"). A 5/8" backer rod will be placed into the bottom of the saw cut as needed to secure the wiring within the saw cut. All loop detector wires shall be laid in saw cuts in a clockwise rotation beginning with "S". The Engineer may require a High Voltage Ground Test with a 500 VDC megger after the loop detector installation is complete and prior to sealing saw cuts. If the resistance to ground is less than 100 megohms, this work will be rejected.

A sealer and sealer accelerant or retarder (if necessary) shall be applied in accordance with the manufacturer's directions and protected from traffic until it has set. A minimum of 1 inch of sealer shall be installed on top of the loop detector wire and finished flush with the pavement. Drilled holes in the pavement shall also be sealed.

Two loop detector wires shall be installed in a saw cut from the loop to the edge of the road. These two wires shall then extend from the end of the saw cut to a junction well (see Plan Details). Wires shall be parallel, twisted a minimum of 5 wraps per foot, and taped every 12" to 18" from the end of the saw cut to a junction well up to the splice.

The loop detector wire shall be installed between the end of the saw cut and junction well through a penetration created by a 1 ½" rotary drill as directed by the Engineer.

The loop detector wire shall be continuous and without splices from the junction well, through the saw cuts and conduit.

Home-run Wire Installation - refer to furnish and install cable specifications and conduit installation specifications. Refer to plans for details.

Splicing – splices between the loop detector wire and home-run cable shall be done in accordance with the plan details.

Conductors to be soldered shall be placed side by side with the exposed copper aligned. The copper shall then be twisted clockwise with pliers until a good mechanical connection is affected. The splice shall be coated with flux, heated with a soldering iron, and rosin core soldered in a manner that minimizes insulation damage. After each soldered connection is completed, it shall be properly insulated with heat shrink tubing.

After the electrical and mechanical connection is completed and before the splicing kit is applied, a test shall be made by the Contractor to ensure that all circuits are complete. An approved splice kit shall be installed as per manufacturer's instructions. A continuity test will be performed at the cabinet by the Department technician after the splicing kit is applied. The Department will be notified of the test results. If the continuity test fails the Contractor shall remake the splice and/or loop at his own expense.

If a splice is found to be faulty within 90 calendar days of installation, it shall be the Contractor's responsibility to remake the splice at his own expense.

Method of Measurement:

The quantity of loop detector wire to be measured under this item shall be the number of linear feet of sawcut in which loop detector wire is installed, sealed, tested, and accepted.
Sealer, sealer accelerant or retarder shall be incidental to this item.

Loop detector wire routed through the rotary drill penetration is considered incidental to the cost of the loop installation.

Conduit and associated home-run cable between the junction well and cabinet will be measured and paid for under their respective items, separate from this specification.

Splicing of the loop detector wire to a home-run cable in a junction well shall be incidental to the cost of the loop wire.

Basis of Payment:

The quantity of loop detector wire supplied and installed will be paid for at the Contract unit price per linear foot, determined by measuring the footage of sawcut described above. Price and payment shall constitute full compensation for "wet"-sawcutting, furnishing and placing all materials including loop detector wire, backer rod, sealer, and for all labor, equipment, tools, splicing in the junction well, and incidentals necessary to complete this item.

The price bid per linear foot of sawcut with Loop Wire shall include drilling required for installation, concrete and pavement patching, sealing the conduit ends, internal bushings shown on the plans, and all incidentals necessary to complete the item.

7/18/14

746925 – FURNISH & INSTALL EMBEDDED METERED SERVICE PEDESTAL (100 AMP)

Description:

Electrical service equipment consists of the equipment necessary to connect a utility company service to a traffic signal controller cabinet, lighting control cabinet, traffic monitoring station cabinet, or other traffic control device cabinet. Provide electrical service equipment at the phasing and amperage specified in the Contract Documents. This work includes coordinating the connection with the local utility company.

Materials:

Embedded Metered Service Pedestal:

Install a galvanized steel post including a 100 amp double pole main circuit breaker for service disconnect, branch circuit breakers, integral meter socket with bypass lever and 20 Amp GFCI duplex receptacle. The post shall be designed for embedment into the soil at least 18 in. and have a stabilizer shoe. Pour a concrete collar around the post as shown in the Contract Documents. The post and meter socket shall meet NEMA 3R. Provide the means to padlock the post closed and to install a utility company seal on the meter. Provide branch circuit breakers as specified. Embedded metered service pedestals shall be UL listed Suitable for Service Equipment, and be acceptable to the local utility companies for use as a service connection.

Circuit Breakers:

Molded case type having a minimum rating of 10,000 amp interrupting capacity (AIC) and be quick make, quick break, thermal magnetic, trip indicating, and have common trip on all multiple breakers with internal tie mechanism. They shall have the current and voltage ratings and number of poles as specified, and be treated to resist fungus and be ambiently compensated for the enclosure and proximity to adjacent breakers. All circuit breakers shall be the plug in type.

Construction Methods:

Utility Connection - Before any control equipment or material is ordered, arrange a meeting with the utility company representatives, Signal Construction Inspection representatives and the Engineer to establish a schedule for utility connections. Do not disconnect, de-energize, reconnect, tamper with, or otherwise handle any of the utility company's facilities. Make the utility service connection to the point of service supplied by the utility company. Make the necessary arrangements with the utility companies to ensure having needed utilities available at the time of turn on. Delays due to utility energization, connection, or disconnection will not be a basis for time extension. Report any difficulties in securing utility company services to the Engineer as soon as possible.

Installation - Embedded Metered Service Pedestal shall be installed per the standard construction or applicable plan details.

Measurement and Payment:

Embedded Metered Service Pedestal will be measured and paid for at the Contract unit price per each. The payment will be full compensation for all enclosures, panel boards, ground rods, circuit breakers, internal wiring, wiring devices, concrete collar, meter sockets, meter, shunts, cover plates, wiring, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.
Underground conduit will be measured and paid for separately under the applicable conduit item(s).

Service lateral cable will be measured and paid for separately under the applicable cable item(s).

Utility connection coordination with the utility company will not be measured, but the cost will be incidental to other pertinent items. Utility company energizing, connection, and disconnection costs will be the responsibility of the Department.

746926 – FURNISH & INSTALL ELECTRICAL UTILITY SERVICE EQUIPMENT 120/240

Description:

Electrical service equipment consists of the equipment necessary to connect a utility company service to a traffic control device cabinet, lighting control cabinet, traffic monitoring station cabinet, or other traffic control device cabinet. Provide electrical service equipment at the phasing and amperage specified in the Contract Documents. This work includes coordinating the connection with the local utility company.

Materials:

Meter Sockets:

Provide either ringed or ringless type meter sockets as required by the utility company. If a meter is not required, provide a ringless socket with suitable shunts and a metallic cover plate. Provide stainless steel hardware for attaching the meter socket to a cabinet, wood post, or other structure.

Disconnect Switches:

Disconnect switches shall be NEMA standard KS 1-1990. The disconnect switch enclosure shall be Type 4 stainless steel, with external operating handle, enclosure cover interlock, and external switch mechanism handle with provisions for securing in both the ON and OFF positions by padlock. The switch mechanism shall be of heavy duty design with quick make, quick break type operations and visible blades.

The disconnect switch shall be fusible with integral fuse puller. Single phase disconnect switches shall have 2 poles with solid neutral and shall be rated at 240 Volts. Three phase disconnect switches shall have 3 poles with solid neutral and shall be rated at 600 Volts. The design of the neutral bar may be factory or field installable.

Construction Methods:

Utility Connection - Before any control equipment or material is ordered, arrange a meeting with the utility company representatives, Signal Construction Inspection representatives and the Engineer to establish a schedule for utility connections. Do not disconnect, de-energize, reconnect, tamper with, or otherwise handle any of the utility company's facilities. Make the utility service connection to the point of service supplied by the utility company. Make the necessary arrangements with the utility companies to ensure having needed utilities available at the time of turn on. Delays due to utility energization, connection, or disconnection will not be a basis for time extension. Report any difficulties in securing utility company services to the Engineer as soon as possible.

General Installation - Electrical Utility Service Equipment shall be installed per the standard construction or applicable plan details.

Measurement and Payment:

Electrical Utility Service Equipment will be measured and paid for at the Contract unit price per each at the phasing and amperage specified. The payment will be full compensation for the disconnect switch, meter socket, meter, shunts, cover plate, ground rods, wiring, conduit risers, elbows, conduit nipples and adapters, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Underground conduit will be measured and paid for separately under the applicable conduit item(s).

Service lateral cable will be measured and paid for separately under the applicable cable item(s).

Utility connection coordination with the utility company will not be measured, but the cost will be incidental to other pertinent items. Utility company energizing, connection, and disconnection costs will be the responsibility of the Department.

2/29/12

746939 - TRAFFIC CONTROL DEVICE EQUIPMENT TURN ON, PICK UP, REMOVAL AND MAINTENANCE, TYPE I
746940 - TRAFFIC CONTROL DEVICE EQUIPMENT TURN ON, PICK UP, REMOVAL AND MAINTENANCE, TYPE II
746941 - TRAFFIC CONTROL DEVICE EQUIPMENT TURN ON, PICK UP, REMOVAL AND MAINTENANCE, TYPE III

Description:

This work shall consist of pickup of DelDOT furnished materials, removal and/or returning of existing equipment, and maintenance of existing equipment as specified in the Contract Documents or as directed by the Engineer.

Materials:

Not applicable

Construction Methods:

Equipment Turn On - Notify the Engineer and Signal Construction Inspection representative at least 10 working days before completion of the project to allow DelDOT to install any additional traffic control device(s).

Notify the Engineer and Signal Construction Inspection representative five working days prior to the completion of the project to schedule a final inspection and turn-on.

Stakeout, with the Engineer and Signal Construction Inspection representative present, the proposed construction as indicated on the plan(s).

Pick-Up of Administration Furnished Materials - Notify the Signal Construction warehouse representative a minimum of 72 hours in advance of the anticipated pick up or delivery of materials. The Signal warehouse is located at:

14 Sign Shop Road
Dover, Delaware 19901
Signal Warehouse: Phone 302-760-2565

The Contractor shall be responsible for the transportation, labor, equipment, tools and incidentals necessary to obtain and load any DelDOT furnished materials.

Materials not furnished by DelDOT shall be furnished by the Contractor.

Removal and Disposal of Existing Material and Equipment - Removal of all structures as specified. Remove concrete foundations as specified. All holes caused by this removal shall be backfilled, compacted and restored to surrounding conditions.

Remove all existing abandoned junction wells or manholes shown on the plans, the holes shall be backfilled, compacted and restored to surrounding conditions. Cap and abandon conduit(s). The sidewalk where junction wells are removed shall be reconstructed to the nearest tooled joint or expansion joint.

Existing inductive loop detectors and magnetic detectors not shown on the plans shall be disconnected and or removed, all cables shall be removed form all conduit raceways, span wires, signal structures, junction wells and cabinets.

Remove any existing signalization cables within the intersections that have been disconnected or are unused. This includes removal from all conduit raceways, span wires, signal structures, junction wells and cabinets.

Dispose of all material not salvaged or returned. 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 manufacturer's recommendations or as approved by the Engineer.

Return of Material to DelDOT – After their removal in the field, the following materials shall be returned to the DelDOT sign shop:

Traffic Signal Poles and Pedestrian Signal Poles, Pedestal Poles, Lighting Poles, Salvaged Cable, Controllers and Cabinet enclosures, Junction Well Frames and Lids, Signal Heads, Pedestrian Signal Heads, Opticom Detector Units, and Signs that were mounted on mast arms, poles, or structures.

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 DelDOT standards, the adjustments to the traffic control devices shall be made within 4 hours of verbal notification by the Engineer.

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 all vehicular and pedestrian detectors in continuous operation. If any detector is damaged by the Contractor, it shall be replaced within 72 hours after notification by the Engineer.

All traffic signals and existing interconnect cable shall remain 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 Per Each payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work for a “Type I”, “Type II”, or “Type III” location as specified in the Contract Documents and defined below.

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 Material and Equipment - Removal and disposal of concrete foundations, junction wells, structures, and all other specified equipment will be measured and paid for at the Contract Bid Item price for Remove and Dispose of Existing Materials Type I, II or III as follows:

Remove, and Dispose Type I -

Removal, return to DelDOT, and disposal of existing TCD material for minor signal modification, cables, junction wells, signal heads, signs and all other specified equipment. No concrete foundation removal is anticipated.

Remove and Dispose Type II -

Removal, return to DelDOT, and disposal of existing TCD material for signal modification, cables, junction wells, concrete foundations, structures, signal heads, signs and all other specified equipment. 2 to 4 concrete foundations and structures and/or cabinet removals are anticipated.

Remove and Dispose Type III -

Removal, return to DelDOT, and disposal of existing TCD material for full signal reconstruction, cables, junction wells, concrete foundations, structures, cabinets, signal heads, signs and all other specified equipment.

Maintenance of Existing Signal Equipment - Materials storage, cable sealing and handling, adjustments to maintain minimum DelDOT standards on existing signals made necessary by new signal or geometric modifications and Contractor repair of any damaged detector caused as a result of Contractor's error will not be measured but the cost will be incidental to other pertinent items specified in the Contract Documents.

3/1/12

747500 - LOAD CENTER CABINETS WITH PAD

Description:

This work consists of providing and installing load center cabinets with pad with all necessary conduits, underground facilities, equipment, and wiring as indicated on the Plans or as directed by the Engineer.

Materials:

The concrete for the pad shall conform to Section 812, Class B of the Standard Specifications.

Galvanized steel conduits and fittings shall be as specified under Section 745 of the Standard Specifications.

The cabinets and doors shall be constructed from 5052-H32 sheet aluminum alloy with a thickness of 0.125" (3.2 mm). External welds shall be made by using heliarc welding method, internal weld, may be made by the wire welding method. All welds shall be neatly formed and free of cracks, flow holes and otherwise irregularities.

The outside surface of the cabinet shall have a smooth uniform, natural aluminum finish. The cabinets shall have a sloped top to prevent the accumulation of water on its top surface.

The enclosure door frame shall be double flanged out on all four sides. These flanges increase strength of opening and keep dust and liquids from dropping into enclosure when door is opened. The cabinet door shall be hinged on the right side when facing the cabinet and shall be a minimum 80% of the front surface area. The door shall be gasketed to satisfy requirements of NEMA 4X enclosure.

The door shall have a heavy gauge continuous hinge with 1/4" (6 mm) diameter stainless steel hinge pin. Hinge shall be secured with 1/4-20 stainless steel carriage bolts and stainless steel nylock nuts.

Cabinets shall be provided with a 5052-H32 aluminum alloy metal back panel of 0.125" (3.2 mm) minimum thickness. All mounting hardware shall be furnished. All internal hardware shall be either stainless steel or cadmium pressed steel Type II, Class I.

Cabinets finish shall be natural aluminum mill finish for Fed. Spec. QQA-250/8.

Panelboards for 240/480 volt installations shall be single phase three-wire and shall have main-rated busses and shall conform to Federal Specification W-P-115B, Type 1, Class 1. Circuit breakers shall be UL listed and comply with NEMA Standards and Federal Specification W-C-375B.

The size and rating of other electrical apparatus within the two (2) cabinets that comprise the load center cabinets shall be as designated on the Plan details.

Construction Methods:

The concrete pad shall be a cast-in-place monolithic slab, with sides formed to a minimum 30" (0.75 m) depth below the final ground surface. Concrete shall not be poured until the forming, position of conduits and grounding facilities are approved by the Engineer. Appropriate provisions shall be used to support conduit, grounding facilities and anchor bolts during concrete pouring and curing. All conduits shall be provided with temporary pipe caps during the placement of concrete. A minimum distance of 1" (25 mm) shall be maintained between conduits.

Forms shall not be removed from the concrete pad until twenty-four (24) hours after the concrete has been poured and the pad is to be kept moist for a period of seven (7) days after pouring. The concrete surface shall be level and have a broom finish.

All excavation material shall be stockpiled on the site until backfilling has been completed. Backfill may be placed after the first 24 hours and is to be accomplished in 6" (150 mm) layers, with each lift mechanically tamped. All excess material is to be removed and used elsewhere on the project as approved by the Engineer.

Cabinets shall be installed on the concrete pad using the method of attachment as noted on the Plan details.

Method of Measurement:

The quantity of load center cabinets with pads be measured as the actual number of load center cabinets with pads, each consisting of the two cabinets with pad and all equipment and wiring within, complete in place and accepted.

The pad will include all conduits within the pad, grounding bushings on conduits coming out of top of pad, and anchor bolts as shown on the contract drawings.

Basis of Payment:

The quantity of load center cabinets with pads will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing all materials, excavation and backfilling for the pad, and for all labor, equipment, tools and incidentals necessary to complete the item.

8/31/01

747513 - LIGHTING CONTROL AND DISTRIBUTION ENCLOSURE (120/240 100 AMP)

Description:

This work consists of furnishing all materials and installing light panels, meters, control and distribution equipment for any highway lighting system.

Materials:

Lighting Control and distribution equipment enclosures shall be dead front type weatherproof metal enclosed self-supporting structures, as specified in the Contract Documents. Free standing enclosures shall be fabricated from sheet aluminum and shall be as specified herein. Panel and control equipment cabinets shall be the manufacturer's standard enclosure for the type and application specified.

Circuit Breakers. Circuit breakers shall be molded case type having a minimum rating of 22,000 amp interrupting capacity (AIC) and be quick make, quick break, thermal magnetic, trip indicating, and have common trip on all multiple breakers with internal tie mechanism. They shall have the current and voltage ratings and number of poles as specified in the Contract Documents, and shall be treated to resist fungus and be ambiently compensated for the enclosure and proximity to adjacent breakers. All circuit breakers shall be the bolt in type.

Photoelectric Controls. Photoelectric controls shall be solid state, cadmium sulfide type with hermetically sealed silicone rectifier rated 120/240 or 277 volts, 60 cycle AC and 1000 watts maximum load. Built in surge protection shall be provided, and a failsafe operating feature shall be included so that the lighting circuits will remain energized in the event the photo control components become inoperative. Nominal operating levels of this control shall turn on at a minimum vertical illumination value of 3 FC (32 lux) and turn off at a maximum vertical illumination value of 6 FC (65 lux). These limitations shall be set by the manufacturer, and tolerances of plus or minus 20 percent for the specified value will be acceptable. Photoelectric controls for luminaires and lighting controls shall be twist lock type. A suitable mounting bracket with locking type receptacle and all other necessary mounting hardware shall be furnished.

Contactors and Relays. Contactors of the current ratings and number of poles specified in the Contract Documents shall be held by permanent magnets. They shall be fully rated for all classes of load to 600 volts AC and shall have an interrupting rating of 600 percent of rated current. A HAND-OFF-AUTOMATIC selector switch shall be provided in the photoelectric cell circuit. Relays shall be the type, size and contact ratings as specified in the Contract Documents.

Panel Boards. Panel boards shall conform to Federal Specification W-P-115 and shall be suitable for operation on the voltage and type service specified in the Contract Documents. They shall be listed and labeled by the Underwriters' Laboratories, Inc. Panel boards shall be equipped with the number and size circuit breakers specified. Circuit breakers in panel boards shall conform to Federal Specification W-C-375 and shall be bolted to copper busses. Buss ratings shall be as specified. Panel shall be provided with modular Transient Voltage Surge Suppressors. (TVSS).

Lightning Arresters. Lightning arresters shall be secondary type, having the specified number of poles and 0-650 volts RMS. Arresters shall be provided with suitable mounting brackets and all other necessary mounting hardware.

Control Power Transformers. Control power transformers shall be the dry type, two windings, of the size and voltage ratings specified in the Contract Documents.

Enclosures. Enclosures shall conform to the NEMA 3R. They shall have door clamps, solid neoprene gaskets, welded seams, stainless steel external hardware and continuous hinges with stainless steel pins. Enclosures shall have two weep holes in the bottom and shall be equipped for padlocking.

Pad Mounted Enclosures. For ventilation, all cabinets shall be provided with louvered vents in the front door with a removable air filter.

(a) Louvers shall satisfy the NEMA Rod Entry Test for 3R rated ventilated enclosure.
(b) Filters for all cabinets shall be 16 in. (400mm) long, 12 in. (300mm) wide, and 1 in. (25mm) thick. The filter shall cover the vents and be held firmly in place with top and bottom brackets and a spring loaded upper clamp.
(c) Exhaust air shall be vented out of the cabinet between the top of the cabinet and the main access door. The exhaust area shall be screened with a screen type material having a maximum hole diameter of 1/8 in. (3.125mm)

Thermostats and Fans. A thermostatically controlled cooling fan shall be provided for all cabinets. The fan and thermostat shall be rated for 125 percent of capacity and they shall be mounted at the top of the cabinet.

(a) Thermostats shall be the inline type, single pole, 120 volts, 10 amps with a minimum range of 70F to 160F.
(b) The fan shall have a minimum rated capacity of 100 CFM air flow and a minimum rated design life of 100,000 hours.

Method of Measurement:

The number of Lighting Control and Distribution Enclosures to be measured per each under these items shall be the actual number in accordance with these special provisions complete in place and accepted.

Basis of Payment:

The number of Lighting Control and Distribution Enclosure as determined above, shall be paid for at the contract unit price bid for each item "Lighting Control and Distribution Enclosure 120/240 volts; 100 AMP" installed in accordance with the requirements contained herein, complete in place and accepted, which price and payment shall constitute full compensation for furnishing all materials, including panels, control devices concrete pad foundation and for all labor and equipment necessary for the installation of the electrical equipment specified.

5/7/12

747514 - CABINET BASE TYPE F
747515 - CABINET BASE TYPE M
747516 - CABINET BASE TYPE P
747517 - CABINET BASE TYPE R

Description:

This work consists of constructing cabinet base Type F, M, P and R in accordance with the Standard Construction Details or applicable Plan Details and at locations as directed by plans or the Engineer.

Materials:

Class B Concrete
3/4” x 10’ sectional copperclad steel ground rods
5/8" Zinc plated or Stainless Steel Drop-in Anchors manufactured by Hilti Systems, Concrete Fastening Systems, or approved equal
5/8" x 1-1/2" galvanized hex bolts
3/4” acorn type ground clamps
PVC conduit sweeps

Construction Methods:

The base shall conform to the dimensions as indicated in the cabinet base detail on the Standard Construction Details or applicable Plan Sheets. A concrete collar is only required when installed in earth areas or as directed by the engineer. Conduits entering the base must enter only in the designated area. A minimum distance of 1 inch shall be maintained between conduits and a minimum distance of 2 inches between conduits and the ground rods.

A minimum of 8 foot of the ground rods must be driven into undisturbed soil through the 2 inch PVC sleeve. The PVC sleeve shall be driven into the ground so that the top of the sleeve will be flush with the concrete when the base is poured.

Method of Measurement:

The quantity of cabinet bases will be measured as the number of bases constructed in accordance with these specifications, complete in place, and accepted.

All conduit sweeps extending into the cabinet base as shown on the Plans or Standard Details as applicable shall be included in the price for each cabinet base..

Basis of Payment:

The quantity of cabinet bases will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for all concrete, ground rods, labor, equipment, tools, conduit sweeps, and incidentals required to complete the work as shown on the standard details or applicable plan sheets.

10/9/2012

748506 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 4"
748507 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 6"
748508 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 8"
748509 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 12"
748510 - PERMANENT PAVEMENT STRIPING, SYMBOL/LEGEND, EPOXY RESIN PAINT
748535 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 4"
748536 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 6"
748537 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 8"
748538 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 10"
748539 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 12"
748540 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 16"
748548 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 5"
748549 -PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 10"
748557 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 3"
748559 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 5"
748568 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 9"
748569 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 14"

Description:

This work consists of striping layout,furnishing and applying white or yellow, epoxy reflectorized pavement markings or black epoxy contrast pavement markings at the locations and in accordance with the patterns indicated on the Plans, or as directed by the Engineer, and in accordance with these specifications.

The white/yellow epoxy marking material shall be hot-applied by spray methods onto bituminous and/or Portland cement concrete pavement surfaces as required by the Plans. Following an application of double drop glass beads of two sizes and upon curing, the resultant epoxy marking shall be an adherent reflectorized stripe of the specified thickness and width that is capable of resisting deformation by traffic.
All marking materials shall be certified lead free and free of cadmium, mercury, hexvalent chromium, and other toxic heavy metals.

The black epoxy marking shall be a two-component, hot-spray applied epoxy resin pavement marking material to be used for pavement marking on Portland cement concrete pavement surfaces. Following an aggregate drop, and upon curing, it shall produce an adherent stripe of specified thickness and width capable of resisting wear from traffic. Black contrast pavement markings will be required on all Portland cement concrete pavements.

Materials Requirements:

A. White and Yellow Reflectorized Epoxy

1. Epoxy Composition Requirements:

   The epoxy resin composition shall be specifically formulated for use as a pavement marking material and for hot-spray application at elevated temperatures. The type and amounts of epoxy resins and curing agents shall be at the option of the manufacturer, providing the other composition and physical requirements of this specification are met.

   The epoxy marking material shall be a two-component (Part A and Part B), 100% solids type system formulated and designed to provide a simple volumetric mixing ratio (e.g. two volumes of Part A to one volume of Part B).

   Component A of both white and yellow shall conform to the following requirements:

	% BY WEIGHT	
	WHITE:	**YELLOW:**
Pigments	Titanium Dioxide - 18% Min. (ASTM D476, Type II)	Organic Yellow - 6%-10%
Epoxy Resin	75% Min., 82% Max.	70% Min., 77% Max.

The entire pigment composition shall consist of either titanium dioxide and/or organic yellow pigment. No extender pigments are permitted. The white pigment upon analysis, shall contain a minimum of 16.5% TiO_2 (100% purity).

Epoxy Content-WPE (Component A) - The epoxy content of the epoxy resin will be tested in accordance with ASTM D1652 and calculated as the weight per epoxy equivalent (WPE) for both white and yellow. The epoxy content will be determined on a pigment free basis. The epoxy content (WPE) shall meet a target value provided by the manufacturer and approved by the Department's Material and Research Section (from now on will be addressed as Department). A $\pm$ 50 tolerance will be applied to the target value to establish the acceptance range.

Amine Value (Component B) - The amine value of the curing agent shall be tested in accordance with ASTM D2074-66 to determine its total amine value. The total amine value shall meet a target value provided by the manufacturer and approved by the Department. A $\pm$50 tolerance will be applied to the target value to establish the acceptance range.

Toxicity - Upon heating to application temperature, the material shall not exude fumes which are toxic or injurious to persons or property.

Viscosity - Formulations of each component shall be such that the viscosity of both components shall coincide (within 10%) at a recommended spray application.

2. Physical Properties of Mixed Composition:

Unless otherwise noted, all samples are to be prepared and tested at an ambient temperature of 73 ± 5 F. (23 ± 3 C).

a. Color. The white epoxy composition when applied at a minimum wet film thickness of 20$\pm$1 mils (500 µm) as applicable and allowed to dry, shall plot within the boundaries described by the four corner points listed in Tables 1 and 2 of ASTM D 6628-01 when measured in accordance with the test methods prescribed in Section 7 of ASTM D 6628-01.

The yellow epoxy composition when applied at a minimum wet film thickness of 20$\pm$1 mils (500 µm) as applicable and allowed to dry, shall plot within the boundaries described by the four corner points listed in Tables 1 and 2 of ASTM D 6628-01 when measured in accordance with the test methods prescribed in Section 7 of ASTM D 6628-01.

b. Directional Reflectance. The white epoxy composition (without glass spheres) shall have a daylight directional reflectance of not less than 84% relative to a magnesium oxide standard when tested in accordance with Method 6121 of Federal Test Method Standard No. 141.

The yellow epoxy composition (without glass spheres) shall have a daylight directional reflectance of not less than 55% relative to a magnesium oxide standard when tested in accordance with Method 6121 of Federal Test Method Standard No. 141.

c. Drying Time (Laboratory). The epoxy composition, when mixed in the proper ratio and applied at a 20$\pm$1 mils (500 µm) minimum wet film thickness, and immediately dressed with large reflective glass spheres (Federal Spec. Type 4)at a rate of 12 lb/gal (1.4 kg/l) of epoxy pavement marking materials, immediately followed by a second drop of AASHTO M-247 Type 1 glass spheres applied at a rate of 12 lb/gal (1.4 kg/L) of epoxy pavement marking material, shall exhibit a no-track condition in 15 minutes or less (ASTM D711). A Bird Applicator or any other doctor blade shall be used to produce a uniform film thickness.

d. Drying Time (Field). When installed at a minimum wet film thickness of 20±1 mils (500 or 625 um) and reflectorized with glass spheres, the maximum drying times shall correspond to these temperatures:

80 F (27 C)	10 minutes
70 F (21 C)	10 minutes
60 F (16 C)	15 minutes
50 F (10 C)	25 minutes
40 F (4 C)	45 minutes
35 F (2 C)	60 minutes

The composition shall dry to "no-tracking" in approximately 10 minutes, and after thirty (30) minutes shall show no damaging effect from traffic. Dry to no-tracking shall be considered as the condition where no visual deposition of the epoxy marking to the pavement surface is observed when viewed from a distance of 100 feet (30 meters), after a passenger car is passed over the line. Regardless of the temperature at the time of installation, the installation contractor shall be responsible for protection of the markings material until dry to a non-tracking state.

e. Abrasion Resistance. The wear index of the composition shall not exceed 82 when tested in accordance with ASTM C501 using a CS-17 wheel and under a load of 1000 grams for 1000 cycles.

f. Tensile Strength. The tensile strength of the epoxy composition shall not be less than 6000 psi (41 MPa) when tested in accordance with ASTM D638 using a Type IV specimen [0.125" ± 0.010" (3.18 ± 0.25 mm) thick]. Tests shall be conducted at an ambient temperature of 75 ± 5 F (24 ± 3 C). The testing machine shall operate at a speed of 0.20" (5.1 mm) per minute.

The total conditioning or drying period, from the time the epoxy composition is first mixed to the time of testing, shall not be less than 24 hours nor more than 96 hours.

Test specimens for tensile strength determination will be prepared as follows:

A 1/8 inch (3 mm) thick sheet of epoxy material is cast from a reservoir-type mold, fabricated from polyterrafluorethylene (PTFE), 1/8" deep x 10" x 10" (3 mm deep x 250 mm x 250 mm).

Prior to casting, the mold is sprayed with a suitable release agent. A sufficient amount of epoxy composition is mixed in the proper proportions (A:B) and poured level with the top of the mold. Care should be taken so as not to decrease or exceed the 1/8" (3 mm) thickness.

After a period of 1 to 4 hours, the material will have set into a semi-rigid sheet that is flexible enough to die-cut yet rigid enough to retain its shape. While the material is in this "plastic" state, five (5) specimens shall be die-cut and then placed on a flat, smooth, PTFE surface for the completion of the specified conditioning period.

g. Compressive Strength. The compressive strength of the epoxy composition shall not be less than 12,000 psi (83 MPa) when tested in accordance with ASTM D695 except that a compression tool shall not be necessary. The test specimen shall be a right cylinder [0.50 inch diameter by 1.0 inch length (12 mm diameter by 25 mm length)]. Tests shall be conducted at an ambient temperature of 75 ± 5 F (24 ± 3 C).

The total conditioning or drying period, from the time the epoxy composition is first mixed to the time of testing shall not be less than 24 hours nor more than 96 hours. Test specimens for compressive strength determinations will be prepared as follows:

Five molds will be prepared from 1/2" (12 mm) I.D., 1/16" (1.5 mm) wall thickness acrylic tubing, cut in 1 1/2" (38 mm) lengths. After spraying the inside of the mold with a suitable release agent,[1] the cylindrical tubes are placed in a vertical position on a PTFE sheet base. A sufficient amount of epoxy composition is thoroughly mixed in the proper proportions (A:B) and poured into the mold to a depth of approximately 1 1/4" (32 mm). After a minimum of 72 hours curing, the specimens are removed from the molds and machined to a length of 1" ± 0.002" (25 mm ± 0.05 mm).

h. Hardness. The epoxy composition when tested in accordance with ASTM D2240 shall have a Shore D hardness of between 75 and 100. Samples shall be allowed to dry for not less than 24 hours nor more than 96 hours prior to testing.

B. Reflective Glass Spheres/Beads

Reflective glass spheres for drop-on application shall conform to the following requirements:

The glass spheres shall be colorless; clean; transparent; free from milkiness or excessive air bubbles; and essentially clean from-surface scarring or scratching. They shall be spherical in shape and at least 80% of the glass beads shall be true spheres when tested in accordance with ASTM D1155. At least 80% of the Type IV beads shall be true spheres as measured by the visual method.

The refractive index of the spheres shall be a minimum of 1.50 as determined by the liquid immersion method at 77 F (25 C). The silica content of the glass spheres shall not be less than 60%.

The crushing resistance of the spheres shall be as follows: A 40 lb. (18 kg) dead weight, for 20 to 30 (850 µm to 600 µm) mesh spheres shall be the average resistance when tested in accordance with ASTM D1213.

The glass spheres shall have the following grading when tested in accordance with ASTM D1214.

M247 AASHTO Type 1 Glass Spheres

U.S. Standard Sieve	% Retained	% Passing
#20 (850µm)	0	100
#30 (600µm)	5-25	75-95
#50 (300µm)	40-65	15-35
#100 (150µm)	15-35	0-5
Pan	0-5	

Type 4 Large Spheres

U.S. Standard Sieve	% Retained	% Passing
#10 (2000 µm)	0	100
#12 (1680 µm)	0-5	95-100
#14 (1410 µm)	5-20	80-95
#16 (1190 µm)	40-80	10-40
#18 (1000 µm)	10-40	0-5
#20 (850 µm)	0-5	0-2
Pan	0-2	

The AASHTO M247 Type 1 glass spheres shall be treated with a moisture-proof coating. They shall show no tendency to absorb moisture in storage and shall remain free of clusters and hard lumps. They shall flow freely from dispensing equipment at any time when surface and atmosphere conditions are satisfactory for marking operations. The moisture-resistance of the glass spheres shall be determined in accordance with AASHTO M247 test method 4.4.1.

Type IV glass spheres shall be treated with an adhesion coating. They shall show no tendency to absorb moisture in storage and shall remain free of clusters and hard lumps. They shall flow freely from dispensing equipment at any time when surface and atmosphere conditions are satisfactory for marking operations. The adhesion coating property of the Type IV beads shall be tested in accordance with the dansyl-chloride test.

C. Black Epoxy Contrast Markings

Epoxy Resin Requirements: The two-component, 100% solids, paint shall be formulated and designed to provide a simple volumetric mixing ratio (e.g. 2 part component A to 1 part component B) specifically for service as a hot-spray applied binder for black aggregate in such a manner as to produce maximum adhesion. The material shall be composed of epoxy resins and pigments only.

The paint shall be well mixed in the manufacturing process and shall be free from defects and imperfections that may adversely affect the serviceability of the finished product. The paint shall not thicken, curdle, gel, settle excessively, or otherwise display any objectionable properties after storage. Individual components shall not require mixing prior to use when stored for a maximum of 6 months.

The overall paint composition shall be left to the discretion of the manufacturer, but shall meet the following requirements:

Composition:	Component	Percent By Weight
	Carbon Black (ASTM D476 Type III)	7±2 percent, by weight
	Talc	14±2 percent, by weight
	Epoxy Resin	79±4 percent, by weight

D. Black Aggregate

The moisture resistant aggregate shall meet the gradation requirements (AASHTO T27) as follows:

Sieve Size	Percent Retained
#30	18-28%
#40	60-80%
#50	2-14%

The moisture resistant aggregate shall have a ceramic coating. The aggregate shall be angular with no dry dispensement pigment allowed.

Hardness:	The black aggregate hardness shall be 6.5-7 on Moh's Mineral Scale.
Porosity:	The black aggregate porosity shall be less than two (2) percent.
Moisture Content:	The black aggregate moisture content shall be less than a half (.5) percent.

E. Packaging and Shipment

Epoxy pavement marking materials shall be shipped to the job site in strong substantial containers. Individual containers shall be plainly marked with the following information:

a. Name of Product
b. Lot Number
c. Batch Number
d. Test Number
e. Date of Manufacture
f. Date of expiration of acceptance (12 months from date of manufacture)
g. The statement (as appropriate)
   Part A - Contains Pigment & Epoxy Resin
   Part B - Contains Catalyst
h. Quantity
i. Mixing proportions, Application Temperature and Instructions
j. Safety Information
k. Manufacturer's Name and Address

Reflective glass spheres shall be shipped in moisture resistant bags. Each bag shall be marked with the name and address of the manufacturer and the name and net weight of the material.

F. The Department reserves the right to randomly take a one-quart sample of white, yellow and hardener, of the epoxy material or glass spheres without prior notice for testing to ensure the epoxy material meets specifications.

Epoxy Application Equipment:

Application equipment for the placement of epoxy reflectorized pavement markings shall be approved by the Department, prior to the start of work. At any time throughout the duration of the project, the Contractor shall provide free access to his epoxy application equipment for inspection by the Engineer or his authorized representative.

In general, the application equipment shall be a mobile, truck mounted and self contained pavement marking machine, specifically designed to apply epoxy resin materials and reflective glass spheres in continuous and skip-line patterns. The application equipment shall be maneuverable to the extent that straight lines can be followed and normal curves can be made in a true arc. In addition, the truck mounted unit shall be provided with accessories to allow for the marking of legends, symbols, crosswalks, and other special patterns.

The Engineer may approve the use of a portable applicator in lieu of truck mounted accessories, for use in applying special markings only, provided such equipment can demonstrate satisfactory application of reflectorized epoxy markings in accordance with these specifications.

The applicator shall be capable of installing up to 20,000 lineal feet (6,100 lineal meters) of epoxy reflectorized pavement markings in an 8-hour day and shall include the following features:

1. The applicator shall provide individual material reservoirs, or space, for the storage of Part A and Part B of the epoxy resin composition; for the storage of water; and for the storage of reflective glass spheres.

2. The applicator shall be equipped with heating equipment of sufficient capacity to maintain the individual epoxy resin components at the manufacturer's recommended temperature for spray application and for heating water to a temperature of approximately 140 F (60 C).

3. The glass spheres shall be gravity dropped upon 20 mils (500 um) of epoxy pavement markings to produce a wet-night-reflective pavement marking. The large spheres (Federal Spec. Type 4) shall be applied at a rate of 12 pounds per gallon (1.4 kg/L) of epoxy pavement marking material, immediately followed by a second drop of AASHTO M-247 Type 1 glass spheres applied rate of 12 pounds per gallon (1.4 kg/L) of epoxy pavement marking material. This application rate and the following gradation shall conform to FHWA's FP-96: Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects (pages 757-761 Type 3 and Type 4 Beads).

4. The applicator shall be equipped with metering devices or pressure gauges, on the proportioning pumps. Metering devices or pressure gauges shall be visible to the Engineer.

5. The applicator shall be equipped with all the necessary spray equipment, mixers, compressors, and other appurtenances to allow for the placement of epoxy reflectorized pavement markings in a simultaneous sequence of operations as described below in Construction Details, D. Applications of Epoxy Reflectorized Pavement Markings of this Special Provisions.

Construction Details.

A. General: All pavement marking and patterns shall be placed as shown on the Plans or as directed by the Engineer.

Before any pavement markings work is begun, a schedule of operations shall be submitted for the approval of the Engineer. This schedule shall be submitted 2 weeks prior to the application of the striping.

At least five (5) days prior to starting striping the Contractor shall provide the Engineer with the epoxy manufacturer's written instructions for use. These instructions shall include but not be limited to: mixing ratios, application temperatures, and recommendations for use of water spray.

The application of pavement markings shall be done in the general direction of traffic. Striping against the direction of traffic flow shall not be allowed.

The Contractor shall be responsible for removing, to the satisfaction of the Engineer, tracking marks, spilled epoxy or epoxy markings applied in unauthorized areas.

The hot water spray shall not be used in conjunction with markings applications on any pavement surface, or on any existing durable type marking, unless specifically recommended by the manufacturer of the epoxy material.

B. Atmospheric Conditions: Epoxy pavement markings shall only be applied during conditions of dry

weather and on substantially dry pavement surfaces. At the time of installation the pavement surface temperature shall be a minimum of 35 F (2 C) and the ambient temperature shall be a minimum of 35 F (2 C) and rising. The Engineer shall be the sole determiner as to when atmospheric conditions and pavement surface conditions are such to produce satisfactory results.

C. Surface Preparations: The Contractor shall clean the pavement or existing durable marking to the satisfaction of the Engineer.

Surface cleaning and preparation work shall be performed only in the area of the epoxy markings application.

At the time of application all pavement surfaces and existing durable markings shall be free of oil, dirt, dust, grease and similar foreign materials. The cost of cleaning these contaminants shall be included in the bid price of this item. Also, the item shall include the cost of removal of the curing component in the area of the epoxy markings application, if concrete curing compounds on new portland cement concrete surfaces have been used. Waterblasting will not be permitted for removal.

D. Application of White/Yellow Epoxy Reflectorized Pavement Markings: White/yellow epoxy reflectorized pavement markings shall be placed at the widths and patterns designated on the Contract Plans.

Markings operations shall not begin until applicable surface preparation work is completed, and approved by the Engineer.

White/yellow epoxy pavement markings shall be applied at a minimum uniform thickness of 20 mils (500 µm) on all Portland cement concrete and bituminous concrete pavement, including Stone Matrix Asphalt.

Large reflective glass spheres (Federal Spec. Type 4) shall be applied at the rate of 12 pounds per gallon (1.4 kg/L) of epoxy pavement marking material, immediately followed by a second drop of AASHTO M-247 Type 1 glass spheres applied at a rate of 12 pounds per gallon (1.4 kg/L) of epoxy pavement marking material. Glass spheres shall uniformly cover the length and width of the pavement marking.

E. Application of Black Epoxy Contrast Pavement Markings: Black epoxy contrast pavement markings shall be placed at the widths designated on the Contract Plans.

Markings operations shall not begin until applicable surface preparation work is completed, and approved by the Engineer.

Black epoxy contrast pavement markings shall be applied at a minimum uniform thickness of 20 mils (500 µm) on all Portland cement concrete surfaces followed by a single drop of graded black aggregate.

The width of black epoxy line shall be applied for the following situations:

Center Skip Line - On Portland cement concrete pavements a black contrast skip line shall be 10 feet (3 m) in length of the same width as the white epoxy reflectorized skip. It is to lead the white skip and stop at the beginning of the white skip. The black contrast skip is to have a single application of graded black aggregate.

Edge Lines -White Edge lines on Portland cement concrete pavements shall have a 3 inch black contrast line running parallel to the white edge line. The contrast line shall be to the inside or travel lane side of the edge line. The black contrast marking is to be applied with a single drop of graded black aggregate. Once it has cured sufficiently so as not to track, the reflectorized white line is to be applied along side of the contrast line and the two lines shall adjoin each other.

Dotted Line: All dotted lines on Portland cement concrete pavements shall have a base of black contrast markings which is 4 inches (100 mm) wider than the reflective white marking. The black contrast marking is to be applied first with a single drop of graded black aggregate. Once it has cured sufficiently so as not to track, the reflectorized white line is to be applied on top of it. The reflective line is to be centered along the black contrast line such that a minimum of 2 inches (50 mm) of black contrast marking is visible on either side of the reflective marking.

F. Defective Epoxy Pavement Markings: Epoxy reflectorized pavement markings, which after application and curing are determined by the Engineer to be defective and not in conformance with this specification,

shall be repaired. Repair of defective markings shall be the responsibility of the Contractor and shall be performed to the satisfaction of the Engineer as follows:

1. Insufficient film thickness [(less than 20±1 mils (500 µm) as applicable] and line widths; insufficient glass bead coverage or inadequate glass bead retention.

   Repair Method: Prepare the surface of the defective epoxy marking by shot blasting, sand blasting, or water blasting. No other cleaning methods will be allowed. Surface preparation shall be performed to the extent that a substantial amount of the reflective glass spheres are removed and a roughened epoxy marking surface remains.

   Immediately after surface preparation remove loose particles and foreign debris by brooming or blasting with compressed air.

   Repair shall be made by re-striping over the cleaned surface, in accordance with the requirements of this specification and at a full 20±1 mils (500 µm) minimum line thickness as applicable.

2. Uncured or discolored epoxy (brown patches); insufficient bond to pavement surface (or existing durable marking).

   Uncured epoxy shall be defined as applied material that fails to cure (dry) in accordance with the requirements of this specification under MATERIALS, A, 2d. DRYING TIME (FIELD); or applied material that fails to cure (dry) within a reasonable time period under actual field conditions, as defined by the Engineer.

   Discoloration (brown patches) shall be defined as localized areas or patches of brown or grayish colored epoxy marking material. These areas often occur in a cyclic pattern and also, often are not visible until several days or weeks after markings are applied.

   Repair Method: The defective epoxy marking shall be completely removed and cleaned to the underlying pavement surface to the satisfaction of the Engineer.

   The extent of removal shall be the defective area plus any adjacent epoxy pavement marking material extending one foot (300 mm) any direction.

   After surface preparation work is complete, repair shall be made by re-applying epoxy over the cleaned pavement surface in accordance with the requirements of this specification.

3. Reflectivity for epoxy resin paint.

   After satisfactory completion of all striping work and written notification from the Contractor, the Department shall test the striping to ensure it has the minimum reflectivity. The testing will be completed within 30 calendar days from notification. The Contractor may request that tests be conducted on completed phases or portions of the work. Approval of such a request will be at the discretion of the Engineer. Testing will be done using a LTL-X Retrometer (30 meter geometry). Five readings will be taken per line per mile (1.6 km). Projects less than 1 mile (1.6 km) in length will have a minimum of 5 readings per line. These readings will then be averaged for the overall project average.

   The required average minimum initial reflectivity reading in millicandellas shall be:

   White 450
   Yellow 325

   Any single reading shall not be less than 350 millicandellas for white and 250 millicandellas for yellow. Without exception, any pavement markings installed that does not meet the above average minimum initial reflectivity numbers shall be removed and replaced, at the installation contractor's expense.

   Other defects not noted above, but determined by the Engineer to need repair, shall be repaired or replaced as directed by and to the satisfaction of the Engineer.

   All work in conjunction with the repair or replacement of defective epoxy reflectorized pavement markings shall be performed by the Contractor at no additional cost to the State.

Method of Measurement:

The quantity of permanent pavement striping (white, yellow, or black epoxy resin paint) will be measured by the number of linear feet (meters) of pavement striping line and number of square feet (meter) of symbol installed on the pavement and accepted in accordance with the Plans.

Basis of Payment:

The quantity of permanent pavement striping (white, yellow, or black epoxy resin paint) payment will be paid for at the Contract unit price per linear foot (meter) for 3", 4", 5", 6", 8", 9", 10", 12", 14", 16" (75 mm, 100 mm, 125 mm, 150 mm, 200 mm, 225 mm, 250 mm, 300 mm, 350 mm, or 400 mm) line and the Contract unit price per square foot (meter) of symbol. The quantity of permanent pavement marking (white, yellow, or black epoxy resin paint) will be paid for at the Contract unit price per linear foot (meter) of line and the Contract unit price per square foot (meter) of symbol. Price and payment shall include striping layout, cleaning and preparing the pavement surface, and placing all materials, for all labor, tools, equipment and incidentals necessary to complete the work.

NOTE:

For information only:

The following manufacturers are known to us which manufacturer Epoxy Resin Paint for Pavement Striping. The Department does not endorse or require the use of any of the manufacturers listed below. However, a bidder wishes to use another manufacturer's product, it shall be submitted for review and approval prior to submitting a bid proposal. Should the product be deemed unacceptable by the Department, the successful bidder will be required to use only an approved product.

1. POLY CARB, Inc.
   33095 Bainbridge Road
   Solon, Ohio 44139
   Tel. 1-800-CALLMIX

2. IPS - Ennis Paint
   P.O. Box 13582
   Research Triangle Park, North Carolina 27709
   Tel. 1-877-477-7623

3. Epoplex
   One Park Avenue
   Maple Shade, NJ 08052
   Tel. 1-800-822-6920

4. Or an approved equal.

8/7/2013

748530 - REMOVAL OF PAVEMENT STRIPING

Description:

This work consists of removing pavement markings of all kinds including paint, tape, etc., in accordance with this special provision, notes on Plans and/or as directed by the Engineer. The Contractor shall coordinate with the Engineer for maintaining traffic during the operation, prior to starting the work.

Materials and Construction Methods:

Paint and Epoxy Resins:
Shot/abrasive grit blasting or water blasting equipment shall be used for removal of markings from pavement surfaces.

Alkyd Thermoplastic:
In addition to the removal techniques discussed for paint and epoxy, grinding (erasing machines) equipment may also be used for removal of markings from pavement surfaces.

The removal operation shall be performed in a manner that will not damage the pavement surface.

The Contractor shall collect and dispose of all shot/abrasive grit and pavement marking materials removed from the pavement surface. Washing or sweeping such material to the roadside will not be permitted.

After removal of striping on bituminous concrete asphalt sealer shall be used to cover any exposed aggregate or embedded paint at no additional cost.

Method of Measurement:

The quantity of pavement striping removal will be measured as the number of square feet (meters) of pavement striping removed and accepted. The area of lines will be calculated by multiplying the nominal width of line times the length and the area of symbols will be as specified in Subsection 748.10 of the Standard Specifications.

Basis of Payment:

The quantity of pavement striping removal will be paid for at the Contract unit price per square foot (meter) for "Removal of Pavement Striping". Price and payment shall be full compensation for furnishing all materials, removing the pavement markings, disposing of the removed marking material, covering up the exposed aggregate, and for all labor, equipment, tools and incidentals necessary to complete the work.

Note:

There will be no measurement and payment for removal of pavement markings placed incorrectly by the Contractor.

5/21/2013

748541 - PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS, 4”
748542 - PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS, 6"
748543 - PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS, 8"
748544 - PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS, 12”
748545 - PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS, 16"
748546 - PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS, SYMBOL/LEGEND
748553 - PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS, BIKE SYMBOL
748554 - PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS, PEDESTRIAN SYMBOL
748555 - PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS, HANDICAP SYMBOL

Description:

This work consists of furnishing and installing preformed retroreflective thermoplastic pavement marking with a preapplied Federal Specification Type IV glass bead coating throughout its entire cross section on bituminous asphalt pavement at the locations and in accordance with the patterns on the Plans, or as directed by the Engineer.

The preformed retroreflective markings shall conform to the size and dimensions as shown in the Federal “Standard Highway Signs” book found at: http://mutcd.fhwa.dot.gov/SHSe/pavement.pdf as referred to in the Delaware Manual on Uniform Traffic Control Devices, Part 3, Markings.

Materials:

General: Only materials listed on the Department’s Approved Pavement Markings Material List will be used for this item. The preformed retroreflective markings shall be fusible to bituminous asphalt pavement by means of the normal heat of a propane type of torch. Adhesives, primers or sealers are not necessary prior to the preformed retroreflective markings application on bituminous asphalt pavement.

The preformed retroreflective markings shall conform to pavement contours, breaks and faults through the action of traffic at normal pavement temperatures. The markings shall have resealing characteristics and be capable of fusing to itself and previously applied worn hydrocarbon and/or alkyd thermoplastic pavement markings.

The preformed retroreflective markings shall be capable of application on bituminous asphalt pavement wearing courses during the paving operation in accordance with the manufacturer's instructions. After application the markings shall be immediately ready for traffic. The preformed retroreflective markings shall be suitable for use for one year after the date of receipt when stored in accordance with the manufacturer's recommendations.

The preformed retroreflective thermoplastic markings shall not be brittle and must be sufficiently cohesive and flexible at temperatures exceeding 50ºF (10ºC) for one person to carry without the danger of fracturing the material prior to application.

Composition: The retroreflective pliant rosin ester thermoplastic pavement markings shall consist of a homogeneous mixture of high quality polymeric thermoplastic binders, pigments, fillers and glass beads. The thermoplastic material must conform to AASHTO M249-79(86) with the exception of the relevant differences due to the material being preformed, and identified herein.

Intermix Glass Beads: The preformed retroreflective material shall contain a minimum of 30% glass spheres which shall conform to AASHTO M247-81 Type 1. Glass spheres shall have a minimum of 80% true spheres overall.

Top Beads: To provide the required retroreflectivity, the preapplied factory top coating of glass beads shall be a combination of both Federal Spec. Type IV and AASHTO M247-81 Type I beads. Federal Spec. Type IV beads shall be evenly disbursed across the entire surface of the product at a minimum rate of 4 lb. (1.8 kg) per 100 ft^2 (9.3 m^2) and the AASHTO at 3 lb.(1.4 kg) per 100 ft^2 (9.3 m^2). In combination, the total glass bead coverage shall be 7-8 lb. (3.2-3.6 kg) per 100 ft^2 (9.3 m^2). The AASHTO M247-81 Type I beads shall have a minimum of 80% true spheres overall and the Federal Spec. Type IV beads shall be 80% true spheres on the 12 and 14 sieves and shall be no less than 75% true spheres on the remaining sieves.

Retroreflectivity: After satisfactory completion of all striping work and written notification from the contractor, the Department shall test the striping to ensure it has the minimum reflectivity. The testing will be completed within 30 calendar days from notification. Testing will be done using a Delta LTL 2000 Retrometer (30 meter geometry). The required minimum initial reflectivity reading in millicandellas shall be:

White 300
Yellow 200
Blue 200

Skid Resistance: The surface of the preformed retroreflective thermoplastic markings shall provide a pre-appled minimum skid resistance value of 45-51 BPN and a post-applied minimum skid resistance value of 45-55 BPN when tested according to ASTM E303-74.

Thickness: The thickness of the supplied material shall have a minimum average thickness of .090" (90 mils) for all Longitudinal lines and a thickness of .125" (125 mils) for all transverse lines and symbols/legends.

Tensile Strength and Elongation: The preformed retroreflective thermoplastic material shall have a minimum tensile strength of 150 lb. per square inch (1054 kg per square mm) of cross section, at .002" (2.28 mil) thickness, when tested according to ASTM D638-76 except that a sample 6" by 1" (150 mm by 25 mm) shall be tested at a temperature between 70°F and 80°F (21°C and 27°C) using a jaw speed of 10" to 12" (250 mm to 300 mm) per minute. The sample shall have a maximum elongation of 20% at break when tested by this method.

Flexibility: The preformed retroreflective thermoplastic marking material shall have flexibility at 50°F such that when a 1" by 6" (25 mm by 150 mm) sample is bent through an arc of 90 degrees at a uniform rate in 10 seconds (9 degrees per second) over a 1" (25 mm) mandrel, no cracking occurs in the test sample. The sample must be conditioned prior to testing at 50°F±2 degrees (10°C) for a minimum of four hours. At least two specimens tested must meet the flexibility requirements at 50°F (10°C) for a passing result.

Environmental Resistance: The applied markings shall be resistance to deterioration due to exposure to sunlight, water, oil, diesel fuels, gasoline, pavement oil content, salt and adverse weather conditions.

Effective Performance Life: When properly applied, in accordance with manufacturer's instructions, the preformed retroreflective pavement markings shall be neat and durable. The markings shall remain skid resistant and show no lifting, shrinkage, tearing, roll back or other signs of poor adhesion for a period of one winter season.

Oil/grease Resistant Test: The preformed retroreflective thermoplastic material shall not dissolve or smear after rubbing a small amount of motor oil on a small piece of the thermoplastic material for two minutes.

Bond Strength: The material shall exhibit a bond strength to Portland Cement Concrete (PCC) equal or exceed 180 psi when tested at room temperature (73.4±3°F) (23°C) in accordance to ASTM Standard Test Method for Bond Strength of thermoplastic marking Material D4796-88. Place a coarse brick in a 400°F (204°C) oven for 5 minutes. Prepare a 4 square inch test specimen. Place the test specimen on the brick and further heat in the 400°F (204°C) oven for 15 minutes. The test specimen is then allowed to cool to room temperature and prepared for testing.

Low Temperature Cracking (Stress) Resistance for Extended Period: The material shall be tested according to AASHTO T250 Section 7 with Section 7.2.3 modified for and extended cold temperature 15 degrees ±3°F (-9.4±2°C) exposure period 72 hours. Any cracking shall constitute failure of the material for PCC road surfaces.

Impact Resistance (Gardner Falling Weight): A 2" by 7.5" (50 by 190 mm) specimen shall be applied on a course concrete brick. Using a Gardner Impact Tester, a 2 lb (.91 kg) weight is dropped from a height of 80" (2032 mm). The specimen when tested at room temperature 73.4±3°F (23°C) should show no sign of cracking. (Test procedure is in accordance with ASTM D5420-93).

Packaging: The flexible preformed retroreflective thermoplastic marking materials, for use as transverse or longitudinal markings as well as legends, arrows and symbols shall be available in flat form material or in rolls. Flat material shall be supplied in maximum of 4' (1.2 m) lengths up to 2' (.6 m) in width. The material shall be packed in suitable cartons clearly labeled for ease of identifying the contents.

Construction Methods:

The markings shall be applied in strict accordance with the manufacturer's recommendations on clean and dry surfaces. Marking configurations shall be in accordance with the "Delaware Manual on Uniform Traffic Control Devices, Part 3, Markings."

The preformed retroreflective thermoplastic material shall be fusible to the pavement by means of a propane torch recommended by the manufacturer. Preheating the surface to remove any latent moisture will be done just prior to the placement and installation of the Symbol/ Legend.

No markings shall be placed when the ambient temperature is below 40°F (4°C). The material shall be kept in a location above 55°F (13°C) until just before application.

The supplier shall provide technical services as may be required.

Method of Measurement:

The quantity of pavement striping (748541-748545) will be measured by the number of linear feet (linear meters) of 4”, 6”, 8”, 12”, or 16” pavement striping line placed and accepted. The quantity of symbol/ legend (748546) will be measured by the number of square feet (meters) of symbol/legend placed and accepted. The quantity of bike symbol, pedestrian symbol, and handicap symbol (748551-748553) will be measured as each placed and accepted. The dimensions for the symbol/legends are as follows:

Bike Rider with Helmet shall be 3’ X 5’.
Pedestrian shall be 4’ X 8’.
Handicap Symbol shall be 40” X 40”.

Basis of Payment:

The quantity of pavement striping payment will be paid for at the Contract unit price per linear foot (linear meter) for 4”, 6”, 8”, 12” and 16” (100 mm, 150 mm, 200 mm, 300 mm, and 400 mm) line. The quantity of symbol/legend will be paid for at the Contract unit price per square foot (meter). The quantity of bike symbol, pedestrian symbol, and handicap symbol will be paid for at the Contract unit price per each. Price and payment shall include cleaning and preparing the pavement surface, and placing all materials, for all labor, tools, equipment and incidentals necessary to complete the work.

Warranty:

The Contractor shall warrant to the Department that the installed retroreflective preformed thermoplastic pavement markings are free of defects, as hereafter defined, for a period of one winter season beginning at the initial acceptance of the marking installation by the Department. The initial acceptance of the marking installation will occur upon the satisfactory correction of all deficiencies noted in the marking installation during the Final Inspection of the project. The markings shall be warranted against failure due to blistering, excessive cracking, bleeding, staining, discoloration, oil content of the pavement materials, smearing and spreading under heat, deterioration due to contact with grease deposits, oil, diesel fuel, or gasoline drippings, chipping, spalling, poor adhesion to the pavement materials, vehicular damage, and wear from normal maintenance activities including snow plowing.

The Contractor shall repair all defective areas identified by the Department after initial installation or during the Warranty Period. All repairs shall begin immediately following the notice to the Contractor by the Department unless weather limitations prevent the corrective work. Should the contractor not commence

work within the period stated in the notice, weather permitting, and pending severity, the Department reserves the right to remedy the condition and charge the contractor for the work. Any corrective work shall be as recommended by the manufacturer of the marking material and approved by the Department. The Department shall be given notification before the Contractor begins corrective work to allow for inspection of the operation. All costs associated with the repair work shall be the responsibility of the contractor. These costs shall include, but are not limited to, removal, material, maintenance of traffic, etc.

2/28/09

749687 - INSTALLATION OR REMOVAL OF TRAFFIC SIGN ON SINGLE SIGN POST

Description:

This work consists of installing or removing traffic sign(s) on a single post or other type of pole at the locations indicated on the Plans or as directed by the Engineer. This specification also includes installation of posts in boring holes constructed under other items.

A single sign totaling more than 9 square feet, or with any dimension, length or width, greater than or equal to 48 inches shall be installed on multiple sign posts under Item 749690 - Installation or Removal of Traffic Sign on Multiple Sign Posts.

Materials:

The Department will provide all sign materials to be used on this project. The Contractor shall contact the DelDOT Sign Shop Supervisor with project plans and quantity sheets at 302-760-2581. Sign fabrication orders require a minimum of four (4) weeks for completion. Orders placed with less than 4 weeks lead-time will result in a delay. Any delay caused by inadequate lead-time due to a late order will be the sole responsibility of the Contractor. The Contractor shall pick-up the sign materials from the DelDOT Sign Shop and deliver them to the job site without any damage to the sign materials.

Construction Methods:

The Contractor shall pick-up necessary signs, sign posts, hardware, and extensions from the Department and install the signs in the locations indicated on the Plans in accordance with the Delaware MUTCD or as directed by the Engineer. The Contractor shall be responsible for obtaining all necessary utility clearances before the signs may be installed. Signs and plaques shall be mounted no lower than the minimum mounting height specified in the Delaware MUTCD. Signs and plaques shall be mounted no higher than one foot above the minimum mounting height specified in the Delaware MUTCD. Any excess sign post protruding above the top of the top sign shall be cut off and removed. For sign removals, the sign posts shall have all nuts, bolts, and other connectors removed. The disturbed ground shall be graded and backfilled accordingly. The Contractor is responsible for disposal of all signing material removed from the project

Method of Measurement:

The number of single sign installations or removals will be measured as the actual number of signs installed or removed and accepted.

Basis of Payment:

The quantity of single sign post installations or removals will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for installing or removing signs and sign materials, pick-up and delivery of sign materials, grading disturbed areas, and for all labor, equipment, tools, and incidentals required to complete the work. Signs that are not installed in accordance with the Delaware MUTCD or signs installed in the incorrect location shall be moved at no additional cost to the Department.

5/28/2013

749690 - INSTALLATION OR REMOVAL OF TRAFFIC SIGN ON MULTIPLE SIGN POSTS

Description:

This work consists of installing or removing traffic sign(s) on multiple sign posts at the locations indicated on the Plans or as directed by the Engineer. This specification also includes installation of posts in holes installed under other items.

A single sign totaling more than 9 square feet, or with any dimension, length or width, greater than 48 inches shall be mounted on two (2) posts. Signs with a length greater than or equal to 78 inches shall be mounted on three (3) sign posts.

Materials:

The Department will provide all sign materials to be used on this project. The Contractor shall contact the DelDOT Sign Shop Supervisor with project plans and quantity sheets at 302-760-2581. Sign fabrication orders require a minimum of four (4) weeks for completion. Orders placed with less than 4 weeks lead-time will result in a delay. Any delay caused by inadequate lead-time due to a late order will be the sole responsibility of the Contractor. The Contractor shall pick-up the sign materials from the DelDOT Sign Shop and deliver them to the job site without any damage to the sign materials.

Construction Methods:

The Contractor shall pick-up necessary signs, sign posts, hardware, and extensions from the Department and install the signs in the locations indicated on the Plans in accordance with the Delaware MUTCD or as directed by the Engineer. The Contractor shall be responsible for obtaining all necessary utility clearances before the signs may be installed. Signs and plaques shall be mounted no lower than the minimum mounting height specified in the Delaware MUTCD. Signs and plaques shall be mounted no higher than one foot above the minimum mounting height specified in the Delaware MUTCD. Any excess sign post protruding above the top of the top sign shall be cut off and removed. For sign removals, the sign posts shall have all nuts, bolts, and other connectors removed For sign removals, the sign posts shall have all nuts, bolts, and other connectors removed. The disturbed ground shall be graded and backfilled accordingly. The Contractor is responsible for disposal of all signing material removed from the project..

Method of Measurement:

The number of sign installations or removals will be measured as the total square foot of the sign(s) installed or removed and accepted.

Basis of Payment:

The quantity of sign installations or removals will be paid for at the Contract unit price per square foot. Price and Payment will constitute full compensation for installing or removing signs and sign materials, pick-up and delivery of sign materials, grading disturbed areas, and for all labor, equipment, tools, and incidentals required to complete the work. Signs that are not installed accordance with the Delaware MUTCD or signs installed in the incorrect location shall be moved at no additional cost to the Department.

5/28/2013

753516 - SANITARY SEWER SYSTEM

Description:

This work consists of furnishing and installing all materials to relocate a portion of the Kent County sanitary sewer system as shown on the Kent County relocation plans (sheets 268 through 270) and meeting the requirements of the applicable DelDOT Standard Specifications, these Special Provisions, and the Technical Specifications. Work includes, but is not limited to, various classes of ductile iron gravity sewer pipe, manholes, steel casing pipe, well pointing system, demolition of existing sanitary sewer manholes and piping, temporary bypass pumping and piping, and various fittings, bends, wyes, tees, valves, etc. The sewer relocations are generally located between sta 806+00 +/- and sta 810+00 +/- along Charles Polk Rd.

Any requirements included in the Technical Specifications that are not addressed on the plans or by these Special Provisions, shall be performed in accordance with the applicable sections of the Appendix A Technical Specifications. The Contractor is advised to obtain and be fully acquainted with the specifications of the Owner. Costs to comply are considered incidental to Item 753516.

The Owner of the sanitary sewer infrastructure involved within the aforementioned relocation work is the Kent County Public Works Department, Dover, Delaware, and their Technical Specifications are included in this contract as Appendix A to the Special Provisions. When referenced in these Special Provisions, or the Technical Specifications, the Owner is intended to be represented by the Kent County Public Works Director.

A "Breakout Sheet" is included in the contract to establish unit prices for the items listed below. The total of these unit prices multiplied by the estimated quantities will establish the total Lump Sum price to be submitted with the bid. Each listed item will be measured as a unit price item in the field. The final Lump Sum payment for Item 753516 will be adjusted by change order, either plus or minus, to match the final totals of all unit price items established in the Breakout Sheet. Failure to complete and submit the Breakout Sheet with the bid will cause the bid to be considered unresponsive.

Breakout Item	Description
A-1	Well Pointing System (LS)
A-2	Selective Demolition (LS)
A-3	Temporary Bypass Pumping (LS)
A-4	Furnish and Install 16" Class 52 Ductile Iron Pipe (LF)
A-5	Furnish and Install 16" Class 56 Ductile Iron Pipe (LF)
A-6	Furnish and Install 30" Steel Casing with 16" Class 52 Ductile Iron Pipe (LF)
A-7	Furnish and Install 48" Manhole (EA)
A-8	Furnish and Place Select Backfill (TN)

General Requirements:

As listed in Appendix A - Technical Specifications 07400, 02050, 02722, 02221, & 03400.

Any and all emergency repairs required during the period of this Contract shall be the responsibility of the Contractor. In the event the Owner is unable to contact the Contractor for the immediate emergency repair items of work, or in the event the Contractor does not take action when contacted within a reasonable length of time, the Owner of the utility reserves the right to attend to any and all emergency repair work items and to resubmit the costs directly to the Contractor for complete payment.

Specifications:

DelDOT Standard Specification Sections 208.04, 209.04, 708.08, 708.14, 812.02, 812.03 (Class B), and 813

Appendix A Technical Specification Sections 07400, 02050, 02722, 02221, & 03400.
Contract Plans, Notes and Details These Special Provisions.

Submittals:

In addition to the shop drawings outlined in Article 1.3 of Technical Specification Sections 02722, the Contractor shall submit for review by the Engineer a detailed plan for dewatering the work zone prior to beginning any sanitary sewer work. The plan must be signed and sealed by a licensed Delaware Well Driller. It is intended to place all pipe and manholes in a "dry trench", bedded on minimum 12" of Delaware #57 stone.

A bypass operation plan shall be provided with the project submittals for review and approval by Kent County Public Works Department.

Certification for pipe, fittings, casings, manholes and bypass pumps shall be provided.

Shop drawings for manholes, include plans, elevations, sections, details, and frames and covers.

Excavation support systems shall be submitted and signed by a Professional Engineer licensed in the State of Delaware.

Materials:

Material requirements for pipe, bends, valves, fittings, joint restraints, wye branches, tees, and materials related to the sewer pipe installation, are as listed in the plan details and Part 2 of Technical Specification Sections 02722.

Cast-in-place Concrete shall meet the requirements of Section 812, Class B of the Delaware Standard Specifications.

Borrow, Type C, or existing material meeting Borrow, Type C requirements for backfilling shall conform to the requirements of Section 209.04 of the DelDOT Standard Specifications.

Pipe bedding shall meet the requirements of #57 Stone in accordance with Section 813 of the DelDOT Standard Specifications.

Precast Manholes, Frames and Covers, Steps, and related appurtenances shall meet the requirements of Technical Specification Section 02722, Part 2 and the plan details. Shop drawings, including proposed mix design, pipe openings, reinforcing details, shall be submitted to the Engineer and Owner along with anti-floatation calculations and corrective measures for review and approval prior to fabricating the manholes.

Casing pipe for Open Cut installation shall conform to Article 3.1 of Technical Specification Section 02722.

Construction Methods:

Well Pointing System (Breakout Item A-1) -

The Contractor shall submit for review by the Engineer a detailed plan for dewatering the work zone prior to beginning any sanitary sewer work. The plan must be signed and sealed by a licensed Delaware Well Driller. It is intended to place all pipe and manholes in a "dry trench", bedded on Delaware #57 stone.

All excavation must be kept free of water below the subgrade of the work while work is in progress. This must be accomplished by well points producing the required results. Upon removal of dewatering equipment, the Contractor shall backfill all holes and restore disturbed areas to their original conditions.

Dewatering for the structures and pipelines shall commence when groundwater is first encountered and shall be continued until such time as backfill has been completed. No manhole or pipe shall be laid in water nor shall water be allowed to rise over them until the trench is backfilled.

The Contractor shall dispose of the water from the work in a suitable manner without damage to adjacent property. No water shall be drained into work built or under construction without prior consent of the Engineer. Water shall be disposed of in such a manner as not to damage property or be a menace to the Public.

In the event the Contractor's dewatering operations affect any water supplies within the project area, the Contractor shall take whatever steps that are required to provide uninterrupted water service.

The Contractor shall remove any siltation deposits in storm sewer systems, resulting from his dewatering or construction operations. He shall also be responsible for Conveyance of dewatering flows and for erosion and sediment control.

Selective Demolition (Breakout Item A-2) -

Remove underground piping and backfill and compact trench or fill abandoned underground pipe with flowable fill. Excavate around manhole as required and use either of the following procedures; remove manhole and close open ends of remaining piping; remove top of manhole down to at least 36 inches below final grade, fill to within 12 inches of top with stone, sand, gravel, or compacted dirt, fill to tope with concrete.

Temporary Bypass Pumping (Breakout Item A-3) -

A bypass operation plan must be submitted for review and approval by Kent County prior to beginning bypass activities.

A minimum of two pumping units are required during gravity interceptor bypass operations, each pump shall be sufficient of equal or greater cpacity to handle the peak flow of 350 gallons per minute. Each pump rate shall not exceed 500 gallons per minute. The lead pump must be critically silenced.

Install above ground 6" HDPE DR-21 force main as indicated on contract drawings or as designated by Owner, anchored every 50 ft, at a minimum, as necessary to prevent movement. Pipe shall be inserted at least 10 ft. into receiving manhole with a tight fitting cover and straps as to prevent movement.

Insert plugs per approved bypass operation plan. Contractor shall be responsible for the operation of bypass pumps.

Furnish and Install 16" Class 52 and Class 56 Ductile Iron Pipe Gravity Sewer (Breakout Items A-4 and A-5) –

All pipes shall be thoroughly cleaned before they are laid and shall be kept clean until the completed work is accepted. The Contractor shall place the pipe and related materials in accordance with Part 1 and Article 3.1 of Technical Specification Section 02722.

Sheeting, shoring, or an approved steel trench box shall be installed if necessary to meet all applicable OSHA requirements. Also refer to Technical Specification Section 02221 for additional details.

Following dewatering, the excavation and backfill for the pipe shall be performed in accordance with the applicable requirements of DelDOT Standard Specification Section 208 including backfill requirements of Section 208.04. The trench width shall be as shown on the plan details. Type C borrow, or existing material meeting Type C borrow, shall be placed for the entire depth of trench from top of bedding to the bottom of roadway patching materials under existing and proposed roadways and shoulders. In areas outside of the roadway or proposed roadway including shoulders, Type C material shall be placed at least one foot above the top of the sewer line. Excavated material may be used for backfill above the Type C borrow in areas outside of roadway and shoulders provided it is dry and free of organic material. Type C Borrow will be counted and paid for under item A-8.

The pipe shall be installed at the locations and to the lines, grades, and dimensions shown on the Plans or as directed by the Owner. All invert elevations on the provided plans are approximate. The Contractor shall verify all existing and proposed invert elevations prior to ordering precast structures. Invert elevations of drainage inlets and pipes may be modified as directed by the Owner to meet conditions encountered during installation of sanitary structures. The Contractor shall contact Kent County if elevations deviate from the provide plan and profile sheets. Final tie-ins to any existing gravity lines and/or manholes are to be made with costs included in the linear foot price for the pipe.

During backfill of the gravity sewer, the Contractor shall install the specified detectable warning tape at a depth of 12" to18" below finished grade or as directed and approved by the Engineer/Owner.

Provide 401 Protecto coating on interior of all piping, min. 40 mils, Ceramapure, or thermoplastic liner, or approved equal interior corrosion protection.

No pipe shall be laid upon a foundation into which frost has penetrated or at any time when the Engineer or Owner shall deem that there is danger of the formation of ice or the penetration of frost at the bottom of the excavation.

Prior to the request for inspection by the Engineer, it shall be the Contractor's responsibility to examine all completed pipe lines to insure that they are laid to the proper alignment and grade and free from foreign material. After this has been done to the satisfaction of the Engineer, he/she will order tests to be made on all portions of the sewers built under the Contract.

The Contractor shall cooperate and furnish all assistance necessary to perform the tests as specified herein and as further required and directed by the Engineer and the representative of the Owner.

Testing of Gravity Sewers shall be in accordance with Article 3.6 of Technical Specification Section 02722.

Compaction testing is required.

The Contractor shall furnish all equipment and personnel to conduct the tests specified and/or any proposed by the Owner of the utility.

All material and labor required for tests, including caps and plugs shall be furnished by the Contractor and the cost thereof included in the prices bid for Item 753516.

Furnish and Install 30" Steel Casing with 16" Class 52 Ductile Iron Pipe (Breakout Item A-6) –

This item includes furnishing and installing a 30 inch casing pipe by open cut installation method, including 16" Class 52 Ductile Iron Carrier Pipe at the location and elevations shown on the plans in accordance with Technical Specification Section 02722.

This item includes all items covered under item A-4.

Furnish and Install 48" Diameter Precast Manhole (Breakout Item A-7) -

Precast Concrete Manholes shall conform to the notes, sanitary sewer detail plans, and Technical Specification Section 02722. Shop drawings, including proposed mix design, pipe openings, and reinforcing details, shall be submitted to the Engineer along with anti-floatation calculations and corrective measures for review and approval prior to fabricating the manholes. The Contractor is responsible for assuring that the manhole will fit the field conditions encountered. No additional compensation will be considered to correct openings in the manhole that were not properly cast in the shop.

Borrow Type C or existing material meeting Borrow Type C requirements, for backfilling shall conform to the requirements of Section 209.04 of the DelDOT Standard Specifications. Borrow Type C shall be counted and paid for under item A-8.

Excavation and Backfilling for manhole installation shall conform to Sections 708.08 and 708.14 of the DelDOT Standard Specifications.

Sheeting, shoring, or an approved steel trench box shall be installed, if needed, to meet all applicable OSHA requirements. Also refer to Technical Specification Section 02221 for additional details.

Manhole bedding shall be minimum 12" of #57 stone per DelDOT Standard Specification 813.

Manhole Frames and Covers shall be furnished and installed under this item on all 48" Precast Concrete Manholes in accordance with the plan notes, details, and Article 2.5 of Technical Specification Section 02722.

Rim and invert elevations of each manhole shall be recorded by the Contractor on the as-built record plans with costs incidental to Item 763501, Construction Engineering.

Furnish and Place Select Backfill (Breakout Item A-8) –

Type C Borrow material shall be carefully deposited in the trench by methods which will not damage or

disturb the pipeline or structure, and shall be solidly tamped around the pipe or structure. Backfill material shall be free from large lumps, pavement, pieces of concrete and stones. Backfill material shall be placed in 8-inch layers and compacted to 95% of maximum density at optimum moisture content as determined by the Modified Proctor Test, ASTM D1557 Method C. Materials containing an excess of moisture shall be permitted to dry until the moisture content is within the specified range. Materials too dry shall be wetted uniformly until the moisture content is in the specified range.

Field density testing shall be performed at a rate of 1 test per 50 linear feet of trench, at a depth specified by the Engineer. Such testing shall be arranged by the Contractor and performed by an independent testing agency approved by the Engineer. The Contractor shall pay the testing laboratory for all tests performed inclusive of sample collection, preparation and transportation.

Whenever test results indicate compaction densities less than specified, the Contractor shall, at his own expense, secure the specified compaction using methods approved by the Engineer.

All unauthorized excavations made by the Contractor shall be immediately backfilled in accordance with the requirements of the specifications for trench backfill at the Contractor's expense. After completion of backfilling, all material not used shall be disposed of as approved by the Engineer, and all places on the line of the work shall be left clean and in good condition.

No backfill shall be placed against new concrete or masonry structures until properly cured.

Measurement and Payment:

Well Pointing System (Breakout Item A-1) -

Payment for Well Pointing System will be made at the lump sum price.

Well Pointing System shall include all labor, equipment, material, and incidentals necessary to setup, mainting and remove well pointing dewatering system in order to achieve dry excavation as required by the contract documents and indicated on the contract drawings and in accordance with section 02221 – Excavation and Backfill for Pipelines and Structures.

Selective Demolition (Breakout Item A-2) -

Payment for Selective Demolition will be made at the lump sum price.

Selective Demolition shall include the removal of existing manhole structures and piping. Item shall include all backfill, flowable fill, caps, plugs, fittings, and all labor, equipment, material, and incidentals necessary to complete the work as indicated on the contract drawings and in accordance with section 02050 – Selective Demolition.

Temporary Bypass Pumping (Breakout Item A-3) -

Payment for Temporary Bypass Pumping will be made at the lump sum price bid.

Temporary Bypass Pumping shall include mobilizing, maintaining, and removing temporary bypass pumps, piping, floats, alarms, plugs, elbows, fittings, anchors, special manhole covers and all labor, equipment, material and other incidentals necessary to perform the work as shown on the contract drawings and in accordance with section 02722 – Sanitary Sewer System.

Furnish and Install 16" Class 52 and Class 56 Ductile Iron Pipe Gravity Sewer (Breakout Items A-4 and A-5) –

Payment for constructing Ductile Iron Pipe gravity sewer lines will be made per linear foot for the lengths of the various classes furnished and installed. Measurements of lengths for gravity sewers will be made horizontally along the centerline. No deduction will be made for the lengths of fittings, and no deduction for pipe within the inside measurements of manholes.

The prices bid per linear foot for construction of gravity sewer mains shall include and cover; the excavation of all materials encountered in the trenches, excavation of hotmix pavement and base course shall be included in the linear foot price of the gravity pipe being installed, excavation for appurtenances that may be shown or required, any excavation that may be necessary in sheeting or bracing the trench; protective coating on the interior of the pipe; the placing and removal or cutting off of sheeting or bracing; furnishing and placing #57 stone pipe bedding material; removal of surplus material, furnishing and placing detectable warning tape; the support and protection of all structures and their restoration in case of injury; the protection of existing utilities, bracing of existing utility poles, foundations and other underground conditions or facilities; the furnishing and delivering of all materials, tools, and equipment necessary; the handling of all materials to and into the trench; and the laying of all pipe and fittings and the testing of the gravity sewer; and related work as specified, shown or directed in accordance with Section 02722 – Sanitary Sewer System.

The prices per linear foot for constructing gravity sewer main shall also include all connections of new systems to existing sewers or manhole structures.

Sawcutting, pavement patching and restoration, maintenance of traffic, and final topsoil and seeding will be paid for under their respective bid items.

Payment for constructing the sewer main will be made per linear foot actually constructed, including all required testing. A total of five (5) percent of the unit price bid item will be withheld per linear foot until all final testing of the sewer main is complete.

Payment for furnishing Type C Borrow material shall paid for under item A-8.

Furnish and Install 30” Steel Casing with 16” Class 52 Ductile Iron Pipe (Breakout Item A-6) –

Payment for the open cut 30” Steel Casing and 16” Class 52 Ductile Iron carrier pipe installation at the location and elevations shown on the plans will be made per linear foot for lengths furnished and installed. Measurements of lengths for this item will be made horizontally along the centerline of the casing pipe.

The price bid shall include excavation, furnishing, installing and removing sheeting, shoring, or trench box, furnishing and installing the casing pipe and installation equipment, end caps, stainless steel spacers, seals and incidentals necessary to complete the casing installation, furnishing and installing carrier pipe and all associated items covered under A-4 and incidentals necessary to complete the carrier pipe installation and in accordance with Section 02722 – Sanitary Sewer System.

Payment for furnishing Type C Borrow material shall paid for under item A-8.

Furnish and Install 48" Diameter Precast Manhole (Breakout Item A-7) -

Payment for Furnish and Install 48” Diameter Precast Manhole will be made at the unit price for each manhole actually installed. Measurement shall be made on the number of new sewer manholes furnished and installed.

The unit price bid for Furnish and Install 48” Diameter Precast Manhole shall include and cover the furnishing of all labor, materials, and equipment necessary for the construction of the manholes complete, including frame and cover, manhole insert liners, excavation, sheeting, shoring and bracing, steps, #57 stone bedding, ballast concrete, waterproofing, connection of existing pipe to new manhole including any additional fittings and pipe necessary to make connections, and all incidental work as indicated on the contract drawings and in accordance with Section 02722 – Sanitary Sewer System.

Manholes which are part of other bid items as described herein or as shown on the drawings shall not be paid for under this item.

Payment for furnishing Type C Borrow material shall paid for under item A-8.

Furnish and Place Select Backfill (Breakout Item A-8) –

Payment for Furnish and Place Select Backfill will be made at the unit price bid for the weight, in tons, actually furnished and placed within limits defined herein and as authorized by the Engineer.

Measurement for quantities of select backfill will be based upon the authorized depth of placement in trench and trench payment width and length.

Furnish and Place Select Backfill shall include and cover, furnishing, placing, and compacting select backfill, disposal of unsuitable material and all other incidental work as authorized by the Engineer.

Payment Clarification –

A percentage of the total Lump Sum will be paid based on the work performed in each pay period. The percentage will be calculated by multiplying the total units of each completed Breakout Item times the appropriate unit price; then adding the total dollars of completed work, divided by the total Lump Sum bid price for item 753516, Sanitary Sewer System. Final payment may result in less than 100% of the total Lump Sum based on actual work performed. Should the Lump Sum total be exceeded, additional funds will be added by Change Order based on the best available estimate at the time. Failure to fully complete the Breakout Sheet for this Item will result in the bid being declared non-responsive.

Warranty –

In addition to the One-year Warranty outlined in Article 6.19 of General Conditions, a Maintenance Bond representing 15% of the total price bid for Item 753516 shall be furnished to the Owner upon successful completion of the item and shall be in effect for one (1) Calendar Year. Costs to provide the warranty and furnish the Bond to be included in the Lump Sum price bid for item 753516.

9/10/14

759511 - FIELD OFFICE, SPECIAL II

Description:

This Field Office, Special item shall consist of erecting, furnishing, equipping, maintaining, and removing a double wide modular field office, its entrances, and its adjacent parking area. The Contractor shall submit a specific location layout drawing and construction details for the proposed field office, its entrances, and its parking area for approval by the Engineer. The field office and its parking area shall be for the exclusive use of Department Officials, Engineers, Consultants, Inspectors, and any other parties involved with the construction and/or administration of the project.

The field office structure shall be free of asbestos and/or other hazardous materials. The field office, its entrance, and its parking area shall be constructed and installed in accordance with all applicable city, county, state, and federal codes. The Contractor shall be responsible for obtaining all required licenses and permits for installation and placement of the field office, its entrances, and its parking area. The costs of obtaining such licenses and permits are to be incidental to the Field Office, Item. The field office shall be available for use by the Department continuously throughout the duration of the project.

Construction and Equipment:

The field office shall be new and have a minimum floor space of 1,200 square feet with minimum exterior dimensions of 50'-0" length by 24'-0" width. The floor to ceiling height of the field office shall be nominal 8'-0". The exterior walls, ceiling, and floor of the field office shall be insulated. The field office shall be of weather-proof construction, tightly floored and roofed, constructed with an air space above the ceiling for ventilation, supported above the ground, safely secured to its support if the support is an in-ground anchored foundation or otherwise by tie-downs to the ground, and fully skirted with rigid watertight covering overlapping the bottom of the exterior siding to the existing ground.

The Contractor shall provide entries to the field office by constructing a stair and deck platform with canopy at each exterior door. These entries shall be fabricated using treated dimension lumber, be constructed with hand and safety railing, be designed to last the life of the Contract, and conform to the requirements of the Architectural Accessibility Board and other federal, state and local boards, bodies and/or courts having jurisdiction in the Contract limits.

The Contractor shall construct and maintain an all-weather parking area adjacent to the field office of at least 2,500 square feet and having a minimum of 10 functional parking spaces striped for full size cars. All weather pathways from the parking area to the entrance of the field office shall also be constructed and maintained. This parking area and entrance pathway shall have a minimum of 2" type "C" hot mix on top of minimum 6" graded aggregate subbase. Snow and/or ice shall be removed from the entrance, the parking area, and the entrance pathways of each field office within 12 hours after each occurrence. Costs for furnishing, placing, and maintaining the aggregate base and hot mix, and for snow and/or ice removal, is incidental to the "Field Office, Special" Item.

The ground area 30'-0" from around the perimeter of the field office shall be landscaped and maintained. If the earthen grounds do not have a stand of weed free grass, the surface of this area shall be loosened to a depth of 4" and a satisfactory seedbed shall be prepared free of debris and extraneous matter. The area shall be seeded to a healthy stand of grass or sodded, after which the area shall be watered, suitably maintained and mowed, and trimmed a minimum of three times a month during the growing seasons. Cost for this landscaping and maintenance is incidental to the "Field Office, Special" Item.

The field office shall have full carpeting, kitchenette facilities, and interior and exterior paneling, lighting, and plumbing fixtures. The field office shall have a minimum of two (2) exterior doors, each door having a passage and a deadbolt lock. These door locks shall be keyed and at least 2 complete sets of keys shall be supplied to the Engineer's representative. The exterior doors shall be insulated or have storm doors. The field office shall have a minimum of six (6) windows, each window having a minimum glass area of 1,150 square inches and a horizontal mini-blind covering the full glass area. The windows shall be insulated or have storm windows, shall be equipped with a locking device, and shall have screens installed and repaired when damaged.

At least one (1) outside water service connection shall be provided at the field office. The water connection shall have a 3/4" frost proof hose bib with vacuum breaker and shall include 100 linear feet of 5/8" minimum diameter reinforced, industrial or commercial grade, soft rubber hose.

The field office shall be provided with sufficient natural and artificial light and shall be adequately heated and cooled to provide comfortable working conditions.

The field office shall have satisfactory lighting, electrical outlets, heating equipment, exhaust fan, and air-conditioning connected to an operational power source. Plan and drawing areas shall have individual fluorescent lights situated over their worktables. Replacement fluorescent bulbs shall be furnished as required. Electrical current, water service, telephone service, internet service, and any fuel for heating equipment shall be furnished and the cost of such shall be borne by the Contractor. Maintenance of the heating, exhaust fan, and air-conditioning equipment shall be provided for by validated service contracts for the length of the Contract. These service contracts shall allow a Department authorized project person to deal directly with the service organization to request repair.

The Contractor shall furnish and maintain two fire extinguishers and provide one lighted "Exit" sign for each exterior passage door. Fire extinguisher(s) may be chemical or dry power and shall be UL Classification 10-B:C(min.) and shall be suitable for Types A:B:C fires. A commercial or industrial type first aid and safety kit suitable for project conditions and hazards (including snakebite) shall be provided and maintained to full capacity on a monthly basis.

The Contractor shall provide an alarm system for field office security with electronic, direct connection to a security service provider. The security system shall have interior motion, window, and entrance detectors and built in manual fire alarm. All windows of each field office shall be covered with steel bar grids as a deterrent to forced entry. The Contractor shall provide validated monitoring and service contracts for the length of the Contract. The service contracts shall allow a Department authorized project person to deal directly with the security service provider to request service and/or repair.

The Contractor shall furnish and maintain an adequate supply of cold potable water, a minimum 23 cubic foot new refrigerator, and a minimum 900-watt new microwave oven. Maintenance of the potable water supply equipment, refrigerator, and microwave shall be provided for by validated service contracts for the length of the Contract. These service contracts shall allow a Department authorized project person to deal directly with the service organization to request repair.

Suitable indoor toilet facilities, conforming to the requirements of the State and Local Boards of Health or of other bodies or courts having jurisdiction in the area, shall be provided. When separate facilities for men and women are not available or required, a sign with the wording "Rest Room" {letter heights of 1" minimum} shall be placed over the doorway and an adequate positive locking system shall be provided on the inside of the doorway to insure privacy. The facility(s) shall be maintained by the Contractor to be clean and in good working condition and shall be stocked by the Contractor with adequate lavatory and sanitary supplies at all times during the period of the Contract.

The Contractor shall be responsible to provide and maintain all necessary telephone and internet connections, for providing a new telephone equipment system, for payment of all connections and the new telephone system equipment and its installation; and for final disconnection of the telephones.

The telephone system for the field office complex shall have a total of 4 lines consisting of 3 direct single lines with call forward busy feature and 1 dedicated facsimile line. All lines shall be capable of making unlimited local and long distance calls. The telephone system shall have 3 phone sets with privacy feature (1 set which may be for wall mounting). The dedicated facsimile line shall be capable of sending facsimiles to either local or long distance numbers. The telephone system is for the official and exclusive use of the Engineer and other representatives of the Department. Location of telephone lines shall by as directed by the Engineer. Arrangement shall be made to allow a Department authorized project person to deal directly with the telephone company to report outages and/or request repair. The Contractor shall arrange for the installation and initial setup of the specified telephone system including phone company provision of a termination point with smart-jack. Initial installation and setup costs shall be the responsibility of the Contractor, as will all subsequent monthly billings for the field office telephone system.

The field office internet system shall be a broadband connection capable of download speeds of at least 50 Megabits per second and upload speeds of at least 10 Megabits per second. The internet connection shall be capable of attaching to a wireless networking hub/router, which is also to be provided by the Contractor to allow for connection of multiple PCs as outlined further in this Specification. Cost of installation, setup, and all subsequent monthly billings shall be the responsibility of the Contractor.

For all utilities, the Contractor shall be responsible for performing or for making arrangements for all necessary utility connections and/or for their maintenance; for payment of all utility connections, installations, service fees and bills; and for final disconnection of utilities.

The field office interior shall be furnished by the Contractor. The Contractor shall provide new and maintain the following office furnishings, all which are to be approved by the Engineer prior to installation in the field office. Placement of these furnishings shall be as directed by the Engineer. These furnishings consist of 1 drafting table with sufficient drawers for standard size plans, either attached to the tables or in cabinet form, with an ergonomic design spring back stool with five leg base having wheel casters, 6 full size office desks each with filing drawer and fully adjustable ergonomic design swivel chair with armrests and five leg base having wheel casters, 2 computer stations with acoustical panels having minimum 60 NRC rating for privacy screen and fully adjustable ergonomic design swivel chair with armrests and five leg base having wheel casters, 1 large conference table for a minimum of 12 people with surrounding chairs with armrests, 4 folding tables minimum 6'-0" by 3'-0" each with ergonomic design straight back chair with armrests, 2 work tables, 2 supply cabinets, 1 or more clothes closets of ample size to meet inspection manpower requirements, 4 rough plan racks, 2 legal size filing cabinets with 4 drawers, 4 legal size fire-resistant filing cabinets with lock and key with 4 drawers and meeting fire underwriters' approval for not less than one hour test, 2 stackable steel flat file cabinets for 43" by 32" size plan sheets each cabinet having 5 drawers with full suspension, rear hood, and hinged front depressor, 2 book shelves minimum 3'- 6" by 4'- 6" each, 3 vertical surface legal size three compartment pockets, 2 dry erase boards minimum 4' by 3' each with markers and erasers, and 2 cork bulletin boards minimum 3' by 2'. These office furnishings will remain the property of the Contractor at the conclusion of the project.

The Contractor shall also furnish new and maintain the following office equipment for the field office complex, all which are to be approved by the Engineer prior to installation. Location of the office equipment shall be as directed by the Engineer. The required equipment will enable the Department to synchronize project record keeping and office functions. The equipment shall be delivered in working and useable condition:

6 heavy-duty calculators having extra-large 12-digit fluorescent display, full size keyboard with contoured keys, two-color ribbon printer, and AC powered;

1 professional or office grade laser printer, color, to have the ability to print on paper size of up to 11" by 17" in size, with two-sided printing capabilities, having wireless and hard line network connectivity, with all necessary software and cables for proper operation and shall be connected to high speed wireless and connected for use to share on a local network.

1 Canon imageRUNNER C3080i, XEROX Work Centre 7845, or approved equal all-in-one copier which includes color scanner, color printer, and fax. Copier to have high speed wireless and network capability. Copier shall have all necessary software and cables for proper operation and shall be connected to high speed wireless and connected for use to share on a local network. Copier to have zoom and preset reduction and enlargement features, automatic two (2) sided copying, automatic document feeder with minimum 30 sheet capacity with automatic stapling capacity;

1 micro cassette recorder, having fast playback, voice-activated system, three-digit tape counter, silent auto-stop and pause, two tape speeds, one-touch and follow-up, built-in condenser microphone, cue and review, and rechargeable with combination battery charger/AC adapter;

1 telephone answering machine or voice mail having all-digital recording, 14 minute message capacity, selectable message time, voice prompt assistance, day/time stamp, call screening, two-digit LED message indicator, toll saver, power failure memory back-up, and message interrupt from any station;

3 compact digital cameras with 10 megapixels or greater, maximum dimensions of 3" x 5" x 3", built in flash, autofocus, video mode LCD for review of images, LCD viewfinder acceptable, removable memory

compatible with compact flash, or secure digital (SD) or secure digital high capacity (SDHC), ISO compatible with 100, 200, 400 standard of quality of better, and memory cards supported by camera of 8 GB or better;

1 Canon Vixia HF M300, Panasonic HDC SD60, Samsung HMX-R10 or approved equal digital video camera, 1080p, CMOS optical sensor, digital format H.264, digital photo mode, camcorder sensor resolution 3.2 mega-pixels or greater, SD memory expansion card for still images, connection type, HDMI, USB, component video/audio output;

1 heavy duty 3-hole punch with minimum 40 sheet capacity;

1 extra heavy duty stapler with anti-jam feature having capacity up to 200 sheets; and

1 comb binding machine with manual punching capacity of 10 sheets having a minimum binding capacity of 150 sheets.

Consumables as required to manage the business of the project shall be provided for all office equipment for the length of the Contract. These consumables shall be furnished on request and shall include but not be limited to paper, tapes, ribbons, various size plastic combs, rolls, toner, cleaning kits, microcassette tapes and batteries, camera batteries and memory cards/sticks, DVD and CD R/RW media, printer plan size paper rolls and ink cartridges, etc. Maintenance of all office equipment shall be provided for by a validated service contract for the length of the Contract. This service contract shall allow a Department authorized project person to deal directly with the service organization to request repair.

Computer Requirements:

The field office shall have five (5) IBM compatible Microcomputer Systems to be furnished and maintained by the Contractor for use by the Engineer, the cost to be incidental to the "Field Office, Special" Item. The specified computer systems will synchronize the construction management functions of the Department to monitor, report, and perform the accounting of the project work. The computer systems and all their related equipment specified below shall be furnished new and remain the property of the Contractor at the conclusion of the Contract. A detailed listing of the proposed computer systems and all their related equipment to be provided by the Contractor shall be submitted for approval by the Engineer prior to furnishing the Microcomputer Systems. The Microcomputer Systems shall be Laptop Computer Systems each with docking station, unless otherwise determined by the Engineer. Each of the five (5) Microcomputer Systems shall consist of, at a minimum:

Central Processing Unit (CPU) – Lap Top

Intel I5, 4th Generation, processor,

Minimum 4.0 GB RAM with expansion capability to at least 8.0 GB and clock/calendar card equivalent, and

Microsoft "Windows® 7 Professional with 64 bit support

Memory & Connectivity

8x DVD +/- RW with double layer write capability, and 250GB hard drive minimum, integrated Ethernet 10/100, a 802.11n or better wireless card. Included software shall support double layer media writing and automatic backup of data;

Monitor (LCD)

Monitor for docking station and docking station. 21" minimum diagonal visual area flat panel capable of multiple frequency color graphics, 1440 x 900 (wide) or 1280 x 1024 or better resolution, 16.7 million display colors, 5 ms response time, D-Sub and DVI video input ports;

Laptop - shall have 15.4” display minimum;

Color Graphics Card

PCIe video card,integrated video or better;

Keyboard

Keyboard shall be ergonomic, enhanced layout minimum with keyboard interface cable;

Software

The latest version programs for application management (operating system), word processing, spreadsheet, and anti-virus shall be provided with all user manuals. Upgrades, maintenance, and full technical support by the manufacturer shall be provided for the length of the Contract. The required software will enable the Department to synchronize accounting and record keeping functions between the project, District, and Department offices. A list of programs to be provided shall be submitted to the Engineer for approval. Software, other than for application management and anti-virus, is to be delivered unopened to the Department's administrative office. All software is to be compatible with and for use to run on "Windows® 7 Professional". The required applications software follows and is to be latest version unless noted:

collection - "Office Home & Business 2013" with Word, Excel,
antivirus - "Norton,
replication - Adobe Acrobat X Suite Software w/Adobe Photoshop® CS5 suite, and software supporting creation of DVD +/- R/RW disks (supporting double layer media writing) and DVDR and DVDRW disks using DVDRW drive, for example: Ahead Nero, Roxio DVD/CD Creator, or some equivalent product. Note: software commonly included as part of the standard CDRW upgrade/standalone package is acceptable if included with the unit;

Related Equipment

Wireless networking hub/router, 802.11n or better, with all associated hardware (adapters, cables, etc) and software to enable wireless networking for resource/equipment sharing among all office computers and printers, the cost of wireless and network connections and service to be incidental to the “Field Office, Special” Item,

A wireless optical mouse with proper driving software having complete Microsoft emulation,

Necessary cables for proper operation,

An uninterruptible power supply (UPS) units for protection from power loss or fluctuation, minimum of 6 outlets, adequate to provide a minimum of 30 minutes backup power for an orderly shutdown of the computer system with software and connections for automatic system shutdown,

Two channel Sound Blaster compatible or better PCI soundcard with desktop speakers,

A combination surge, spike, and noise protection device with receptacles for all peripherals (may be in combination with the UPS power supply),

A wrist rest suitable for use with the furnished keyboard,

All cards, hardware, and operating, anti-virus, and equipment software to be fully installed and operational;

Maintenance and Service

Maintenance of all specified equipment and components shall be provided for by a validated service agreement for the length of the Contract. Maintenance (upgrades, replacement, full technical support) for each software application shall be provided for by validated maintenance agreement for the length of the Contract. These agreements shall allow an authorized project person to deal directly with the service organization to request repair or the maintenance organization to request assistance.

Supplies

Consumables as required to manage the business of the project shall be provided for the Microcomputer Systems in each field office for the length of the Contract. These consumables shall be furnished on request and include but not be limited to memory cards/sticks compatible with provided digital cameras having 8 GB or greater capacity and compatible with provided computers, DVDR and DVDRW media compatible supporting operational minimum to maximum speed of the DVD/RW drive unit, cut sheet paper and labels compatible with the printers, hardware and screen cleaners, printer ink cartridges, and toner cartridges.

Maintenance Requirements for Each Field Office:

Maintenance of the field office including its entrances and adjacent parking area, for the time required, shall consist of maintenance and/or replacement of all provided items, security system, furniture and equipment, computer systems, providing lavatory supplies, providing trash containers and waste baskets, providing entrance mats at each door, providing replacement items for lighting fixtures, maintaining all utilities, providing vermin and pest control by professional exterminator(s), providing satisfactory and sanitary janitorial and waste disposal services twice a week, providing cleanup of trash and debris on the parking lot and landscaped area once a week, and shall be included in the monthly unit cost.

The Contractor shall provide and deliver a current copy of all validated field office equipment and computer maintenance, service, assistance and/or monitoring agreements and/or contracts as mentioned hereinabove to the Department's administrative office on or before the first day each field office is ready for use.

Method of Measurement:

This item will not be measured but will be paid for on a monthly basis. Partial months will be paid at the rate of 0.033 Months per day. Full months will be paid at the rate of 1.000 Each-Month, regardless of the number of days in the month.

Basis of Payment:

The field office will be paid for on a unit price bid per month, which price shall be full compensation for performing the work specified and the furnishing of all materials, labor, tools, equipment and incidentals necessary to maintain the field office, its entrance, and its adjacent parking area and restore the field office area, entrance, and adjacent parking area to match the original site condition. Price shall also include making arrangements for all necessary utility connections and/or for their maintenance; for payment of all utility connections, installations, service fees and bills; and for final disconnection of utilities. No separate payment will be made for costs involved with removing hazardous material or underground tanks to install the field office, its entrances, and its parking area. No separate payment will be made for reimbursement of phone/internet or any other utility.

Payment will be made only for the actual number of months that the field office is acceptably provided by the Contractor.

The field office, its entrance, and its parking area shall be ready for use not later than thirty (30) calendar days after the date of the fully executed Contract and before construction operations begin.

9/18/2014

760502 - PAVEMENT MILLING, TAPER CUT

Description:

This work consists of furnishing a pavement milling machine and milling or planing the existing bituminous concrete pavement to the average depths and widths in accordance with the locations, notes on the Plans and as directed by the Engineer.

The pavement milling machine shall be one with a proven record for use in milling/planing hot-mix pavement. The Contractor shall reuse, salvage, or dispose of the milled material as indicated on the Plans.

Construction Methods:

Milling and/or planing shall consist of one pass with a specified depth at one edge (face of the curb) and 0 depth at the other edge, or in cases where excessive crown is being removed, the required number of passes to mill a specified depth at the existing road centerline and 0 depth at the edges. The depth shall be as shown on the Plans or as directed by the Engineer.

Method of Measurement:

The quantity of taper cut milling will be measured in square yards per inch of depth (square meters per 25 mm of depth). The average depth shall be determined by either measuring the actual depth removed at face of the curb and dividing by two or measuring the actual depth removed at road centerline and dividing by two, whichever case is applicable.

Basis of Payment:

The quantity of taper cut milling will be paid for at the Contract unit price per square yard per inch of depth (square meter per 25 mm of depth). Price and payment will constitute full compensation for furnishing milling machine with operator and milling/planing the roadway, removal and disposal or salvaging the milled material and for transporting, as indicated on the Plans, for all labor, equipment, tools, and necessary incidentals to complete the work.

10/25/01

760507 - PROFILE MILLING, BITUMINOUS CONCRETE
760508 - PROFILE MILLING, CONCRETE

Description:

This work consists of furnishing a pavement-milling machine or cold planer and planing the existing bituminous concrete pavement or P.C.C. Pavement at the locations and to the nominal depths shown on the Plans and/or as directed by the Engineer to obtain a smooth profile on the existing roadway surface. Unless otherwise noted on the Plans or specifications the Contractor shall reuse, salvage and/or dispose of the milled material.

Equipment:

The milling equipment shall be a commercially designed and manufactured milling machine capable of performing the work in a manner satisfactory to the Engineer.
The machine shall be power-operated and self-propelled, shall have sufficient power, traction and stability to remove a thickness of material to a specified depth. In addition, the machine must accurately and automatically establish profile grades by referencing the existing pavement surface. This shall be accomplished by means of 1.) a ski of 30 (9 m) minimum length with an accuracy of ±0.125 in 30 (3 mm in 9 m) or 2.) a minimum of three (3) ultra sonic, non-ground contacting sensors with an accuracy of ±0.100 in 25 (2.5 mm in 7.5 m). If noted on the Plans, a profile grade shall be established independent of the existing pavement surface. In such case the machine shall be capable of following the independent grade line (e.g. string line). The machine shall have an automatic system for controlling grade elevation and cross slope. The machine shall also be equipped with a means to effectively control dust generated by the cutting operation.

Construction Methods:

The surface resulting from the planing operation shall be in accordance with notes and details on the Plans and shall be characterized by uniform, discontinuous longitudinal striations and shall not be gouged or torn. Imperfections exceeding 5/16" (8 mm) at any point along the surface as a result of missing teeth or faulty operation shall be removed by approved methods.
Before opening the milled surface to traffic, all loose material shall be removed from the surface with a power vacuum sweeper.

Whenever the milling operation causes water to pond or lay within the wheelpaths of the roadway the Contractor shall alleviate this problem by cutting bleeders into the shoulder or median to provide positive drainage. Cost for such work will be incidental to this item.

If the road is to remain open to traffic, longitudinal vertical drop-offs in excess of 2" (50 mm) at lane lines or at the centerline shall not be left overnight.

Transverse faces at the beginning and end of the milling operation existing at the end of a work period shall be tapered 20:1 or flatter in a manner approved by the Engineer to avoid a hazard for traffic.

Surface material that cannot be removed by cold planing equipment because of physical or geometrical restraints shall be removed by other methods acceptable to the Engineer.

If independent grade reference is required, it shall be designated in the Plans and/or Contract documents and elevations shall be provided by the Plans or at the direction of the Engineer.

If a severe bump exist in the pavement surface extra effort shall be taken at these locations to improve the profile. Manual changes to the cutter head may be needed at these locations to achieve this. It is the intent to remove bumps and irregularities in the pavement and produce a smooth milled surface for hot-mix resurfacing.

If the existing bituminous surface is over concrete the intent is to remove all of the existing bituminous material to the top of the concrete surface unless otherwise directed by the Plans or the Engineer.

If milling to remove open graded hot mix, the milling operation must remove all of the open graded hot mix from the roadway surface.

Method of Measurement:

The quantity of pavement milling will be measured as the number of square yards per inch (square meters per 25 mm) of depth as shown on the Plans or established by the Engineer. The nominal depth shown on the Plans and initially set on the milling machine, even though it will vary automatically during profiling, will be the depth measured and paid.

Basis of Payment:

The quantity of pavement milling will be paid for at the Contract unit price per square yard per inch (square meter per 25 mm) of depth. Price and payment will constitute full compensation for furnishing an accepted pavement-milling machine and operator, for removal and disposal of the milled material or delivery to a designated site, for transporting equipment, for all labor, tools equipment and incidentals necessary to complete the item.

10/25/13

763501 - CONSTRUCTION ENGINEERING

Description:

This work consists of construction lay out including; stakes, lines and grades as specified below. Subsection 105.10 Construction Stakes, Lines and Grades of the Standard Specifications is voided.

Based on contract plans and information provided by the Engineer, the Contractor shall stake out right-of-way and easements lines, limits of construction and wetlands, slopes, profile grades, drainage system, centerline or offset lines, benchmarks, structure working points and any additional points to complete the project.

The Engineer will only establish the following:

(a) Original and final cross-sections for borrow pits.
(b) Final cross-sections for all excavation items.
(c) Line and grade for extra work added on to the project plans.

Equipment:

The Contractor shall use adequate equipment/instruments in a good working order. He/she shall provide written certification that the equipment/instrument has been calibrated and is within manufacturer's tolerance. The certification shall be dated a maximum of 9 months before the start of construction. The Contractor shall renew the certification a minimum of every 9 months. The equipment/instrument shall have a minimum measuring accuracy of [3mm+2ppmxD] and an angle accuracy of up to 2.0 arc seconds or 0.6 milligons. If the Contractor chooses to use GPS technology in construction stakeout, the Contractor shall provide the Engineer with a GPS rover for the duration of the contract. The GPS rover shall be in good working condition and of similar make and model used by the Contractor. The Contractor shall provide up to 8 hours of formal training on the Contractor's GPS system to a maximum of four Engineer's appointees. At the end of the contract, the Engineer will return the GPS rover to the Contractor. If any of the equipment/instruments are found to be out of adjustment or inadequate to perform its function, such instrument or equipment shall be immediately replaced by the Contractor to the satisfaction of the Engineer. The Contractor may utilize GPS equipment to perform the excavation and embankment for the project as indicated on the plans. Use of this procedure and equipment is intended for grading the subgrade surface only; it is not intended for use in constructing final surface grades. GPS technology and machine control technology shall not be used in the construction of bridge or structures such as, but not limited to, curb, drainage inlets, manholes, junction boxes, pole bases and pipe inverts.

Engineering/Survey Staff:

The Contractor shall provide and have available for the project an adequate engineering staff that is competent and experienced to set lines and grades needed to construct the project. The engineering personnel required to perform the work outlined herein shall have experience and ability compatible with the magnitude and scope of the project. Additionally, the Contractor shall employ an engineer or surveyor licensed in the State of Delaware to be responsible for the quality and accuracy of the work done by the engineering staff. When individuals or firms other than the Contractor perform any professional services under this item, that work shall not be subject to the subcontracting requirements of Subsection 108.01 of the Standard Specifications. The Contractor shall assume full responsibility for any errors and/or omissions in the work of the engineering staff described herein. If construction errors are caused due to erroneous work done under Construction Engineering the Contractor accepts full responsibility, no matter when the error is discovered. Consideration will not be given for any extension of contract time or additional compensation due to delays, corrective work, or additional work that may result from faulty and erroneous construction stakeout, surveying, and engineering required by this specification.

Construction Methods:

Performance Requirements:

(a) Construction Engineering shall include establishing the survey points and survey centerlines; finding, referencing, offsetting the project control points; running a horizontal and vertical circuit to check the

accuracy of given control points. Establishing plan coordinates and elevations marks for culverts, slopes, subbase, subsurface drains, paving, subgrade, retaining walls, and any other stakes required for control lines and grades; and setting vertical control elevations, such as footings, caps, bridge seats and deck screed. The Contractor shall be responsible for the preservation of the Department's project control points and benchmarks. The Contractor shall establish and preserve any temporary control points (traverse points or benchmarks) needed for construction. Any project control points (traverse points) or benchmarks conflicting with construction of the project shall be relocated by the Contractor. The Contractor as directed by the Engineer must replace any or all stakes that are destroyed at any time during the life of the contract. The Contractor shall re-establish centerline points and stationing prior to final cross-sections by the Engineer. The Vertical Control error of closure shall not exceed 0.05 ft times [Square root of number of miles in the level run] (0.01 m times [square root of number of kilometers]). The Horizontal Control accuracy ratio shall not exceed an error of closure of 1 foot per 20,000 feet (1 meter per 20,000 meters or 1:20,000) of distance traversed prior to adjustment.

(b) The Contractor shall perform construction centerline layout of all roadways, ramps and connections, etc. from project control points set by the Engineer. The Contractor using the profiles and typical sections provided in the plans shall calculate proposed grades at the edge of pavement or verify information shown on Grades and Geometric sheets.

(c) The Contractor shall advise the Engineer of any horizontal or vertical alignment revisions needed to establish smooth transitions to existing facilities. The Contractor shall immediately bring to the attention of the Engineer any potential drainage problem within the project limits. The Engineer must approve any proposed variation in profile, width or cross slope.

(d) The Contractor shall establish the working points, centerlines of bearings on bridge abutments and on piers, mark the location of anchor bolts to be installed, check the elevation of bearing surfaces after they are ground and set anchor bolts at their exact elevation and alignment as per Contract Plans. Before completion of the fabrication of beams for bridge superstructures, the Contractor shall verify by accurate field measurements the locations both vertically and horizontally of all bearings and shall assume full responsibility for fabricated beams fitting and bearing as constructed. After beam erection and concurrently with the Department project surveyors, the Contractor shall survey top of beam elevations at a maximum of 10-ft (3.0-meter) stations and compute screed grades. These shall be submitted to the Engineer for review and approval before the stay in place forms are set. Construction stakes and other reference control marks shall be set at sufficiently frequent intervals to assure that all components of the structure are constructed in accordance with the lines and grades shown on the plans. The Contractor will be responsible for all structure alignment control, grade control and all necessary calculations to establish and set these controls.

(e) The Contractor, using contract plans, shall investigate proposed construction for possible conflicts with existing and proposed utilities. The Contractor shall then report such conflicts to the Engineer for resolution. All stakes for advanced utility relocation, which will be performed by others, shall be paid for under item 763597 – Utility Construction Engineering.

(f) The Contractor shall be responsible for the staking of all sidewalk and curb ramp grades in accordance with the plans and the Departments Standard Construction Details. The Contractor shall review the stakeout with the Engineer prior to construction. The Engineer must approve any deviation from plans, Department Standard Construction Details and Specifications in writing. The Contractor shall be responsible for any corrective actions resulting from problems created by adjustments if they fail to obtain such approval.

(g) If wetland areas are involved and specifically defined on the Plans the following shall apply:

i. It is the intent of these provisions to alert the Contractor, that he/she shall not damage or destroy wetland areas, which exist beyond the construction limits. These provisions will be strictly enforced and the Contractor shall advise his/her personnel and those of any Subcontractor of the importance of these provisions.

ii. All clearing operations and delineation of wetlands areas shall be performed in accordance with

these Special Provisions. Before any clearing operation commences the Contractor shall demarcate wetlands at the Limits of Construction throughout the entire project as shown on the Plans labeled as Limits of Construction or Wetland Delineation to the satisfaction of the Engineer.

iii. The material to be used for flagging the limits of construction shall be orange vinyl material with the wording "Wetland Boundary" printed thereon. In wooded areas, the flagging shall be tied on the trees, at approximate 20-foot (6.1 meter) intervals through wetland areas. In open field and yard areas that have been identified as wetlands, 3 foot (one meter) wooden grade stakes shall be driven into the ground at approximate 20 foot (6.1 meter) intervals and tied with the flagging.

iv. If the flagging has been destroyed and the Engineer determines that its use is still required, the Contractor shall reflag the area at no cost to the Department. If the Contractor, after notification by the Engineer that replacement flagging is needed, does not replace the destroyed flagging within 48 hours, the Engineer may proceed to have the area reflagged. The cost of the reflagging by the Engineer will be charged to the Contractor and deducted from any monies due under the Contract.

v. At the completion of construction, the Contractor shall remove all stakes and flagging.

vi. The Contractor shall be responsible for any damages to wetlands located beyond the construction limits, which occurs from his/her operations during the life of the Contract. The Contractor shall restore all temporarily disturbed wetland areas to their preconstruction conditions. This includes restoring bank elevations, streambed and wetland surface contours and wetlands vegetation disturbed or destroyed. The expense for this restoration shall be borne solely by the Contractor.

Submittals:

All computations necessary to establish the exact position of all work from the control points shall be made and preserved by the Contractor. All computations, survey notes and other records necessary to accomplish the work shall be made available to the Department in a neat and organized manner at anytime as directed by the Engineer. The Engineer may check all or any portion of the stakeout survey work or notes made by the Contractor and any necessary correction to the work shall be made as soon as possible. The Contractor shall furnish the Engineer with such assistance as may be required for checking all lines, grades, and measurements established by the Contractor and necessary for the execution of the work. Such checking by the Engineer shall not relieve the Contractor of his/her responsibility for the accuracy or completeness of the work.

The Contractor shall submit any of the following at the Engineer's request:

(a) Proposed method of recording information in field books to ensure clarity and adequacy.

(b) A printout of horizontal control verification, as well as coordinates, differences and error of closure for all reestablished or temporary Control Points.

(c) A printout of vertical control verification, with benchmark location elevation and differences from plan elevation.

(d) Sketch of location of newly referenced horizontal control, with text printout of coordinates, method of reference and field notes associated with referencing control.

(e) Description of newly established benchmarks with location, elevation and closed loop survey field notes.

(f) All updated electronic and manuscript survey records.

(g) Stakeout plan for each structure and culvert.

(h) Computations for buildups over beams, screed grades and overhang form elevations.

(i) A report showing differences between supplied baseline coordinates and field obtained coordinates, including a list of preliminary input data.

(j) Any proposed plan alteration to rectify a construction stakeout error, including design calculations, narrative and sealed drawings.

(k) Baseline for each borrow pit location.

(l) Detailed sketch of proposed overhead ground mounted signs or signals showing obstructions that may interfere with their installation.

(m) Copies of cut sheets.

Method of Measurement:

The quantity of Construction Engineering will not be measured.

Basis of Payment:

Payment will be made at the Lump Sum price bid for the item "Construction Engineering". The price bid shall include the cost of furnishing all labor, equipment, instruments, stakes and other material necessary to satisfactorily complete the work as herein described under this item for all roads and structures that are a part of the contract. Adjustment in payment will be made for the deletion or addition of work not shown in the contract documents.

Monthly payment will be made under this item in proportion to the amount of work done as determined by the Engineer.

6/11/2012

763503 - TRAINEE

Description:

The item shall consist of providing training in the construction crafts in accordance with the requirements stated in the General Notices of this proposal under the Standard Federal Equal Employment Opportunity Construction Contract Specifications (Executive Order 11246).

Basis of Payment:

The payment for the item shall be made at a fixed rate of $.80 per hour toward the hourly rate of the trainee.

5/2/02

763508 - PROJECT CONTROL SYSTEM DEVELOPMENT PLAN
763509 - CPM SCHEDULE UPDATES AND/OR REVISED UPDATES

Description:

Plan, schedule and construct the Project by using a Critical Path Method Project Schedule (CPM) meeting the requirements of these specifications. Use the CPM for coordinating and monitoring the Work specified in the Contract Documents including all activities of Subcontractors, vendors, suppliers, utilities, railroads, the Department, and all other parties associated with the construction of the Contract. Include all Work in the CPM; including but not limited to submittals, major procurement, delivery, and construction activities. Include all activities, including bid items, quantified in the Contract Documents. Base the CPM upon the entirety of the Contract Documents. Utilize CPM software that generates files compatible with Primavera P6 Project Management Release: 7.0.0.

Scheduling Representative:

Designate a scheduling representative prior to submission of the Original Critical Path Method Project Schedule (OCPM). The scheduling representative is the person primarily responsible for development and maintenance of the CPM schedule; the Contractor's representative in all matters regarding the schedule; and the Contractor's designated attendee for all schedule related meetings. The scheduling representative shall also be knowledgeable of the status of all parts of the Work throughout the duration of the Project. Replacement of the scheduling representative will require written approval from the Engineer.

Submit the qualifications of the scheduling representative to the Engineer for approval. This approval is required before the OCPM 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.

Critical Path, Project Completion Date, and Float:

The critical path is defined as the series of activities in a CPM that has the longest path in time. The submitted activity sequence and durations must generate a CPM with only one critical path. Divide Project wide activities such as Maintenance of Traffic, Construction Engineering, or Temporary Erosion Control that, by their nature, generate long durations and complement other activities into "establish" and "conclude" activities to prevent this type of Work from occupying a significant portion of the critical path.

The project start date, or initial data date, of the original CPM shall be the first chargeable day of Work. Nonproductive Work and administrative activities may begin and/or end prior to the project start date. The Original CPM must use all of the Contract Time and contain a critical path containing exactly zero float. Early completion schedules are not permitted. The schedule ending date of the Original CPM that uses all of the Project Time is the contract completion date.

Total Float is the difference between the schedule's finish date and the contract completion date. Free float is the difference in time between an activity's early finish and late finish. Free float is a shared commodity for the use of the Department and the Contractor and is not for the exclusive use or benefit of either party. Both parties have the full use of free float until depleted.

Submittal of the OCPM; the Start of Work and the Schedule of Record:

Complete and submit the proposed original CPM schedule (OCPM) database and the written narrative (WN) within 30 calendar days after Contract is Awarded. The WN is a description of any elements of the Schedule that deviate from the proposed construction sequence shown in the Contract Documents. Submit the OCPM in CPM format fully compatible with Primavera P6 Project Management Release: 7.0.0 by email or CD ROM as a single compressed database in CPM format.

The Engineer will complete the review of the OCPM within 30 calendar days after submittal. If required, a Joint Review Conference will be convened at which time the Engineer and Contractor may make corrections and adjustments to the proposed OCPM. 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 OCPM. The Engineer will respond to the revised OCPM within seven calendar days after receipt. Clearly identify each submittal and resubmittal for clarity by labeling "2nd Draft", "3rd Draft", etc.

Do not start any Work until the OCPM is accepted. If the Engineer is ready to issue a Notice to Proceed but the OCPM is not yet accepted, the Engineer may issue the NTP and start Contract Time, but forbid Work to begin until the OCPM is accepted. The Engineer may partially accept a OCPM and allow Work to begin if the required corrections to the OCPM are minor, but the Engineer will not accept submittals that do not show the complete schedule. The Engineer will not pay any estimates until the OCPM is partially accepted. Once the OCPM is partially accepted, the Engineer will pay the first estimate. If the Contractor fails to make a good faith effort to address the Engineer's comments before the second estimate is due for payment, the Engineer will not pay the second estimate until a good faith effort is made by the Contractor to comply. The Engineer may not withhold an estimate payment if, within the estimate period in question, the Engineer has failed to provide timely review comments in response to the Contractor's submittal. The Engineer may, however, withhold the payment of subsequent estimates if the Contractor fails to make a good faith effort to address the Engineer's comments. Upon issuance of the Notice to Proceed, the start date utilized in the OCPM will be adjusted to comply with the first chargeable day of Work. Any delay in starting Work caused by the acceptance of the OCPM by the Engineer will not be considered as a basis for any adjustment in the Contract amount or time. For Contracts that have fast-tracked starts, the Engineer and the Contractor may agree to alter the response times and approval dates listed above.
Upon notification that the OCPM has been accepted, the corrected copy will become the CPM of record. The CPM of record shall be the Contractor's work plan for completing the entire Contract as specified in the Contract Documents.

Requirements for the OCPM:

The format of the OCPM database shall be the precedence diagram method with days as the planning unit and shall be based on Calendar Days. Use the Department's partially predetermined coding structure (CS) that is furnished by the Engineer.

Activity Sequencing. Activity sequence must be logical and representative of the Contractor's order of the Work. Successors and predecessors determine the schedule logic or activity sequence. A given activity cannot start until all of the given activity's predecessors have been completed. Use only finish to start dependency relationships (links); do not use lag times without approval from the Engineer. The Engineer may request that the Contractor resequence the activities to reflect realistic job logic. When scheduling using multiple resources, each resource unit shall have a corresponding activity. Durations of activities include all the time necessary to complete the activity including, but not limited to, Contractor's non-work periods (other than those shown on the calendars), reasonably foreseeable inclement weather, weekends and holidays. Base schedule calculations on retained logic, contiguous durations, and total float as finish float.

Activity Resources. Sequence activities to reflect resource apportionment. Logically connect and code each activity to reflect the crew (resource) performing the operation. Submit a summary list of crews, their crew codes, and their operation(s) with each schedule submission, unless unchanged. Identify responsibility for each activity. Identify Subcontractors, DBE's, utilities and Work performed by others that affects the Schedule.

*Breakdown and Durations of Activities***.** An individual activity is required for each construction element or each activity not under the control of the Contractor that affects the sequence or progress of the Work. The Engineer reserves the right to require additional breakdown of the Work activities at any time. Each activity must be identified by a name, symbol and coding, and shall have a duration, sequence, responsibility and resource(s). Choose activity names that are descriptive and identify single construction elements. Activity symbols, or ID's, shall be unique and systematic.

Activity types must be either "task", "start milestone", or "finish milestone". Do not use "hammock" type activities. Date constraints, float and duration constraints, and/or flags for activities are not permitted.

Assign a reasonable duration to each activity representative of its scope. Durations may not exceed 14 calendar days unless approved by the Engineer. Determine the duration of each activity by using productivity rates based on Calendar Days.

Include the preparation and approval of Working Drawings as activities. Include phasing (staging) milestones as activities. Correlate phasing milestones with the sequence of construction provided in the Contract Documents. Use a separate start and finish milestone activity to delineate each phase (stage).

*Utility Work***.** Include all Work performed by utilities on the Project as activities in the OCPM. Include each utility item of Work shown in the Contract's Utility Statement as an activity. Durations for utility activities shall be the same as the durations shown in the Utility statement for each activity unless otherwise approved by the Engineer.

*Calendars***.** Assign a calendar to each activity in the schedule. Use a minimum of 6 calendars, when applicable: (1) Full Schedule; (2) Permit Requirements; (3) Winter Condition; (4) Concrete Work; (5) Asphalt Paving Work; and (6) Nighttime Asphalt Paving Work. Use additional calendars if needed. Calendar non-work periods shall reflect the average Delaware weather history for the jobsite and the restrictions identified in the Contract Documents. The Contractor may choose perform Work during an activity's calendar non-work period at no additional cost to the Department if weather conditions are favorable for such Work and the Work does not violate a set forth in the Contract Documents. The maximum allowable non-work period for each calendar is set forth below. The Contractor may choose to shorten non-work periods at his/her discretion.

CALENDAR	MAXIMUM NON-WORK PERIOD
Full Schedule	None
Winter Condition	December 1 through March 15
Concrete Work	December 1 through March 15
Asphalt Paving	November 15 through March 15
Nighttime Asphalt Paving	October 15 through April 30

Written Narrative (WN). Provide a written narrative (WN) as part of the OCPM explaining the following:

(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 and the basis of determining each non-work period
(g) All abbreviations.
(h) Use of calendars.
(i) Any other conditions that affect the schedule and are not readily discernible in the database.

CPM Updates:

Provide monthly updates to the CPM of record. Meet with the Engineer once a month prior to submitting the update to review the status of the schedule's activities. Prepare an updated list of activities showing all of the actual start and actual finish for each of the schedule's activities so that both parties can agree on the dates. Use the dates that were agreed upon in the meeting to status the CPM of record and submit the updated schedule to the Engineer for approval. Assign a unique file name to each update (Number/version). The data date of the update shall be the next day after the end of the update period. As part of the monthly update, submit a written description that identifies any delays or disruptions to the schedule experienced during the period of an update, any change in manpower or equipment, and any potential delays to the completion date of the schedule.

Do not include any revisions to the CPM without prior approval. Failure to submit complete updates in a timely manner may result in the withholding of estimates by the Engineer. The Engineer agrees to refrain from

withholding estimates unless the Contractor is habitually late in providing updates, is more than four weeks late in submitting an update or has failed to submit an update that is part of a resolution to a serious problem that must be addressed immediately.

Revisions to the Schedule of Record:

Revisions are defined as any changes to the database other than status updates, log entries and moving the data date. Discuss any proposed revisions 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. The Engineer may allow a deviation from the approved CPM for specific mitigating activities.

The Engineer may direct the Contractor to revise the schedule of record at the Contractor's expense if: the critical path has less than minus ten (-10) Calendar Days of total float due to the Contractor's failure to perform the Work in accordance with the schedule; the Contractor requests to re-sequence the Work; and/or the Contractor has performed a significant amount of Work out of sequence. The Engineer may direct the Contractor to revise the schedule for any other reason; and such a revision will be paid at the unit cost for a CPM Revision.

The Engineer will review and respond to the proposed revision within 7 Calendar Days after receipt. Resubmit, if required, within seven calendar days after receipt of the Engineer's review comments. The Engineer reserves the right to reject any proposed revision that adversely impacts the Department, utilities, or other concerned parties.

Extensions of Contract Time and/or Incentive/Disincentive Dates.

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. Include in the request a written narrative of the events that impacted the schedule and a detailed explanation of why the Contractor cannot meet the requirements of the schedule of record. Only delays to activities that affect the Contract completion date or will be considered for an extension of Contract time. Only delays to activities that affect the completion duration of an incentive/disincentive period will be considered for an extension of an incentive/disincentive completion date. 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. The Engineer and Contractor may agree to defer the analysis of a potential impact to the schedule until the completion of the activities that are affected. Such a deferment does not relieve the Contractor of his/her duty to identify potential impacts to the schedule in the applicable schedule updates.

All requests for extensions of Contract Time must be supported by the most recent CPM Update. If, within a reasonable period of time, the Contractor fails to make a good faith effort to produce an acceptable CPM update and uses an unacceptable CPM update to support a request for a time extension, the Contractor loses the right to receive that time extension; and/or the right to receive compensation for that delay caused in whole or in part by the Engineer.

Final As Built Schedule.

Submit a final CPM Schedule database within 14 Calendar Days of Substantial Completion. Failure to submit a final CPM Schedule may result in the withholding of estimates by the Engineer.

Method of Measurement:

The Project Control System will be measured in two items. The item, "Project Control System Development Plan" will be lump sum. The item "CPM Schedule Updates and/or Revised Updates" will be measured one each per update that is submitted and accepted.

Basis of Payment:

The item, "763508 – Project Control System Development Plan" will be paid at the Contract's lump sum bid price on the next monthly estimate after completion of the requirements of the Project Control System Development Plan, which includes the approval of the Original CPM Schedule. Price and payment will constitute full compensation for preparing the CPM database, acquiring the necessary software, attending all scheduling meetings with the Department, submitting and resubmitting all documents and for all labor, tools, equipment and incidentals necessary to complete the Work.

The item, "763509 – CPM Schedule Updates and/or Revised Updates" will be paid at the Contract unit price per each approved CPM schedule update as described above. Price and payment will constitute full compensation for preparing, submitting and resubmitting all CPM updates, for attendance at all scheduling meetings with the Department, for preparing and reviewing a list of actual start and actual finish dates with the Engineer, and for all labor, tools, Equipment and incidentals necessary to complete the Work.

3/28/14

763626 - DIESEL FUEL COST PRICE ADJUSTMENT

I. Description: This section defines the criteria for payments to the Contractor to reflect increases or decreases in the cost of diesel fuel consumed in the performance of applicable construction work. To have the Diesel Fuel Cost Price Adjustment provisions apply to this project, a properly completed Diesel Fuel Cost Price Adjustment Option form must be submitted to the Department with the Bidder's bid proposal. If a properly completed Diesel Fuel Cost Price Adjustment Option form is not provided by the bidder, the Department will consider the option to apply the Diesel Fuel Cost Price Adjustment provisions for the project to be declined. No further opportunity to elect Diesel Fuel Cost Price Adjustment for the project will be made available.

a. General. These price adjustment provisions apply to contract items in the contract schedule of prices as grouped by category. Specific pay items to be adjusted are attached as an appendix to this Special Provision. General category descriptions and the fuel usage factors which are applicable to each are as follows:

1. Categories

1.a. Category A: Earthwork. The combined total of the applicable item plan quantities must exceed 5,000 CY.

1.b. Category B: Subbase and Aggregate Base Courses. The combined total of the applicable item plan quantities must exceed 500 tons.

1.c. Category C: Flexible Bases and Pavements. The combined total of the applicable item plan quantities must exceed 500 tons.

1.d. Category D: Rigid Bases and Pavements. The combined total of the applicable item plan quantities must exceed 5,000 CY.

1.e. Category E: Structures. Contract items will be based upon the total square foot price for each structure including any associated items of work, i.e. items not grouped under Categories A thru D.

2. Diesel Fuel Usage Factors – ENGLISH UNITS

Category	Factor	Units
A – Earthwork	0.34	Gallons per CY
B – Subbase and Aggregate Base Courses	0.62	Gallons per ton
C – Flexible Bases & Pavements	2.98	Gallons per ton
D – Rigid Bases & Pavements	0.98	Gallons per CY
E – Structures	8.00	Gallons per $1,000 of work performed

3. Quantity Conversion Factors – ENGLISH UNITS

Category	Conversion	Factor
B	SY to ton	90 lbs/Inch of depth/SY
C	SY to ton	112.5 lbs/Inch of depth/SY
D	SY to CY	Inches of depth/36

II. The posted index price will be the monthly price most recent data published by the U.S. Department of Energy, U.S. Energy Information Administration. The source information for the posted price for Central Atlantic (PADD 1B) No 2 Diesel Ultra Low Sulfur (0-15 ppm) Retail Prices (Dollars per Gallon) may be viewed at the following website:

http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=EMD_EPD2DXL0_PTE_R1Y_DPG&f=M

The release date for the U.S. Department of Energy, U.S. Energy Information Administration average price data occurs the first Monday of the following month, i.e. October prices are released the first Monday of November and used as the November Price Index.

The price index, FB, is the index price posted by the Department, determined as specified above, on the project advertisement date.

PRICE INDEX (FB) FOR DIESEL FUEL

PER GALLON (PER LITER) = $ 3.965

The price index, FP, will be the index price posted by the Department, determined as specified above, for the month during which the Notice to Proceed (NTP) is issued, and every 90 calendar days thereafter.

III. Price Adjustment Criteria and Conditions. The following criteria and conditions will be considered in determining a price adjustment for diesel fuel cost fluctuations.

a. Price Adjustment Calculation. When the ratio FP/FB is calculated to be less than 0.95 or calculated to be greater than 1.05, the Department will adjust unit bid price prices in accordance with the following formula:

   AUP = (FP-FB)(F)+(UBP)
   where:
   AUP = Adjusted Unit Price
   FP = Fuel Price Index for the month in which prices are adjusted for applicable construction work.
   FB = Fuel Price Index in the Bid Proposal
   F = Diesel Fuel Usage Factor
   UBP = Unit Bid Price specified in the Contractor's Bid Proposal

b. Payment of Adjusted Unit Prices. The unit bid prices of work items affected by the fuel escalation will be adjusted by work order, either up or down, at Notice to Proceed and every 90 Calendar Days thereafter.

c. Expiration of Contract Time. If the Contractor exceeds the authorized allotted completion time, the adjusted item prices on the last authorized allotted work day shall be the prices used during the time liquidated damages are assessed. However, if the posted price for diesel fuel goes down, the item prices shall be adjusted downward accordingly

d. Final Quantities. Upon completion of the work and determination of final pay quantities, an adjusting work order will be prepared to reconcile any difference between estimated quantities previously paid and the final quantities. In this situation, the value for FP used in the price adjustment formula will be the average of all FP's previously used for computing price adjustments.

e. Inspection of Records. The Department reserves the right to inspect the records of the prime contractor and its subcontractors and material suppliers to ascertain actual pricing and cost information for the diesel fuel used in the performance of applicable items of work.

f. Extra Work. When applicable items of work, as specified herein, are added to the contract as Extra Work in accordance with the provisions of Section 110.03, no price adjustment will be made for fluctuations in the cost of diesel fuel consumed in the performance of the extra work, unless otherwise approved by the Engineer. The current price for diesel fuel is to be used when preparing required backup data for extra work to be performed at a negotiated price. For extra work performed on force account basis, reimbursement for material and equipment along with specified overhead and profit markups will be considered to include full compensation for the current cost of diesel fuel.

g. Subcontractors. Any Price Increases or Price Rebates that are calculated based on items of work performed by subcontractors will be added to or deducted from payments due to the Contractor in the appropriate pay period. The Contractor shall then accurately record on the appropriate CN-91 or CN-103 form the additions or deductions into adjusted contract value. The Contractor shall make payment to the subcontractor(s) who actually performed the work in accordance with DelCode Title 17, Chapter 8.

11/10/11

Appendix---Item 763626 Diesel Fuel Cost Adjustment

Contract: **T200411701.01; West Dover Connector**

		Item No./s
Category A:	**Earthwork** Excavation & Embankment, Borrow (total qty must exceed 5000 CY)	202000, 207000, 208000, 209001, 209002, 209003 210000, 212000, 212001
Category B:	**Subbase and Agg.** GABC, PTB, Soil Cement Base (total qty must exceed 500 T)	302006, 302007, 608000
Category C:	**Flexible Bases and Pavements** Warm Mix Asphalts (total qty must exceed 500 T)	401801, 401816, 401819, 401821, 401822, 401823, 401833
Category D:	**Rigid Bases and Pavements** Concrete, P.C.C. Patching (total qty must exceed 5000 CY)	503001
Category E:	**Structures** Bridges, Large P.C.C. Structures	602001, 602003, 602006, 602007, 602009, 602013 602015, 602017, 602553, 604000, 605511, 618042, 618407, 618082, 618092, 619022, 619062, 619068, 623003, 720529

UTILITY STATEMENT
State Contract: 200411701
West Dover Connector
Kent County, Delaware

The following companies maintain facilities within the contract limits:

• Delmarva Power and Light Company – Transmission	Electric
• Delmarva Power and Light Company - Distribution	Electric
• Delaware Electric Cooperative, Inc.	Electric
• City of Dover Electric	Electric
• Verizon of Delaware Inc.	Communications
• AT&T	Communications
• Comcast Cable Co.	Communications
• Eastern Shore Natural Gas - Transmission	Gas
• Chesapeake Utilities Corporation	Gas
• City of Dover	Water & Sewer
• Kent County	Water & Sewer

The following is a breakdown of the utilities involved.

Delmarva Power and Light Company (Transmission) maintains the following aerial electric facilities within the project limits:

Delmarva Power and Light Company maintains 138 kV and 25 kV aerial facilities along the north side of New Burton Road within the Railroad right of way. Eight transmission poles have been replaced due to the West Dover Connector Project. Five poles have 138 kV aerial facilities associated with them. Three of the poles have 138 kV and 25 kV aerial facilities associated with them.

Delmarva Power and Light Company (Transmission) proposed changes to the aerial facilities include but are not limited to:

Replaced 8 existing wood poles in-place with 8 taller steel poles.

1. New 80 Ft. Steel Pole at Pole #109, station 721+04
2. New 90 Ft. Steel Pole at Pole #110, station 717+93
3. New 95 Ft. Steel Pole at Pole #111, station 714+85
4. New 100 Ft. Steel Pole at Pole #112, station 711+78
5. New 100 Ft. Steel Pole at Pole #113, station 708+70
6. New 95 Ft. Steel Pole at Pole #114, station 705+60
7. New 90 Ft. Steel Pole at Pole #115, station 702+50
8. New 85 Ft. Steel Pole at Pole # 116, station 699+47

Replaced Conductors, Install 954 ACSR Conductor and .504" Optical Ground Wire, insulators and miscellaneous hardware.

Delmarva Power and Light Company (Transmission) complete this work in June, 2014.

Delmarva Power and Light Company (Transmission) Outage Restrictions / Requirements:

No outage requests will be honored between Memorial Day and Labor Day.

Outside this window, there is potential for taking the transmission facility out of service for pre-determined one day outages. The latest the dates can be determined is 2 months prior to the outage itself. Keep in mind, Delmarva Power has its own work that requires system outages. If too much work is going on in the same area, an outage request may not be honored. It is recommended to have a schedule of these requested outage dates as early as possible (in advance of the 2 months previously mentioned).

The Contractor shall note that the Delaware Code, Title 16, Chapter 74B, Section 7405B requires notification to and mutually agreeable measures from the public utility for any person intending to carry on any function, activity, work or operation within dangerous proximity of any high voltage overhead lines.

Delmarva Power and Light Company (Distribution) maintains the following aerial electric facilities within the project limits:

1. Delmarva maintains aerial facilities along the east side of US 13 from station 202+00 heading south.
2. Delmarva maintains aerial facilities on Delmarva Transmission facilities along the north side of New Burton Road within the Railroad right of way.
3. Delmarva maintains aerial facilities along the east side of Wyoming Mill Road.

Delmarva Power and Light Company (Distribution) maintains the following underground electric facilities within the project limits:

1. Delmarva maintains underground facilities along the west side of Wyoming Mill Road.

Delmarva Power and Light Company (Distribution) proposed changes to the aerial facilities include but are not limited to:

The following DPL poles that contain distribution facilities and fiber optic cable will require relocation:

DPL will relocate the aerial facilities along the east side of Wyoming Mill Road at the Wyoming Mill Spur.

DelDOT station	DPL Pole #	Adjustment / Relocation
597+20R	48326/21101	Remove, install new pole 5'east at 596+70R
600+00R	48330/21128	Remove, install new pole 10'east at 598+80R
600+35R	New pole	Install new pole behind CZ
602+75R	48333/21156	Remove, install new pole 15'east at 602+60R
605+55R	48337/21184	Remove, install new pole 10'east at 604+75R
608+35R	48340/21212	Remove, install new pole 8'east at 607+00R
609+05R	New pole	Install new pole behind CZ

At the intersection of Wyoming Mill Road Spur and Wyoming Mill Road, DPL will install a new service pole location within R/W at the southeast corner of the intersection at approximate Wyoming Mill Road station 600+00, to be utilized for the proposed roadway lighting cabinet.

At the intersection of Wyoming Mill Road Spur and West Dover Connector, DPL will install a new service pole location within R/W at the northwest corner of the intersection at approximate West Dover Connector station 1069+90, to be utilized for the proposed roadway lighting cabinet.

At New Burton Road, DPL Distribution has relocated the underbuilds (aerial facilities) located on DPL transmission facilities to the new transmission poles.

DPL Pole #	Adjustment / Relocation
48442/20913 (attached to transmission pole)	Relocated underbuilt to new transmission pole
48423/20888 (attached to transmission pole)	Relocated underbuilt to new transmission pole
48410/20863 (attached to transmission pole)	Relocated underbuilt to new transmission pole

Delmarva Power and Light Distribution will complete these changes. DPL request 30 days advance notice to proceed.

Construction time for the Wyoming Mill portion is estimated at 20 calendar days. This work will be performed concurrent with highway construction.

DPL, Distribution completed the underbuilt work on the transmission facilities at New Burton in June, 2014.

The City of Dover Electric maintains the following aerial electric facilities within the project limits:

1. The City of Dover maintains aerial facilities along the east side of US 13 from station 204+45 heading north.

2. The City of Dover also maintains an aerial crossing of US 13 and facilities along the south side of existing Charles Polk Road and running along the back side of the properties.
3. The City of Dover maintains aerial facilities crossing the proposed West Dover Connector at station 1103+05
4. The City of Dover maintains aerial facilities along the south side of North Street in the area of the West Dover Connector intersection.
5. The City of Dover also maintains an aerial crossing of North Street and aerial facilities along the west side of Saulsbury Road.

The City of Dover Electric maintains the following underground electric facilities within the project limits:

1. The City of Dover maintains underground facilities crossing the proposed West Dover Connector at station 1103+65.

The City of Dover Electric proposed changes to the aerial facilities include but are not limited to:

1. The City of Dover will install a new aerial crossing of US 13 at station 207+08 at the tie-in of the proposed West Dover Connector.
2. The City of Dover will install new aerial facilities along the south side of the proposed West Dover Connector from station 1001+50 to 1003+12. From station 1003+12 the City of Dover will install underground facilities along the south side of the proposed West Dover Connector to station 1006+40 where the underground facilities will cross the proposed West Dover Connector and continue underground running along the south side of reconstructed Charles Polk Road to station 809+05. The City of Dover will install underground service crossings of Charles Polk Road at stations 802+20, 804+57, 806+60 and 809+05.
3. The City of Dover will install new service pole location(s) within R/W for roadway lighting cabinet and signal/ITMS (CCTV camera) cabinets at the southwest corner of West Dover Connector/US13 intersection, approximate West Dover Connector station 1000+90.
4. The City of Dover will relocate aerial facilities crossing the proposed West Dover Connector at station 1103+05. The City will install a new crossing at station 1103+50.
5. The City of Dover will shift its aerial facilities crossing North Street and running along Saulsbury Road to the west outside the proposed roadway widening. Proposed poles to be placed 60 ft. left of Station 112+30 and 45 ft. left of Station 114+20 along Saulsburg Road.
6. The City of Dover will install new service pole location(s) within R/W for roadway lighting cabinet and signal/ITMS (CCTV camera) cabinets at the northwest corner of West Dover Connector/North Street/Saulsbury Road intersection, approximate West Dover Connector stations 110+80 (signal/ITMS cabinets) and 112+80 (roadway lighting cabinet).

The City of Dover. will complete these changes. The following relocations/adjustments are expected to take approximately:

1. US 13 and relocation work along the West Dover Connector / Charles Polk Road - The City of Dover to start construction once Eastern Shore Natural has completed their work in this area. The City of Dover's work is expected to start in September / October and take approximately eight (8) weeks.
2. West Dover Connector 69 KV transmission crossing - The City's anticipated construction start date for the relocations / adjustments is October, 2014. This work is expected to take approximately two (2) weeks.
3. Relocation of the pole line at the West Dover Connector and Saulsbury Road – This work will be performed concurrent with highway construction and is expected to take approximately two (2) weeks.

Delaware Electric Cooperative Inc. maintains the following aerial electric facilities within the project limits:

1. Delaware Electric maintains aerial facilities along the south side of New Burton Road.

Delaware Electric proposed changes to the aerial facilities include but are not limited to:

1. Delaware Electric to relocate aerial facilities underground in the area of the proposed West Dover Connector bridge over New Burton Road. Delaware Electric to retire poles 78208, 78209, 78210 and 103951 and overhead wires. Install underground facilities (trench and place 1/0 cable) from pole #78207 to pole #103959.
2. Delaware Electric will install new service pole location(s) within R/W for roadway lighting cabinet and signal/ITMS (CCTV camera) cabinets at the southwest corner of West Dover Connector/New Burton Road Spur intersection, approximate West Dover Connector station 1039+65.
3. Delaware Electric will install new service pole location(s) from New Burton Road within R/W for the ITMS cabinet (Roadway Weather Information System cabinet) at approximate West Dover Connector station 1053+10, adjacent the New Burton Road bridge crossing.

Delaware Electric will complete these changes. Their anticipated construction start date for the relocations / adjustments is October, 2014. This work is expected to take approximately 15 working days.

Verizon of Delaware Inc. maintains the following aerial facilities within the project limits:

1. Verizon maintains aerial facilities (3-4 cables) along the west side of US 13 within the project limits.
2. Verizon maintains facilities (2 cables) along the south side of existing Charles Polk Road and running along the back side of the properties.
3. Verizon maintains aerial facilities (1 cable) along entrance right of station 1006+00 of the proposed West Dover Connector. Also, there is an aerial crossing of the entrance at 105 ft. right of station 1006+00.
4. Verizon maintains aerial facilities crossing the West Dover Connector at station 1013+57 and Charles Polk Road running north within the drainage easement.

Verizon of Delaware Inc. maintains the following underground facilities within the project limits:

1. Verizon has abandoned cable crossing at the entrance, 95 ft. right of station 1006+00 of the West Dover Connector.
2. Verizon maintains buried facilities along both sides of New Burton Road.
3. Verizon maintains buried facilities (3-5 cables) along the south side of North Street crossing the intersection of the proposed West Dover Connector.
4. Verizon maintains buried facilities along the north side of North Street crossing Saulsbury Road.
5. Verizon maintains buried facilities along the west side of Saulsbury Road. Five buried cable from the intersection to Pole # 12192 left of station 113+10. From station 113+10 heading north, one buried cable.
6. Verizon maintains 1 buried cable along the west side of Wyoming Mill Road.

Verizon of Delaware Inc. proposed changes to the aerial facilities include but are not limited to:

1. Verizon pole located left of station 307+23 on US 13 will be shifted approximately 50 ft. south. Cables will be transferred to the new pole. 1 cable to be removed on Pole # 77.Verizon will dead-end cable at Pole # 75-1, approximate location left of Station 310-15.
2. Verizon is to abandon aerial facilities along the south side of existing Charles Polk Road and running along the back side of the properties. Verizon to remove 6 poles at the rear of the properties.
3. Verizon will adjust aerial facilities (1 cable) from the north along entrance right of station 1006+00 to provide service to the properties.
4. Verizon is to abandon aerial facilities crossing the West Dover Connector at station 1013+57 and Charles Polk Road running north for 135 ft. within the drainage easement. New pole to be place at this location. Verizon to move Pole #25 back approximately 8 ft. towards pole # 24.

Verizon of Delaware Inc. proposed changes to the underground facilities include but are not limited to:

1. Verizon to relocate underground facilities along the southeast side of New Burton Road from station 704+00 to station 713+80 outside the proposed turn lanes. Verizon to move / replace cable approximately 50 ft. east of the existing cable, total footage of 1400 ft.
2. Verizon may require adjustments to their underground facilities along the northwest side of new Burton Road in the areas of Delmarva Power Transmission's pole replacement work. If required, Verizon will move the existing fiber cable approximately 10 ft. west, total footage of 1911 ft. plus coils.
3. Verizon to adjust / relocate buried facilities along North Street and Saulsbury Road. The following relocation work is outlined below:

- New hand hole (5 ft. x 5 ft.) to be place at North Street, 66 ft. right of Station 49+65.
- New conduit to be place along North Street from existing hand hole, 50 ft. right of Station 45+60, to new hand hole at Station 49+65, a total footage of approximately 400 feet. New fiber cables to be placed in the conduits.
- New conduit to be placed from new hand hole at North Street, Station 49+65, crossing the West Dover Connector at Station 1156+05 running east along North Street to existing pole, 45 ft. right of Station 55+40, a total footage of approximately 580 feet. New fiber cables will be placed in the conduits.
- New conduits are to be placed from new hand hole at North Street, Station 49+65 crossing North Street running along Saulsbury Rd to 45 ft. left of Station 114+00. New fibers will be placed in the conduits, a total footage of approx. 490 feet.
- Existing Pedestal at left of Station 113+00 will be removed and the cables will transferred to new pedestals.
- New pedestal will be placed 60 ft. left of Station 112+00 on Saulsbury Road. Existing cables will be swung into the new pedestal.
- New pedestal will be placed 45 ft. left of Station 113+90 on Saulsbury Road. Existing Cable will be swung into the new pedestal. New cable will be placed from new pedestal at Station 112+00 to new pedestal at Station 113+90, a total footage of approx. 210 Ft.

4. No impacts are anticipated on Verizon's buried cable along the west side of Wyoming Mill Road.

Verizon of Delaware Inc. will complete these changes.

Relocation work at US 13 and along Charles Polk Road – This work will be performed concurrent with highway construction and is expected to take approximately three (3) weeks.

Relocation work at New Burton Road – Verizon's anticipated construction start date is September / October, 2014. This work is expected to take approximately 3 weeks.

Relocation work at North Street and Saulsbury Road – This work will be performed concurrent with highway construction and is expected to take approximately ten (10) weeks.

No work can commence until the company has been given a minimum of 30 calendar days advance notice that work shall begin and the right-of-way and proposed work has been laid out in the field.

AT&T. maintains the following underground facilities within the project limits:

1. AT&T maintains a buried fiber cable along the north side of the railroad tracks within Railroad right of way. No conflicts are anticipated with road construction.

Comcast Cable Co. maintains the following aerial facilities within the project limits:

1. Comcast maintains facilities (cable & fiber) on the City of Dover Electric overhead facilities throughout the project limits. From station 203+50 thru 212+00 pages 1 and 2
2. Stations 1002+50 thru 1010+50 and to 1019+00 pages 4 & 5 these areas have fiber and coaxial cable that will be relocated (underground) within the new ROW along with the existing power companies involved.

Comcast Cable Co. proposed changes to the aerial facilities include but are not limited to:

1. Comcast will relocate cable and fiber to the City of Dover Electric's proposed relocated overhead facilities. Comcast will be required to relocate aerial facilities underground where the City of Dover Electric is replacing aerial facilities with underground facilities. Comcast will place their facilities in a joint trench with the City provided its acceptable by the City of Dover @ no charge to use their trench, otherwise Comcast will perform all necessary trenching / boring.

Comcast Cable Co. maintains the following underground facilities within the project limits:

1. Comcast has a small section of 2" pipe at New Burton Road.

Note: **Comcast has moratorium periods when they are not allowed to interrupt service.**

Example (holidays / special televised events without 2 weeks' notice and approval from corporate office

Comcast will complete these changes. These relocations/adjustments are expected to take approximately 60 (weather permitting) calendar days to complete after Delmarva Power and the City of Dover pole relocation work is complete in each relocation areas. Comcast's construction start dates depend on the completion date of the City of Dover and Delmarva Power aerial relocations in each area where attachment is required to the new poles.

Eastern Shore Natural Gas (ESNG) maintains the following facilities within the project limits:

1. **<u>West Dover Connector Station 1000+00 to 2012+00</u>**

   ESNG operates a 6.625" O.D. X 0.188" W.T. steel, coated, transmission pipeline centered in a 20' wide easement that meanders along the proposed West Dover Connector entering the proposed right-of-way at station 2012+00+/- and exiting the proposed right-of-way at station 1001+00+/-. The main crosses the proposed West Dover at stations 1017+00, 1022+50 and 2011+00.

2. **<u>New Burton Road Station - 709+31 to 731+62, 22'+/- RT.</u>**

ESNG operates a 10.75" O.D. X 0.219" W.T., steel, coated, transmission pipeline within the state right of way on the west side of New Burton Road.

3. **Intersection of West North Street and Saulsbury Road**

The following is a list of ESNG transmission pipelines that are operated in the intersection of West North Street and Saulsbury Road:

10.75" O.D. X 0.219 W.T., steel, coated (10" pipeline)
8.625" O.D. X 0.219 W.T., steel, coated (8" pipeline)
4.5" O.D. X 0.237 W.T., steel, coated (4" pipeline)

The 10" pipeline is located on westerly side Saulsbury Road, perpendicularly crosses to t the south side of W. North Street and parallels the south side W. North Street within the project limits.

The 8" pipeline interconnects to the 10" pipeline on the south side of W. North Street at station 50+53.32, 40' right. The 8" pipeline continues in a westerly direction paralleling W. North Street.

The 4" pipeline is located in the center of W. North Street from station 56+00 to 50+00 where it transitions to the south side of W. North Street continuing in a westerly direction.

Eastern Shore Natural Gas (ESNG) proposed changes to the following facilities within the project limits:

1. **West Dover Connector Station 1000+00 to 2012+00**

ESNG is proposing to relocate the 6.625" O.D. X 0.188" W.T. steel, coated, transmission pipeline and easement to the south side of the proposed West Dover Connector corridor abandoning the existing pipeline in place. The proposed pipeline will start at a point north of the proposed West Dover Connector right of way and perpendicularly cross at station 2012+00+/- and parallel the southern right-of-way to a point where it will reenter the existing ESNG 20' wide permanent easement at station 1016+00 +/- .The relocation will continuing in an easterly direction, crossing US 13 between station 305+00 and 307+50 (S.B. US 13). Please note exact location of the US 13 crossing is still to be determined.

ESNG will require approximately 50 calendar days to construct approximately 4,450' of a 6" steel pipeline segment, excluding weekends and holidays. This will also include the abandoning of the existing pipeline which will be purged with nitrogen and permanently sealed with welded end caps. ESNG's anticipated construction start date is August / September, 2014.

2. **New Burton Road Station - 709+31 to 731+62, 22'+/- RT.**

ESNG will relocate 400' +/- section of 10.75" O.D. X 0.219" W.T., steel, coated, transmission pipeline from station 709+50 to 713+50, 15.5' left within the new blacktop shoulder. The new location will make way for the proposed bridge pier, West Dover Connector, station 1053+56.59 and proposed concrete safety barrier, New Burton Road, station 709+00 to 713+00.

ESNG will require approximately 30 calendar days to construct this pipeline segment excluding weekends and holidays. This will also include the abandoning of the existing pipeline which will be purged with nitrogen and permanently sealed with welded end caps. ESNG's anticipated construction start date is August, 2014.

3. **Intersection of West North Street and Saulsbury Road**

ESNG will relocate the 10" pipeline to the west side of Saulsbury Road, starting at station 113+50+/-, crossing W North Street at station 50+00+/-, crossing the West Dover Connector at station 1155+50+/-, ending the relocation on the south side of W. North Street station 52+00+/-.

The 8" pipeline along with associated valve and fittings, will be relocated to the south side of Hazlettville Road starting at station 50+00+/-, continuing in a westerly direction and ending at station 46+50+/-

There is no relocation plan at this time. The 4" pipeline will be abandoned in place.

ESNG will require approximately 50 calendar days to complete both pipeline relocations within the intersection of W. North Street and Saulsbury Road, excluding weekends and holidays. This will also include the abandoning of the existing pipelines which will be purged with nitrogen and permanently sealed with welded end caps. This work will be performed concurrent with highway construction.

Chesapeake Utilities Corporation (CU) maintains the following facilities within the project limits:

1. CU maintains gas mains along both sides of US 13. 2 inch main crosses US 13 at station 211. A 4 inch HDPE gas main crossing the proposed West Dover Connector intersection.
2. CU maintains a 2 inch gas main along Charles Polk Road
3. CU maintains a 6 inch gas main along the southeast side of New Burton Road
4. From the west, CU maintains a 6 inch gas main along the north side of North Street and continues north along the west side of Saulsbury Road.

Chesapeake Utilities Corporation (CU) proposed changes to the following facilities within the project limits:

1. CU may need to adjust 4 inch gas main crossing proposed drainage pipe at station 306+44.
2. CU will retire gas services on the south side of Charles Polk Road. CU does not anticipate any major relocations of the gas main along Charles Polk Road just minor adjustments.
3. CU does not anticipate any relocations to the 6 inch gas main along the southeast side of New Burton Road
4. CU does not anticipate any relocations of the 6 inch gas main along the north side of North Street and continues north along the west side of Saulsbury Road.
5. CU to install a new 4 inch HDPE gas main from New Burton Road to the Boy Scouts. The main will be placed along the south side of the proposed New Burton Road Spur in close proximity to the right-of-way line.

Chesapeake Utilities will complete these changes. These relocations / adjustments are expected to take approximately 12 calendar days. This work will be performed concurrent with highway construction.

The City of Dover maintains the following water and sewer facilities within the project limits:

1. The City maintains existing sanitary sewer infrastructure on the west side of US 13 and Charles Polk Road.
2. The City maintains a water production well and appurtenances on the west side of US 13 and Charles Polk Road.
3. The City maintains water and sewer facilities along Charles Polk Road
4. The City maintains an 8 inch sewer main crossing the West Dover Connector at approximately station 1103+40 within the project limits.
5. The City maintains a 27 inch sewer main crossing the West Dover Connector at station 1108+95 within the project limits.
6. The City maintains water and sewer facilities along North Street
7. The City maintains water and sewer facilities along Saulsbury Road

The City of Dover proposed changes to the following water and sewer facilities within the project limits:

1. Relocate existing fire hydrant approximately 15 ft. south at Station 1002+90 of the proposed West Dover Connector. This work will be performed by the City of Dover.

2. Relocate existing fire hydrant on the east side of Saulsbury Road 65 ft. right of Station111+00. This relocation work will be incorporated in the construction contract. The contractor will perform this work.

Not associated with this project, the City of Dover intends to perform water and sewer main replacement / relocation work in Rodney Village and along relocated Charles Polk Road and other side roads. The utility work includes replacement of six manholes,

approximately 2,600 LF of 8" - 10" PVC sanitary sewers, sewer laterals, over 1,000 LF of 8" DIP water main, valves, water services, and hydrants. The City's anticipated construction start date is September 2014. This work is expected to take approximately 6 months.

Important Note: <u>The highway contractor and the City of Dover needs to closely coordinate with each other regarding the timing of the required construction activities of the two parties.</u>

Kent County maintains the following water and sewer facilities within the project limits:

1. Kent County maintains a 16 inch gravity interceptor sewer main that crosses US 13 at Station 305+50 and the proposed West Dover Connector at Station 1002+22 and runs along existing Charles Polk Road.

Kent County proposed changes to the following water and sewer facilities within the project limits:

1. Kent County to relocate the 16 inch gravity interceptor sewer main from approximately Station 809+00 on Charles Polk Road, crossing the proposed storm drain facilities and West Dover Connector, to a tie-in point on south side of the West Dover Connector at approximately Station 1017+20. Kent County to install 30 inch steel casings crossing the drainage facilities and the West Dover Connector.

Kent County's relocation work will be incorporated in the construction contract. The contractor will complete this work.

<u>General Notes</u>

1. Any additional relocations/adjustments that may be necessary will be performed by the Utility Company's forces during construction of the project. The time to complete any additional relocations/adjustments will depend upon the nature of the work, the required advance notice to the Utility Company, the need for the State's Contractor to stake out the right of way or proposed work, and any work that needs to be done by the State's Contractor in advance of the utility relocation/adjustment.

2. The contractor's attention is directed to Section 105.09 Utilities, Delaware Standard Specifications, August 2001.The Contractor shall contact Miss Utility (1-800-282-8555) two working days prior to any excavation. The Contractor is responsible for the support and protection of all utilities when excavating. The Contractor is responsible for ensuring proper clearances, including safety clearances, from overhead utilities for construction equipment. The contractor is advised to check the site for access purposes for his equipment and, if necessary, make arrangements directly with utility companies for field adjustments for adequate clearances.

3. It is understood and agreed that the contractor has considered in his bid all permanent and temporary utility appurtenances in their present of relocated positions as shown on the plans or described in the utility statement and/or are readily discernible and that no additional compensation will be allowed for any delays, inconvenience, or damage sustained by him/her to any interference from the utility facilities and appurtenances or the operation of moving the, except that the contractor may be granted an equitable extension of time.

4. The State's Contractor is responsible for rough grading as required by the roadway construction prior to the utility companies placing their proposed facilities unless indicated on the plans and/or outlined elsewhere in these specifications.

5. The Contractor shall follow all requirements of the Delaware Code, Title 26, Chapter 8. Underground Utility Damage Prevention And Safety. Chapter 8 includes, among other requirements, Section 806. Duties of Excavators which contains the requirement for the Contractor to excavate prudently and carefully and to take all reasonable steps necessary to properly protect, support and backfill underground utility lines. This protection shall include but may not be limited to hand digging, within the limits of the planned excavation or demolition, starting 2 feet of either side of the extremities of the underground utility line for other than parallel type excavations and at reasonable distances along the line of excavation for parallel type excavations.

6. Coordination and cooperation among the utilities and the State's Contractor are of prime importance, therefore, the Contractor is directed to contact the following Utility Representatives with any questions in regard to this work prior to submitting bids and work schedules. Proposed work schedules should reflect the Utility Company's proposed relocations.

7. As outlined in Chapter 3 of the DelDOT Utilities Manual, individual utility companies owning the utility facilities and performing work associated with the project are responsible for obtaining all required permits from municipal, State and federal government agencies and railroads. This includes but is not limited to water quality permits/DNREC Water Quality Certification, DNREC Subaqueous Lands/Wetlands permits, DNREC Coastal Zone Consistency Certification, County Floodplain permits (New Castle County only), U.S. Coast Guard permits, US Army Corps 404 permits, sediment and erosion permits, and railroad crossing permits.

8. Individual utility companies having work associated with the project are required to restore any areas disturbed in conjunction with their relocation work. If an area is disturbed by a utility company and is not properly restored, the Department may have the highway contractor perform the necessary restoration. Any additional costs incurred as a result will be forwarded to the utility company.

Mr. Matthew Parkhurst	Delmarva Power Transmission	(302)-454-4850
Mr. Bill McBane	Delmarva Power Distribution	(302)-934-3358

Mr. Tom Wright	Delaware Electric Cooperative, Inc.	(302)-349-3130
Mr. Aren Wright	City of Dover Electric	(302)-736-7070
Mr. George Zang	Verizon Delaware Inc.	(302)-422-1238
Mr. Bruce Turner	Comcast Cable	(302)-632-1470
Ms. Melissa Koenig	Chesapeake Utilities Corporation	(302)-734-6797, Ext.6059
Mr. Jason Woody	Eastern Shore Natural Gas	(302)-734-6710, Ext.6169
Mr. Jason Lyon	City of Dover, Water & Sewer	(302)-736-7025
Mr. Robert Pierce	Kent County, Water & Sewer	(302)-744-2430

PREPARED AND RECOMMENDED BY:

Cardno TBE — 7-14-14 DATE

APPROVED AS TO FORM BY:

UTILITIES SECTION, DELDOT — 7/14/14 DATE

ACTIVITY	CALANDER YEAR 2014												CALANDER YEAR 2015												CALANDER YEAR 2016												CALANDER YEAR 2017											
NTP	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Phase 1 (off-alignment work)										■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■																		
Phase 2 (tie-in work)																															■	■	■	■	■	■	■	■	■	■	■	■	■						
UTILITY RELOCATION																																																
DPL Trans.						■																																										
DPL Dist.						■																													■													
ESNG								■	■	■		■	■																																			
COD Elec.										■	■	■			■																																	
Verizon										■	■						■	■																														
Comcast												■	■																																			
DEC										■	■																								■													
Chesapeake											■																																					
COD Water/Sewer (independent of WDC project)									■	■	■	■	■																																			

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
PO BOX 778
DOVER, DELAWARE 19903

CERTIFICATE OF RIGHT-OF-WAY STATUS

STATE PROJECT NO. T200411701

F.A.P. NO. N/A for R/W

WEST DOVER CONNECTOR

KENT COUNTY

Certificate of Right-of-Way Status - Stipulated

Status - Level 3

The State is requesting authorization for advertisement for bids or force-account work and construction due to the need to commence construction on the above captioned project in 2014 in order to avoid additional impact to the traveling public due to lengthened construction schedules and avoid the loss of funding. As required by 23 CFR, Part 635, and other pertinent Federal and State regulations or laws, the following certifications are hereby made in reference to this highway project:

All necessary rights-of-way, including control of access rights when pertinent, have not been fully acquired due to the acquisition or right of occupancy and use of the following remaining parcels not being complete

- **Parcel 1-R** Rodney Village Shopping Center
  Status: Agreement in settlement
  ROW Clear Date: October 10, 2014.

- **Parcel 10-R and 11-R** Kesselring Home Farms, LLC.
  Status: Offer made September 3, 2014
  ROW Clear Date: February 6, 2015.

- **Parcel 12-R** Kesselring Company, LLC
  Status: Agreement in process
  ROW Clear Date: February 6, 2015.

- **Parcel 201-R and 201-L** Farm Lands, LP.
  Status: Agreement in process
  ROW Clear Date: January 5, 2015

- **Parcel 3-L** Kent County
  Status: Agreement in settlement
  ROW Clear Date: October 10, 2014.

- **Parcel 19-L and 19-AL** Boy Scouts of America
  Status: Agreement in process
  (Right of Entry Granted)
  ROW Clear Date: January 5, 2015

- **Parcel 20-L** General Foods
  Status: Agreement in process
  ROW Clear Date: February 6, 2015

- **Parcel 104-L** Roadway Express
  Status: Agreement in process
  ROW Clear Date: January 5, 2015

- **Parcel 13-R and 501-R** Norfolk Southern
  Status: RR Agreement received including ROE for construction.
  ROW Clear Date: February 6, 2015

All necessary real property interests have been or shall be acquired in accordance with current FHWA/State directives covering the acquisition of real property; and,

All owners have been provided their written confirmation of the State's offer of Just Compensation, the State's approved appraisal report and other related documents, and,

The State shall ensure that any occupants of residences, businesses, farms, or non-profit organizations or owners of personal property to be removed and who have not yet moved from the right-of-way are protected against unnecessary inconvenience and disproportionate injury or any action coercive in nature.; and,

All occupants of the residences on such parcels as applicable have had replacement housing made available to them in accordance with 49 CFR 24.204; and,

All other residential displaced individuals or families have been relocated to decent, safe and sanitary housing in accordance with the provisions of the current Federal Highway Administration (FHWA) directive(s) covering the administration of the Highway Relocation Assistance Program; and,

Appropriate notification shall be provided in the bid proposals identifying all locations where right of occupancy and use has not been obtained; and,

Any additional project costs resulting from non-availability of right-of-way will be non-participating and,

REAL ESTATE SECTION

Robert Cunningham,
Assistant Director Transportation Solution
Right of Way

September 3, 2014

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
800 BAY ROAD
P.O. BOX 778
DOVER, DELAWARE 19903

SHAILEN P. BHATT
SECRETARY

July 31, 2014

ENVIRONMENTAL REQUIREMENTS

FOR
State Contract No. T200411701
Federal Aid No.: ESTP-2011(17)

Contract Title: West Dover Connector

In accordance with the procedural provisions for implementing the National Environmental Policy Act of 1969, as amended, the referenced project has been processed through the Department's Environmental Review Procedures and has been classified as a Level D/ Class II Action. As such, a Categorical Exclusion has been prepared to evaluate potential adverse impacts to result from construction of the proposed action (per 23 CFR 771.117 d(3)) and the following special provisions have been developed to mitigate and/or minimize these impacts.

PERMIT REQUIREMENTS:

The construction work that will include the construction of the West Dover Connector which will extend a new highway from W. North Street to U.S. 13 near the intersection of Charles Polk Road in Dover, Kent County, Delaware requires permit approval from those agencies listed below. It is the responsibility of the contracting agency, the Delaware Department of Transportation, Division of Transportation Solutions to obtain the necessary permits to ensure that the contractor complies with the requirements and conditions established by the regulatory agencies. The permit coordination for this project is complete, however written authorization from the permitting agencies is not required and paperwork for on-site posting should not be anticipated. As such, the construction work that will occur as part of the West Dover Connector project is authorized under the permits/exemptions listed below:

REQUIRED PERMITS AND APPROVAL STATUS:

- U.S. Army Corps of Engineers (COE) - Nationwide Permit (NWP) #14, CENAP-OP-R-2012-1320-1, **issued 7/9/14, expires 3/18/17**

- DNREC WLSL: Project is consistent with Delaware Code Chapter 72, Section 7217, Special Exemption (a), as amended by Senate Bill 186 (fyi email sent 7/30/14 – concurrence received 7/31/14)

- DNREC Water Quality (WQC) and Coastal Zone Consistency (CZM): Issued (Project is not located within a CRW)

- City of Dover – Floodplain approval for Puncheon Run (BR 2-156)

SPECIFIC REQUIREMENTS:

Compliance with all requirements of the permits is the responsibility of the contractor will follow all special conditions or requirements as stated within those permits. The contractor will be subject to penalties, fines, and the risk of shut down as mandated by laws governing permitting agencies if such are violated or ignored. Therefore, all special conditions, general requirements, and/or other required provisions specified within the permits must be followed. Those obligations are indicated or listed within the permit package, which can be obtained from the DelDOT Contract Administration Office.

Additional requirements by DelDOT not specified within the permits, but listed below, is also the responsibility of the contractor and is subject to risk of shut down at the contractor's expense.

1. The contractor shall employ measures during construction to prevent spills of fuels, or lubricants, if a spill should occur, efforts shall be undertaken to prevent its entry into wetlands, aquatic, or drainage areas. Any spills entering wetlands, aquatic, or drainage areas shall be removed immediately. The Division of Water Resources (DNREC), Wetlands & Aquatic Protection Branch, 302-739-4691, shall be notified of any spill(s) within six (6) hours of their occurrence. That office will determine the effectiveness of spill and contamination removal and specify remediation efforts as necessary.

2. All construction debris, excavated material, brush, rocks, and refuse incidental to such work shall be placed either on shore above the influence of flood waters or on some suitable disposal site approved by the department.

3. The disposal of trees, brush, and other debris in any stream corridor, wetland surface water or any drainage ditch is prohibited.

4. There shall be no stockpiling of construction materials or temporary fills in wetlands or subaqueous lands unless otherwise specified on project plans and approved by permitting agencies that govern them. It is the contractor's responsibility to coordinate and secure those additional permits/amendments in deviating from the plan.

5. The effort shall be made to keep construction debris from entering adjacent waterways, wetlands, ground cover, or drainage areas. Any debris that enters these areas shall be removed immediately. Netting, mats, or establishing confined work areas in stages may be necessary to address these issues.

6. If routine maintenance of worker equipment and heavy machinery is necessary during the construction period, refuse material is prohibited from being disposed or deposited onto or into the ground. All used oils and filters must be recycled or disposed of properly.

7. Harmful chemical wash water applied to clean equipment or machinery shall be discouraged. If undertaken, the residue water and/or material must be collected or contained such that it will be disposed of properly. By no means, shall it be deposited or disposed of in waterways, streams, wetlands, or drainage areas.

8. The contractor shall follow all requirements as indicated in the Environmental Compliance Sheet. It will be the contractor's responsibility, expense, & effort to ensure that workers also follow this requirement. As part of the restrictions, please note the timetables reflected in the contract for the in-stream/water work for endangered species protection.

9. That the fill material shall be free of oil and grease, debris, wood, general refuse, plaster and other pollutants, and shall contain no broken asphalt.

ENVIRONMENTAL COMPLIANCE SHEET:

The contractor shall pay special attention to Project Specific Special Conditions as indicated in the U.S. Army Corps of Engineers Nationwide #14 permit.

1. Specifically, note Condition #5 which states that "Construction activities associated with the proposed project shall comply with the Memorandum of Agreement prepared in cooperation with and signed by the Delaware Historic Preservation Officer, Delaware Department of Transportation and the Federal Highway Administration regarding implementation of the West Dover Connector Project Kent County Delaware. The MOA was signed by FHWA on 5/7/2012 as the lead Federal Agency pursuant to the National Historic Preservation Act."

The contractor shall pay special attention to specific construction requirements as indicated in the Environmental Compliance Sheet for the **Tributary to Isaac Branch (STA 1015+50)**.

1. As per the Project Specific Special Conditions of the U.S. Army Corps of Engineers Nationwide #14, "based upon the limited and irregular flow associated with the unnamed tributary to Isaac's Branch, the seasonal restriction for in-water work is waived for the fill activities associated with the proposed crossing of the unnamed tributary of Isaac's Branch." Therefore, the time of year restriction indicated in under Note #2B Fisheries on Sheet 203 does not apply.

2. Specifically, please note the environmental requirements as indicated in Note #3 on Sheet 203 for Cultural Resource Issues.

3. Specifically, please note the environmental requirements as indicated in Note #4 on Sheet 203 for Stream Restoration and Slope Riprap Treatment.

4. Specifically, please note the environmental requirements as indicated in Note #5 for Clearing in Wetland Areas.

5. Please note the environmental requirements specified in Note #6 on sheet 203 for Staging, Stockpiling, and Disposal.

6. Please note the environmental requirements specified in Note #7 on sheet 203, which addresses notifying the Environmental Studies Office for any changes to approved plans.

The contractor shall pay special attention to specific construction requirements as indicated in the Environmental Compliance Sheet for the **Puncheon Run (BR 2-156)**

1. Please note the environmental requirement as indicated in Note 2B on Sheet 204, **in-stream work at this site should be avoided from March 1 to June 30 (inclusive)**

2. Specifically, please note the environmental requirements as indicated in Note #3 on Sheet 204 for Cultural Resource Issues

3. Specifically, please note the environmental requirements as indicated in Note #4 on Sheet 204 for Clearing in Wetland Areas.

4. Please note the environmental requirements specified in Note #5A-H on Sheet 204 for the construction of a Wetland Access Road.

5. Specifically, please note the environmental requirements in Note #6 on Sheet 204 for Planting of Wetland Access Road.

6. Please note the environmental requirements specified in Note #7 on sheet 204 for Staging, Stockpiling, and Disposal.

7. Please note the environmental requirements specified in Note #8 on sheet 204, which addresses notifying the Environmental Studies Office for any changes to approved plans.

PERMIT TO ENTER PROPERTY

NORFOLK SOUTHERN RAILWAY COMPANY

West Dover Connector
State Contract No. T200411701
Proposed Crossings over Norfolk Southern
MP DM-48.75 General Foods Lead – BR0129220 &
MP DM-49.75 Main Line – BR0129221

July 1, 2014

Temporary permission is hereby granted to the Delaware Department of Transportation, P.O. Box 778, Dover, DE 19903 (hereinafter called **"Permittee"**, to enter property operated by the Norfolk Southern Railway Company, 1200 Peachtree Street Atlanta, GA 30309 (hereinafter called **"Railroad"**), for the purpose of implementing the improvements listed below for this crossing, located in the State of Delaware under the following terms and conditions set forth below:

1. LOCATION AND ACCESS.

The following crossing and property adjacent to the track operated by Railroad, are covered by this Temporary Permit and are hereinafter called **"Property"**:

- **West Dover Connector (State Contract No. T200411701) Proposed Crossings Over Norfolk Southern at:**
  - **MP DM-48.75, General Foods Lead – BR0129220**
  - **MP DM-49.75, Main Line – BR0129221**

The work generally includes the construction of two separate highway bridges over the railroad property at approximate Stations 1054+00 and 1109+00 per the West Dover Connector Construction Documents.

2. INDEMNIFICATION. **Permittee** will require its contractor(s) to defend, indemnify and hold harmless **Railroad**, its officers, directors, employees, agents, servants, successors, assigns and subsidiaries, irrespective of its negligence or fault, from and against any and all losses and liabilities, penalties, fines, forfeitures, demands, claims, causes of action, suits, costs and expenses incidental thereto (including cost of defense, and attorney's fees), which any or all of them may hereafter incur, be responsible for, or pay as a result of injury, death, disease, or occupational disease to any person, and for damage (including loss of use) to or loss of any property of **Railroad**, arising out of or in any degree directly or indirectly caused by or resulting from activities of or work performed on behalf of **Permittee**. The foregoing obligation shall not be limited by the existence of any insurance policy or by any limitation on the amount or type of damages, compensation, or benefits payable by or for **Permittee** or any contractor or subcontractors, and shall survive the termination of this Temporary Permit for any reason.

Permittee shall, during the period of occupation of the Property, require its contractor to hold **Permittee** and the **Railroad** harmless from any and all action or claims of damages, accident, injury or death caused by or arising out of **Permittee's** project; and require all contractors working upon the **Property** to be adequately insured against such liability.

As used in this paragraph, the **"Railroad"** includes the Norfolk Southern Railway Company and their respective officers, directors, employees, agents, servants, successors, assign and subsidiaries.

3. STARTING OF USE OF PROPERTY. **Permittee** shall notify **Railroad's** Division Engineer or its designee, at least fourteen (14) days in advance before entering upon, or starting any work on, the **Property**. No entry upon or use of the **Property** will be permitted until a fully executed copy of this Temporary Permit is returned to **Railroad**, and specific permission to enter upon the **Property** received from the Division Engineer who is Mr. L. E. Swoap, Division Engineer, Norfolk Southern Railway Company, 4600 Deer Path Rd., Harrisburg, PA 17110, Telephone (717) 541-2112.

4. RAILROAD OPERATIONS. All operations of **Permittee** and its contractor(s) shall be performed so as not to interfere with **Railroad's** operations or with any of **Railroad's** facilities. In no event shall personnel, equipment or material cross a track or tracks without special advance permission from **Railroad's** Division Engineer or his designee. If, in the opinion of **Railroad's** Division Engineer or his designee, conditions warrant at any time, **Railroad** will provide flagging service and/or other protection at the sole cost and expense of **Permittee**, and **Permittee** agrees to pay to **Railroad** and full cost and expense therefore within thirty (30) days of receipt of **Railroad's** bill or invoice.

5. CLEARANCES. All equipment and material of **Permittee** and its contractor(s) shall be kept at all time not less than fifteen (15) feet from the centerline of the outside track, unless specifically otherwise authorized in writing by **Railroad's** Division Engineer or his designee. **Permittee** and its contractor(s) shall conduct all operations so that no part of any equipment shall foul an operated track, transmission, communication or signal line, or any other structure or facility of **Railroad**.

6. RESTORATION OF PREMISES. Upon completion of its work, **Permittee** and its contractor(s) shall, at the option of **Railroad**, (a) leave the **Property** in a condition satisfactory to **Railroad** or, (b) restore the **Property** to its original condition. This may include, without limitation, the restoration of any fences removed or damaged by **Permittee** or its contractor(s).

7. TERM OF PERMIT. **Railroad** reserves the right to revoke this Temporary Permit at any time. Unless subsequently modified, this Temporary Permit shall extend until **December 31, 2018** at which time it shall expire automatically. **Permittee** agrees to notify **Railroad** when use of the property or work is completed. Under no circumstances shall this Temporary Permit be construed as granting to **Permittee** or its contractor(s) any right, title or interest of any kind or character in, on, or about any property of **Railroad**.

8. INSURANCE. Before **Permittee** commences any work in, on, or about the **Property, Permittee** or its contractor(s) shall furnish **Railroad**, with evidence of its Workmen's Compensation, Public Liability and Property Damage, and other coverage, as specified in the **Railroad's** Special Provision for the Protection of Railway Interest, attached hereto and made a part hereof (hereinafter "Special Provisions"). In the Special Provisions attached hereto, the term "Department" is deemed to mean Permittee.

9. PROTECTION. All work in, on, or about the **Property** shall be in accordance with the Special Provisions for Protection of Railway Interest, (**Exhibit C**) attached.

10. COMPLIANCE BY PERMITTEE'S CONTRACTOR. **Permittee** shall take all steps necessary to assure that its contractor(s) complies with the terms and conditions of this Temporary Permit.

11. BASIS OF PAYMENT. The entire cost of this project will be borne by the **Permittee** and the **Permittee** will reimburse the **Railroad** for the actual cost of the labor, materials, equipment leasing, and other services furnished by the **Railroad,** including the preliminary engineering performed by the **Railroad** from the date of original authorization. Force Account Estimate (**Exhibit A and B**) attached.

It is hereby agreed that any supplementary estimates, which may subsequently be approved by the **Permittee** and **Railroad**, shall also be made a part of the project.

All reimbursable charges in connection with the project will be subject to an audit.

Billing will be made and payment sought:

1. Immediately following completion of preliminary design work.

2. Immediately upon arrival of materials ordered by **Railroad** and the accompanying receipt, of shipping notice or invoice.

3. Upon presentation of bill for completed work from contractors or monthly progressive bills if the project cannot be completed within one month.

4. Upon completion of work by **Railroad**.

A final bill shall be submitted to the **Permittee** within 90 days of construction completion and the **Permittee** will, within sixty (60) days of receipt and completion of review thereof, pay said final bill.

In the event difficulties arise in securing necessary State and Federal approvals which render it impracticable to utilize funds from current appropriations for the construction of a specific project, **Permittee** or **Railroad** may, at any time before actual construction is started, pursuant to proper authority and approval, serve written notice of cancellation upon the other party; in such event, this Temporary Permit shall thereupon become null and void insofar as the specific project is concerned. It is understood and agreed that in the event of cancellation by the **Permittee**, **Permittee** shall reimburse the **Railroad** all cost and expense incurred by the **Railroad** prior to the receipt of notice of cancellation. In the event of a cancellation originated by **Railroad**, **Railroad** shall not be entitled to reimbursement for the costs it incurred prior to cancellation of the project.

{SIGNATURE PAGE TO FOLLOW}

To confirm acceptance of this Temporary Permit, one fully executed copy will be retained by: Office of Chief Engineer Attn: Bridges & Structures System Engineer Norfolk Southern Corporation Public Improvements 1200 Peachtree Street NE, Internal Box 142 Atlanta, Georgia 30309
The second copy will be retained for our file.

AGREED TO AND ACCEPTED:

DELAWARE DEPARTMENT OF TRANSPORTATION

By: _____
Robert McCleary, P.E., Chief Engineer

Date: 7/02/14

By: _____
Martha Dobson,
Director of Technology and Support Services

Date: 7/7/14

NORFOLK SOUTHERN RAILWAY COMPANY

By: _____

Date: 8-21-14

APPROVED AS TO FORM

_____
Frederick H. Schranck
Delaware Deputy Attorney General

BID PROPOSAL FORMS

CONTRACT T200411701.01

FEDERAL AID PROJECT ESTP-2011(17)

CONTRACT ID: T200411701.01 PROJECT(S): ESTP-2011(17)

All figures must be typewritten.

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
	SECTION 0001 WEST DOVER CONNECTOR					
0010	201000 CLEARING AND GRUBBING	LUMP	LUMP			
0020	202000 EXCAVATION AND EMBANKMENT	347615.000 CY				
0030	202505 SETTLEMENT PLATFORM	4.000 EACH				
0040	202508 WETLAND ACCESS ROAD, TYPE II	LUMP	LUMP			
0050	208000 EXCAVATION AND BACKFILLING FOR PIPE TRENCHES	2181.000 CY				
0060	208001 FLOWABLE FILL	183.000 CY				
0070	209001 BORROW, TYPE A	16435.000 CY				
0080	209002 BORROW, TYPE B	21111.000 CY				
0090	209006 BORROW, TYPE F	62733.000 CY				

CANNOT BE USED FOR BIDDING

CONTRACT ID: T200411701.01 PROJECT(S): ESTP-2011(17)

All figures must be typewritten.

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0100	210000 FURNISHING BORROW TYPE "C" FOR PIPE, UTILITY TRENCH, AND STRUCTURE BACKFILL	1625.000 CY				
0110	211000 REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LUMP	LUMP			
0120	212000 UNDERCUT EXCAVATION	16889.000 CY				
0130	212001 UNDERCUT EXCAVATION, PATCHING	338.000 CY				
0140	251000 SILT FENCE	8743.000 LF				
0150	251001 REINFORCED SILT FENCE	1131.000 LF				
0160	252000 INLET SEDIMENT CONTROL, DRAINAGE INLET	31.000 EACH				
0170	252001 INLET SEDIMENT CONTROL, CURB INLET	124.000 EACH				
0180	254000 STONE CHECK DAM	842.000 TON				
0190	255000 SEDIMENT TRAP	3280.000 CY				

CANNOT BE USED FOR BIDDING

CONTRACT ID: T200411701.01 PROJECT(S): ESTP-2011(17)

All figures must be typewritten.

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0200	260003 EARTH DIKE, TYPE B-1	382.000 LF				
0210	261001 TEMPORARY SLOPE DRAIN, 18"	790.000 LF				
0220	268000 STABILIZED CONSTRUCTION ENTRANCE	638.000 TON				
0230	272500 SKIMMER DEWATERING DEVICE	5.000 EACH				
0240	272501 POND OUTLET STRUCTURE, SPECIAL	LUMP	LUMP			
0250	302006 GRADED AGGREGATE BASE COURSE, TYPE B, PATCHING	87.000 TON				
0260	302007 GRADED AGGREGATE BASE COURSE, TYPE B	31997.000 CY				
0270	302011 DELAWARE NO. 3 STONE	2373.000 TON				
0280	401577 PAVER-LAID ULTRATHIN HOT MIX	27666.000 SY				
0290	401801 BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS PG 64-22 (CARBONATE STONE)	3045.000 TON				

CANNOT BE USED FOR BIDDING

CONTRACT ID: T200411701.01 PROJECT(S): ESTP-2011(17)

All figures must be typewritten.

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0300	401816 BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG 76-22	17430.000 TON				
0310	401819 BITUMINOUS CONCRETE, SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 160 GYRATIONS, PG 64-22	31245.000 TON				
0320	401821 BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22, PATCHING	356.000 TON				
0330	401822 BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG 64-22, PATCHING	349.000 TON				
0340	401823 BITUMINOUS CONCRETE, SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 160 GYRATIONS, PG 64-22, PATCHING	625.000 TON				
0350	401833 BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 76-22, (NON-CARBONATE STONE)	14735.000 TON				
0360	503001 PATCHING P.C.C. PAVEMENT, 6' TO 15', TYPE A	192.000 SY				
0370	503006 DOWEL BARS	528.000 EACH				

CANNOT BE USED FOR BIDDING

CONTRACT ID: T200411701.01 PROJECT(S): ESTP-2011(17)

All figures must be typewritten.

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0380	503503 PATCHING CONCRETE	2304.000 SYIN	5.65000		13017.60	
0390	503521 JOINT REPLACEMENT, TRANSVERSE	864.000 LF				
0400	612021 REINFORCED CONCRETE PIPE, 15", CLASS IV	8326.000 LF				
0410	612022 REINFORCED CONCRETE PIPE, 18", CLASS IV	3416.000 LF				
0420	612023 REINFORCED CONCRETE PIPE, 24", CLASS IV	1243.000 LF				
0430	612024 REINFORCED CONCRETE PIPE, 27", CLASS IV	193.000 LF				
0440	612025 REINFORCED CONCRETE PIPE, 30", CLASS IV	124.000 LF				
0450	612030 REINFORCED CONCRETE PIPE, 18", CLASS V	183.000 LF				
0460	612032 REINFORCED CONCRETE PIPE, 15", CLASS V	155.000 LF				
0470	612034 REINFORCED CONCRETE PIPE, 36", CLASS IV	761.000 LF				

CANNOT BE USED FOR BIDDING

CONTRACT ID: T200411701.01 PROJECT(S): ESTP-2011(17)

All figures must be typewritten.

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0480	612049 REINFORCED CONCRETE PIPE, 12", CLASS V	7.000 LF				
0490	614744 STEEL CASING PIPE, 18"	144.000 LF				
0500	617002 REINFORCED CONCRETE FLARED END SECTION, 15"	9.000 EACH				
0510	617003 REINFORCED CONCRETE FLARED END SECTION, 18"	9.000 EACH				
0520	617005 REINFORCED CONCRETE FLARED END SECTION, 24"	9.000 EACH				
0530	617006 REINFORCED CONCRETE FLARED END SECTION, 27"	2.000 EACH				
0540	617007 REINFORCED CONCRETE FLARED END SECTION, 30"	1.000 EACH				
0550	617515 HEADWALL	2.000 EACH				
0560	617517 HEADWALL, SPECIAL TYPE I	2.000 EACH				
0570	701010 PORTLAND CEMENT CONCRETE CURB, TYPE 1-8	135.000 LF				

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CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0580	701011 PORTLAND CEMENT CONCRETE CURB, TYPE 2	10184.000 LF				
0590	701021 INTEGRAL PORTLAND CEMENT CONCRETE CURB & GUTTER, TYPE 2	837.000 LF				
0600	701022 INTEGRAL PORTLAND CEMENT CONCRETE CURB & GUTTER, TYPE 3-8	27901.000 LF				
0610	705001 P.C.C. SIDEWALK, 4"	18305.000 SF				
0620	705002 P.C.C. SIDEWALK, 6"	30827.000 SF				
0630	705007 SIDEWALK SURFACE DETECTABLE WARNING SYSTEM	1050.000 SF				
0640	705008 CURB RAMP, TYPE 1	1256.000 SF				
0650	705009 CURB RAMP, TYPE 2, 3, AND/OR 4	4755.000 SF				
0660	705010 CURB RAMP, TYPE 5	1708.000 SF				
0670	707005 UNDERDRAIN OUTLET	33.000 EACH				

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CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0680	708050 DRAINAGE INLET, 34" X 18"	27.000 EACH				
0690	708051 DRAINAGE INLET, 34" X 24"	55.000 EACH				
0700	708052 DRAINAGE INLET, 48" X 30"	32.000 EACH				
0710	708053 DRAINAGE INLET, 48" X 48"	3.000 EACH				
0720	708055 DRAINAGE INLET, 66" X 48"	1.000 EACH				
0730	708057 DRAINAGE INLET, 72" X 24"	18.000 EACH				
0740	708058 DRAINAGE INLET, 72" X 48"	6.000 EACH				
0750	708060 REPLACE DRAINAGE INLET GRATE(S)	5.000 EACH				
0760	708107 MANHOLE, ROUND	6.000 EACH				
0770	708505 JUNCTION BOX, SPECIAL	1.000 EACH				

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CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0780	710001 ADJUSTING AND REPAIRING EXISTING DRAINAGE INLET	17.000 EACH				
0790	710002 ADJUSTING AND REPAIRING EXISTING MANHOLE	34.000 EACH				
0800	710501 CONVERTING EXISTING CATCH BASIN TO MANHOLE	13.000 EACH				
0810	712005 RIPRAP, R-4	691.000 SY				
0820	712006 RIPRAP, R-5	244.000 SY				
0830	712531 CHANNEL BED FILL	36.000 CY				
0840	713002 GEOTEXTILES, SEPARATION	15701.000 SY				
0850	713003 GEOTEXTILES, RIPRAP	1562.000 SY				
0860	715001 PERFORATED PIPE UNDERDRAINS, 6"	32684.000 LF				
0870	715500 UNDERDRAIN OUTLET PIPE, 6"	1170.000 LF				

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CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0880	718511 CURB/SIDEWALK OPENING	10.000 EACH				
0890	720050 GALVANIZED STEEL BEAM GUARDRAIL, TYPE 1-31	5205.000 LF				
0900	720529 P.C.C. SAFETY BARRIER PERMANENT, SINGLE FACE	199.000 LF				
0910	720585 GUARDRAIL END TREATMENT ATTENUATOR, TYPE 1-31	10.000 EACH				
0920	720586 GUARDRAIL END TREATMENT ATTENUATOR, TYPE 2-31	9.000 EACH				
0930	725001 GUARDRAIL TO BARRIER CONNECTION (EXIT TYPE 31)	6.000 EACH				
0940	725002 GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 1-31	4.000 EACH				
0950	725003 GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 2-31	8.000 EACH				
0960	725005 GUARDRAIL TO BARRIER CONNECTION (EXIT TYPE 27)	2.000 EACH				
0970	725007 GUARDRAIL TO BARRIER CONNECTION , APPROACH TYPE 2-27	2.000 EACH				

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CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0980	726001 END ANCHORAGE 31	7.000 EACH				
0990	727014 CONSTRUCTION SAFETY FENCE	6126.000 LF				
1000	727015 MONUMENTS	23.000 EACH				
1010	727552 RESOURCE PROTECTION FENCE	3200.000 LF				
1020	727555 RIGHT-OF-WAY MARKER, CAPPED REBAR	77.000 EACH				
1030	733001 TOPSOILING, 4" DEPTH	749.000 SY				
1040	733002 TOPSOILING, 6" DEPTH	271681.000 SY				
1050	734013 PERMANENT GRASS SEEDING, DRY GROUND	375697.000 SY				
1060	734015 PERMANENT GRASS SEEDING, WET GROUND	63621.000 SY				
1070	734017 TEMPORARY GRASS SEEDING, DRY GROUND	294328.000 SY				

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CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
1080	734531 STREAMBANK SEED MIX	6032.000 SY				
1090	734551 NATIVE GRASS SEEDING: NO MOW MIX	4883.000 SY				
1100	734553 WETLAND MITIGATION GRASS SEEDING	9946.000 SY				
1110	735535 SOIL RETENTION BLANKET MULCH, TYPE 5	61254.000 SY				
1120	737523 PLANTINGS	LUMP	LUMP			
1130	743000 MAINTENANCE OF TRAFFIC	LUMP	LUMP			
1140	743004 FURNISH AND MAINTAIN PORTABLE CHANGEABLE MESSAGE SIGN	154.000 EADY				
1150	743006 PLASTIC DRUMS	27643.000 EADY				
1160	743007 TRAFFIC OFFICERS	500.000 HOUR	75.00000		37500.00	
1170	743015 FURNISH AND MAINTAIN PORTABLE PCC SAFETY BARRIER	386.000 LF				

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CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
1180	743023 TEMPORARY BARRICADES, TYPE III	15825.000 LFDY				
1190	743024 TEMPORARY WARNING SIGNS AND PLAQUES	24583.000 EADY				
1200	743025 INSTALL TEMPORARY IMPACT ATTENUATOR	4.000 EACH				
1210	743057 FLAGGER, KENT COUNTY, FEDERAL	1200.000 HOUR				
1220	743066 FLAGGER, KENT COUNTY, FEDERAL, OVERTIME	300.000 HOUR				
1230	743552 PEDESTRIAN CHANNELIZING BARRICADE	59850.000 LFDY				
1240	744506 CONDUIT JUNCTION WELL, TYPE 7, PRECAST POLYMER CONCRETE	15.000 EACH				
1250	744520 CONDUIT JUNCTION WELL, TYPE 1, PRECAST CONCRETE	12.000 EACH				
1260	744530 CONCUIT JUNCTION WELL, TYPE 11, PRECAST CONCRETE/ POLYMER LID-FRAME	52.000 EACH				
1270	744531 CONDUIT JUNCTION WELL, TYPE 14, PRECAST CONCRETE/ POLYMER LID-FRAME	38.000 EACH				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
1280	744544 ADJUST OR REPAIR EXISTING CONDUIT JUNCTION WELL	5.000 EACH				
1290	745602 FURNISH & INSTALL UP TO 4" SCHEDULE 80 HDPE CONDUIT (BORE)	5154.000 LF				
1300	745604 FURNISH & INSTALL UP TO 4" SCHEDULE 80 PVC CONDUIT (TRENCH)	24773.000 LF				
1310	745606 FURNISH & INSTALL UP TO 4" GALVANIZED STEEL CONDUIT (TRENCH)	438.000 LF				
1320	745609 FURNISH & INSTALL UP TO 4" GALVANIZED STEEL CONDUIT (ON STRUCTURE)	200.000 LF				
1330	745610 FURNISH & INSTALL UP TO 4" NONMETALLIC POLE RISER SHIELD	100.000 LF				
1340	746515 INSULATED GROUND CABLES, 1/#6	8075.000 LF				
1350	746517 ALUMINUM LIGHTING STANDARD WITH SINGLE DAVIT ARM, 30' POLE	46.000 EACH				
1360	746528 INSTALLATION OF STEEL POLE (EQUAL TO OR GREATER THAN 40')	3.000 EACH				
1370	746553 POLE BASE, SPECIAL	3.000 EACH				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
1380	746590 FURNISH & INSTALL GROUND ROD	66.000 EACH				
1390	746594 LUMINAIRE (HPS), 250 WATT	46.000 EACH				
1400	746653 ELECTRICAL TESTING	LUMP	LUMP			
1410	746697 INSTALLATION OF WOOD POLE	5.000 EACH				
1420	746847 POLE BASE, TYPE 3	10.000 EACH				
1430	746850 POLE BASE, TYPE 4	9.000 EACH				
1440	746852 POLE BASE, TYPE 6	46.000 EACH				
1450	746888 ALUMINUM LIGHTING SINGLE DAVIT ARM, 8' ARM SPREAD	18.000 EACH				
1460	746889 ALUMINUM LIGHTING SINGLE DAVIT ARM, 12' ARM SPREAD	9.000 EACH				
1470	746890 ALUMINUM LIGHTING SINGLE DAVIT ARM, 15' ARM SPREAD	15.000 EACH				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
1480	746907 FURNISH & INSTALL 1-CONDUCTOR #2 AWG STRANDED COPPER	885.000 LF				
1490	746909 FURNISH & INSTALL 1-CONDUCTOR #6 AWG STRANDED COPPER	21415.000 LF				
1500	746914 FURNISH & INSTALL #6 BARE STRANDED COPPER GROUND	660.000 LF				
1510	746924 FURNISH & INSTALL LOOP WIRE 1-CONDUCTOR #14 AWG ENCASED IN 1/4" FLEXIBLE TUBING IN A LOOP SAWCUT	3324.000 LF				
1520	746925 FURNISH & INSTALL EMBEDDED METERED SERVICE PEDESTAL (100 AMP)	5.000 EACH				
1530	746926 FURNISH & INSTALL ELECTRICAL UTILITY SERVICE EQUIPMENT 120/240	5.000 EACH				
1540	746941 TRAFFIC CONTROL DEVICE EQUIPMENT TURN ON, PICK UP, REMOVAL & MAINTENANCE, TYPE III	2.000 EACH				
1550	747500 LIGHTING CONTROL CENTER PAD	5.000 EACH				
1560	747513 LIGHTING CONTROL AND DISTRIBUTION ENCLOSURE (120/240; 100 AMP)	5.000 EACH				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
1570	747514 CABINET BASE, TYPE F	2.000 EACH				
1580	747515 CABINET BASE, TYPE M	8.000 EACH				
1590	747516 CABINET BASE, TYPE P	3.000 EACH				
1600	748015 PERMANENT PAVEMENT STRIPING, SYMBOL/LEGEND ALKYD-THERMOPLAST IC	5629.000 SF				
1610	748019 TEMPORARY MARKINGS, PAINT, 4"	37300.000 LF				
1620	748026 TEMPORARY MARKINGS, PAINT SYMBOL/LEGEND	350.000 SF				
1630	748530 REMOVAL OF PAVEMENT STRIPING	8062.000 SF				
1640	748548 PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 5"	117821.000 LF				
1650	748549 PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 10"	1200.000 LF				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
1660	748553 PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS, BIKE SYMBOL	89.000 EACH				
1670	748557 PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 3"	2271.000 LF				
1680	749687 INSTALLATION OR REMOVAL OF TRAFFIC SIGN(S) ON SINGLE SIGN POST	240.000 EACH				
1690	749690 INSTALLATION OR REMOVAL OF TRAFFIC SIGNS ON MULTIPLE SIGN POSTS	22.000 SF				
1700	750000 ADJUST WATER VALVE BOXES	3.000 EACH				
1710	752000 RELOCATE FIRE HYDRANTS	1.000 EACH				
1720	753516 SANITARY SEWER SYSTEM	LUMP	LUMP			
1730	758000 REMOVAL OF EXISTING PORTLAND CEMENTCONCRETE PAVEMENT, CURB, SIDEWALK, ETC.	1916.000 SY				
1740	759511 FIELD OFFICE, SPECIAL II	30.000 EAMO				
1750	760502 PAVEMENT MILLING, TAPER CUT	3067.000 SYIN				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
1760	760507 PROFILE MILLING, HOT-MIX	7419.000 SYIN				
1770	762001 SAW CUTTING, HOT MIX	15842.000 LF				
1780	762002 SAW CUTTING, CONCRETE, FULL DEPTH	864.000 LF				
1790	763000 INITIAL EXPENSE	LUMP	LUMP			
1800	763501 CONSTRUCTION ENGINEERING	LUMP	LUMP			
1810	763503 TRAINEE	2160.000 HOUR	0.80000		1728.00	
1820	763508 PROJECT CONTROL SYSTEM DEVELOPMENT PLAN	LUMP	LUMP			
1830	763509 CPM SCHEDULE UPDATES AND/OR REVISED UPDATES	30.000 EAMO				
	SECTION 0001 TOTAL					

SECTION 0002 BRIDGE 2-156 - PUNCHEON RUN

1840	207000 EXCAVATION AND BACKFILL FOR STRUCTURES	2345.000 CY				

CANNOT BE USED FOR BIDDING

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CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS		UNIT PRICE DOLLARS	CTS	BID AMOUNT DOLLARS	CTS
1850	210000 FURNISHING BORROW TYPE "C" FOR PIPE, UTILITY TRENCH, AND STRUCTURE BACKFILL	370.000	CY				
1860	302011 DELAWARE NO. 3 STONE	500.000	TON				
1870	602001 PORTLAND CEMENT CONCRETE MASONRY, CLASS A	28.000	CY				
1880	602003 PORTLAND CEMENT CONCRETE MASONRY, ABUTMENT FOOTING, CLASS A	140.000	CY				
1890	602006 PORTLAND CEMENT CONCRETE MASONRY, PIER FOOTING, CLASS B	1060.000	CY				
1900	602007 PORTLAND CEMENT CONCRETE MASONRY, PIER ABOVE FOOTING, CLASS A	1125.000	CY				
1910	602009 PORTLAND CEMENT CONCRETE MASONRY, APPROACH SLAB, CLASS A	155.000	CY				
1920	602013 PORTLAND CEMENT CONCRETE MASONRY, SUPERSTRUCTURE, CLASS D	1922.000	CY				
1930	602015 PORTLAND CEMENT CONCRETE MASONRY, ABUTMENT ABOVE FOOTING, CLASS A	42.000	CY				

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CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS		UNIT PRICE DOLLARS	CTS	BID AMOUNT DOLLARS	CTS
1940	602017 PORTLAND CEMENT CONCRETE MASONRY, PARAPET, CLASS A	460.000	CY				
1950	602553 MECHANICALLY STABILIZED EARTH WALLS, WALL 1	6260.000	SF				
1960	602646 SILICONE ACRYLIC CONCRETE SEALER	29770.000	SF				
1970	604000 BAR REINFORCEMENT, EPOXY COATED	860000.000	LB				
1980	605511 PREFABRICATED EXPANSION JOINT SYSTEM, 3"	207.000	LF				
1990	606003 METAL BRIBGE RAILING (PEDESTRIAN)	641.000	LF				
2000	608000 COARSE AGGREGATE FOR FOUNDATION STABILIZATION AND SUBFOUNDATION BACKFILL	35.000	TON				
2010	619519 DYNAMIC PILE TESTING BY CONTRACTOR	30.000	EACH				
2020	623003 PRESTRESSED REINFORCED CONCRETE MEMBERS, BULB T BEAM		LUMP	LUMP			
2030	712021 RIPRAP, R-5	3225.000	TON				

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CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
2040	727507 BRIDGE SAFETY FENCE	280.000 LF				
	SECTION 0002 TOTAL					

SECTION 0003 BRIDGE 2-157 - NEW BURTON RD.

2050	207000 EXCAVATION AND BACKFILL FOR STRUCTURES	610.000 CY				
2060	209003 BORROW, TYPE C	3545.000 CY				
2070	210000 FURNISHING BORROW TYPE "C" FOR PIPE, UTILITY TRENCH, AND STRUCTURE BACKFILL	210.000 CY				
2080	602001 PORTLAND CEMENT CONCRETE MASONRY, CLASS A	185.000 CY				
2090	602003 PORTLAND CEMENT CONCRETE MASONRY, ABUTMENT FOOTING, CLASS A	153.000 CY				
2100	602006 PORTLAND CEMENT CONCRETE MASONRY, PIER FOOTING, CLASS B	160.000 CY				
2110	602007 PORTLAND CEMENT CONCRETE MASONRY, PIER ABOVE FOOTING, CLASS A	155.000 CY				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS		UNIT PRICE DOLLARS	CTS	BID AMOUNT DOLLARS	CTS
2120	602009 PORTLAND CEMENT CONCRETE MASONRY, APPROACH SLAB, CLASS A	225.000	CY				
2130	602013 PORTLAND CEMENT CONCRETE MASONRY, SUPERSTRUCTURE, CLASS D	442.000	CY				
2140	602015 PORTLAND CEMENT CONCRETE MASONRY, ABUTMENT ABOVE FOOTING, CLASS A	55.000	CY				
2150	602017 PORTLAND CEMENT CONCRETE MASONRY, PARAPET, CLASS A	145.000	CY				
2160	602553 MECHANICALLY STABILIZED EARTH WALLS, WALL 1	8175.000	SF				
2170	602646 SILICONE ACRYLIC CONCRETE SEALER	14690.000	SF				
2180	604000 BAR REINFORCEMENT, EPOXY COATED	315950.000	LB				
2190	605511 PREFABRICATED EXPANSION JOINT SYSTEM, 3"	145.000	LF				
2200	608000 COARSE AGGREGATE FOR FOUNDATION STABILIZATION AND SUBFOUNDATION BACKFILL	200.000	TON				

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CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
2210	619519 DYNAMIC PILE TESTING BY CONTRACTOR	15.000 EACH				
2220	623003 PRESTRESSED REINFORCED CONCRETE MEMBERS, BULB T BEAM	LUMP	LUMP			
2230	727507 BRIDGE SAFETY FENCE	425.000 LF				
	SECTION 0003 TOTAL					

SECTION 0004 BRIDGE PILE ALTERNATE 1
ALT GROUP AA1

2240	618042 FURNISH CAST-IN-PLACE CONCRETE PILES, 16"	19637.000 LF				
2250	618047 FURNISH CAST-IN-PLACE CONCRETE TEST PILES, 16"	1525.000 LF				
2260	619022 INSTALL CAST-IN-PLACE CONCRETE PILES, 16"	19637.000 LF				
2270	619026 INSTALL CAST-IN-PLACE CONCRETE TEST PILES, 16"	1525.000 LF				
	SECTION 0004 TOTAL					

CANNOT BE USED FOR BIDDING

CONTRACT ID: T200411701.01 PROJECT(S): ESTP-2011(17)

All figures must be typewritten.

CONTRACTOR :_____

SECTION 0005 BRIDGE PILE ALTERNATE 2
ALT GROUP AA2

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
2280	618082 FURNISH PRECAST PRESTRESSED CONCRETE PILE, 16" X 16"	22344.000 LF				
2290	618092 FURNISH PRECAST PRESTRESSED CONCRETE TEST PILE, 16" X 16"	1850.000 LF				
2300	619062 INSTALL PRECAST PRESTRESSED CONCRETE PILE, 16" X 16"	22344.000 LF				
2310	619068 INSTALL PRECAST PRESTRESSED CONCRETE TEST PILE, 16" X 16"	1850.000 LF				
	SECTION 0005 TOTAL					
	TOTAL BID					

CANNOT BE USED FOR BIDDING

BREAKOUT SHEETS

THE FOLLOWING SHEETS MUST BE COMPLETED AND RETURNED WITH THE PROPOSAL AT THE TIME OF BID. BREAKOUT SHEETS MUST BE COMPLETED REGARDLESS OF WHETHER BIDDING BY ELECTRONIC MEANS OR TYPEWRITTEN HARD COPY.

BREAKOUT SHEET - 1 **CONTRACT NO. T200411701**
ITEM 753516 - Sanitary Sewer System

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
A-1	1	LS	Well Pointing System	$	$
A-2	1	LS	Selective Demolition	$	$
A-3	1	LS	Temporary Bypass Pumping	$	$
A-4	70	LF	Furnish and Install 16" Class 52 Ductile Iron Pipe	$	$
A-5	135	LF	Furnish and Install 16" Class 56 Ductile Iron Pipe	$	$
A-6	70	LF	Furnish and Install30" Steel Casing with 16" Class 52 Ductile Iron Pipe	$	$
A-7	2	EA	Furnish and Install 4 Ft Manhole	$	$
A-8	2,500	TON	Furnish and Place Select Backfill	$	$

ITEM 753516 - SANITARY SEWER SYSTEM $_____
(LUMP SUM BID PRICE FOR ITEM 753516)

BREAKOUT SHEET - 2 **CONTRACT NO. T200411701**
ITEM 737523 - PLANTING

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
A-1	8	EA	Acer Rubrum 'Red Sunset'	$	$
A-2	9	EA	Liquidamber Styraciflua 'Moraine'	$	$
A-3	6	EA	Nyssa Sylvatica 'Wild Fire'	$	$
A-4	6	EA	Quercus Bicolor	$	$
A-5	65	EA	Ilex Opaca 'Crooneburg'	$	$
A-6	16	EA	Amelander Arborea	$	$
A-7	8	EA	Cercis Canadensis 'Appalachian Red'	$	$
A-8	13	EA	Myrica Cerifera	$	$

ITEM 737523 - PLANTING $_____
(LUMP SUM BID PRICE FOR ITEM 737523)

CANNOT BE USED FOR BIDDING

"ATTENTION"

TO BIDDERS

This Bid Proposal includes breakout sheets. The breakout sheets **MUST ACCOMPANY** the bid proposal at the time of bid.

Diesel Fuel Cost Price Adjustment Option

The Bidder is required to submit this form with his/her Bid Proposal at the time of bid opening. When this form is not provided by the Bidder at the time of Bid, the Option-OUT will be automatically selected and no further option is available to the Contractor and no Diesel Fuel Cost Adjustments will be made.

OPTION-IN

☐ Checking here selects the option to participate in the 763626 - Diesel Fuel Cost Price Adjustment.

OPTION-OUT

☐ Checking here declines the option to participate in the 763626 - Diesel Fuel Cost Price Adjustment.

The undersigned hereby certifies that he/she is authorized to make this Option on behalf of the bidder in compliance with the special provision 763626 - Diesel Fuel Cost Price Adjustment.

Sealed and dated this _____ day of _____ in the year of our Lord two thousand and ____ _____ (20__).

Name of Bidder (Organization)

Corporate Seal

By:

Authorized Signature

Attest

Title

SWORN TO AND SUBSCRIBED BEFORE ME this ____ day of _____, 20___.

Notary Seal

Notary

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CERTIFICATION

Contract No. T200411701.01
Federal Aid Project No. ESTP-2011(17)

The undersigned bidder, _____

whose address is _____

and telephone number is _____hereby certifies the following:

I/We have carefully examined the location of the proposed work, the proposed plans and specifications, and will be bound, upon award of this contract by the Department of Transportation, to execute in accordance with such award, a contract with necessary surety bond, of which contract this proposal and said plans and specifications shall be a part, to provide all necessary machinery, tools, labor and other means of construction, and to do all the work and to furnish all the materials necessary to perform and complete the said contract within the time and as required in accordance with the requirements of the Department of Transportation, and at the unit prices for the various items as listed on the preceding pages.

Bidder's Certification Statement [US DOT Suspension and Debarment Regulation (49 CFR 29)]:

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NOTICE: All contractors who hold prime contracts (Federal Aid) with DelDOT are advised that the prime contractor and subcontractors are required to submit to DelDOT a signed and notary attested copy of the Bidder Certification Statement for each and every subcontract that will be utilized by the prime contractor. This Certification **must** be filed with DelDOT prior to written approval being granted for each and every subcontractor. Copies of the Certification Form are available from the appropriate District Construction Office.

Under penalty of perjury under the laws of the United States, that I/We, or any person associated therewith in the capacity of (owner, partner, director, officer, principal, investigator, project director, manager, auditor, or any position involving the administration federal funds):

a. am/are not currently under suspension, debarment, voluntary exclusion, or determination of ineligibility by any federal agency;
b. have not been suspended, debarred, voluntarily excluded or determined ineligible by any federal agency within the past 3 years;
c. do not have a proposed debarment pending; and,
d. have not been indicted, convicted, or had a civil judgement rendered against (it) by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past 3 years.

Exceptions will not necessarily result in denial of award, but will be considered in determining bidder responsibility. For any exception noted, indicate below to whom it applies, initiating agency, and dates of action. Providing false information may result in criminal prosection or administrative sanctions.

_____

_____

_____

(Insert Exceptions)

DBE Program Assurance:

NOTICE: In accordance with 49 CFR Part 26 the undersigned, a legally authorized representative of the bidder listed below, must complete this assurance.

By its signature affixed hereto, assures the Department that it will attain DBE participation as indicated:

Disadvantaged Business Enterprise _____ percent (blank to be filled in by bidder)

The foregoing quantities are considered to be approximate only and are given as the basis for comparison of bids. The Department of Transportation may increase or decrease the amount of any item or portion of the work as may be deemed necessary or expedient. Any such increase or decrease in the quantity for any item will not be regarded as a sufficient ground for an increase or decrease in the unit prices, nor in the time allowed for the completion of the work, except as provided in the contract.

Accompanying this proposal is a surety bond or a security of the bidder assigned to the Department of Transportation, for at least ten (10) percentum of total amount of the proposal, which deposit is to be forfeited as liquidated damages in case this proposal is accepted, and the undersigned shall fail to execute a contract with necessary bond, when required, for the performance of said contract with the Department of Transportation, under the conditions of this proposal, within twenty (20) days after date of official notice of the award of the contract as provided in the requirement and specifications hereto attached; otherwise said deposit is to be returned to the undersigned.

I/We are licensed, or have initiated the license application as required by Section 2502, Chapter 25, Title 30, of the Delaware Code.

By submission of this proposal, each person signing on behalf of the bidder, certifies as to its own organization, under penalty of perjury, that to the best of each signer's knowledge and belief:

1. The prices in this proposal have been arrived at independently without collusion, consultation, communication, or Agreement with any other bidder or with any competitor for the purpose of restricting competition.
2. Unless required by law, the prices which have been quoted in this proposal have not been knowingly disclosed and will not knowingly be disclosed by the bidder, directly or indirectly, to any other bidder or competitor prior to the opening of proposals.
3. No attempt has been made or will be made by the bidder to induce any other person, partnership, or corporation to submit or not to submit a proposal for the purpose of restricting competition.

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I/We acknowledge receipt and incorporation of addenda to this proposal as follows:

No.	Date	No.	Date	No.	Date	No.	Date	No.	Date

BIDDERS MUST ACKNOWLEDGE RECEIPT OF ALL ADDENDA

MUST INSERT DATE OF FINAL QUESTIONS AND ANSWERS ON WEBSITE: _____

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Sealed and dated this _____ day of _____ in the year of our Lord two thousand _____ (20___).

_____
Name of Bidder (Organization)

Corporate Seal

By: _____
Authorized Signature

Attest _____

_____
Title

SWORN TO AND SUBSCRIBED BEFORE ME this ____ day of _____, 20____.

Notary Seal

_____
Notary

BID BOND

TO ACCOMPANY PROPOSAL
(Not necessary if security is used)

KNOW ALL MEN BY THESE PRESENTS That:_____

of_____ in the County of _____and State of _____ as **Principal**, and _____ of _____ in the County of _____ and State of _____ as **Surety**, legally authorized to do business in the State of Delaware ("**State**"), are held and firmly unto the **State** in the sum of _____ _____Dollars ($_____), or _____ percent not to exceed _____ _____ Dollars ($_____) of amount of bid on Contract No. T200411701.01___, to be paid to the **State** for the use and benefit of its Department of Transportation ("**DelDOT**") for which payment well and truly to be made, we do bind ourselves, our and each of our heirs, executors, administrators, and successors, jointly and severally for and in the whole firmly by these presents.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH That if the above bounden **Principal** who has submitted to the **DelDOT** a certain proposal to enter into this contract for the furnishing of certain materiel and/or services within the **State**, shall be awarded this Contract, and if said **Principal** shall well and truly enter into and execute this Contract as may be required by the terms of this Contract and approved by the **DelDOT**, this Contract to be entered into within twenty days after the date of official notice of the award thereof in accordance with the terms of said proposal, then this obligation shall be void or else to be and remain in full force and virtue.

Sealed with _____ seal and dated this _____ day of _____ in the year of our Lord two thousand and _____ (20___).

SEALED, AND DELIVERED IN THE presence of

_____
Name of Bidder (Organization)

Corporate Seal

By: _____
Authorized Signature

Attest _____

_____
Title

_____
Name of **Surety**

Witness:_____

By: _____

_____
Title

CANNOT BE USED FOR BIDDING