

STATE OF DELAWARE

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THE PROPOSAL IN ORDER TO
SUBMIT A BID.



DEPARTMENT OF TRANSPORTATION

BID PROPOSAL

for

CONTRACT T200669001.01

FEDERAL AID PROJECT NO. NRT-2011(25)

C & D CANAL RECREATIONAL TRAIL

NEW CASTLE COUNTY

PROSPECTIVE BIDDERS ARE ADVISED THAT THERE WILL BE A MANDATORY PRE-BID MEETING FOR THIS CONTRACT ON MARCH 15, 2012 at 10:30 A.M. IN THE GRASS DALE CENTER, 108 OLD REEDY POINT BRIDGE ROAD, DELAWARE CITY, DELAWARE, 19706.

Completion Date 243 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 April 3, 2012

Contract No.T200669001.01

Federal Aid Project No. NRT-2011(25)

**C & D CANAL RECREATIONAL TRAIL
NEW CASTLE COUNTY**

LOCATION

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

DESCRIPTION

The improvements consist of furnishing all materials for THE PROJECT INVOLVES THE CONSTRUCTION OF A MULTI-USE TRAIL FACILITY ON THE NORTH SIDE OF THE C&D CANAL ALONG THE TIER 1 ROAD.THE PROJECT ALSO INCLUDES CONSTRUCTION OF TWO TRAIL HEAD FACILITIES, LANDSCAPING AND SITE AMENITIES., and 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 243 Calendar Days . The Contract Time includes an allowance for 29 Weather Days

It is the Department's intent to issue a Notice to Proceed such that work starts on or about April 30, 2012.

ELECTRONIC BIDDING

This project incorporates the electronic bidding system Expedite 5.2b. Bidder wishing to use the electronic bidding option should request a bid file disk and installation CD.

PROSPECTIVE BIDDERS NOTE:

1. No retainage will be withheld on this contract.
2. The Department has adopted an External Complaint Procedure. The 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. 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.

**STATE OF DELAWARE
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 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.

REQUIREMENT BY DEPARTMENT OF LABOR FOR SWORN PAYROLL INFORMATION

Delaware Code, Title 29, Chapter 69, Section 6960, Paragraph

"Every contract based upon these specifications shall contain a stipulation that certified sworn payroll reports be maintained by every contractor and subcontractor performing work upon the site of construction. The contractor and subcontractor shall keep and maintain the sworn payroll information for a period of two (2) years from the last day of the work week covered by the payroll. A certified copy of these payroll reports shall be made available:

1. For inspection or furnished upon request to a representative of the Department of Labor;
2. Upon request by the public or for copies thereof. However, a request by the public must be made through the Department of Labor. The requesting party shall, prior to being provided the records, reimburse the costs of preparation by the Department of Labor in accordance with the Department's copying fee policy. The public shall not be given access to the records at the principal office of the contractor or subcontractor; and
3. The certified payroll records shall be on a form provided by the Department of Labor or shall contain the same information as the form provided by the Department and shall be provided within ten (10) days from receipt of notice requesting the records from the Department of Labor."

Contractor may contact:

Department of Labor
Division of Industrial Affairs
4425 No. Market Street
Wilmington, DE 19802
Telephone (302) 761-8200

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."

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."

For all contracts which are identified as Federal-aid projects by having a Federal-aid number inserted in the appropriate space on the cover sheet of the proposal, if there is a conflict between the above Section 6962 and Federal law ~~and~~ the requirements of the above Section 6962 shall not apply.

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."

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:

I. The contractor will not discriminate against any employee or applicant for employment because of race, creed, color, sex 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 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.

ii. 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.

TO REPORT BID RIGGING ACTIVITIES:

CALL 1-800-424-9071

The U. S. Department of Transportation (DOT) operates the above 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.

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.

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

12.3% (New Castle County)
14.5% (Kent & Sussex Counties)

Goals for Female Participation In
Each Trade

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 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 NEW CASTLE 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 One (1). 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 provided 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, Kiribati, 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.

DeIDOT 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

DeIDOT 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.

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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. Bidders shall submit with their bid the name, address, age of the firm, and the gross annual receipts of each DBE and non-DBE subcontractor that supplied a quote or a bid to the prime on this project. The Department has attached this document following the Certification document at the end of the Proposal. Failure to submit this information will result in the bid being declared non-responsive and will be rejected.
4. 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.
5. 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.
6. 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.

7. 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

8. 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)

I. GENERAL

1. 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.

2. Except as otherwise provided for in each section, the contractor shall insert in each subcontract all of the stipulations contained in these Required Contract Provisions, and further require their inclusion in any lower tier subcontract or purchase order that may in turn be made. The Required Contract Provisions shall not be incorporated by reference in any case. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with these Required Contract Provisions.

3. A breach of any of the stipulations contained in these Required Contract Provisions shall be sufficient grounds for termination of the contract.

4. A breach of the following clauses of the Required Contract Provisions may also be grounds for debarment as provided in 29 CFR 5.12:

Section I, paragraph 2;
Section IV, paragraphs 1, 2, 3, 4, and 7;
Section V, paragraphs 1 and 2a through 2g.

5. Disputes arising out of the labor standards provisions of Section IV (except paragraph 5) and Section V of these Required Contract Provisions shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the U.S. Department of Labor (DOL) as set forth in 29 CFR 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 DOL, or the contractor's employees or their representatives.

6. **Selection of Labor:** During the performance of this contract, the contractor shall not:

- a. discriminate against labor from any other State, possession, or territory of the United States (except for employment preference for Appalachian contracts, when applicable, as specified in Attachment A), or
- b. employ convict labor for any purpose within the limits of the project unless it is labor performed by convicts who are on parole, supervised release, or probation.

II. NONDISCRIMINATION

(Applicable to all Federal-aid construction contracts and to all related subcontracts of \$10,000 or more.)

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 and 41 CFR 60) 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 Equal Opportunity Construction Contract Specifications set forth under 41 CFR 60-4.3 and the provisions of the American 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 State highway agency (SHA) and the Federal Government in carrying out EEO obligations and in their review of his/her activities under the contract.
- b. The contractor will accept as his 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, preapprenticeship, and/or on-the-job training."

2. **EEO Officer:** The contractor will designate and make known to the SHA contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active contractor program of EEO 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 minority group employees.
- 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 minority groups 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 minority group applicants. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority group 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, he is expected to observe the provisions of that agreement to the extent that the system permits the contractor's compliance with EEO contract provisions. (The DOL has held that where implementation of such agreements have the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Executive Order 11246, as amended.)
- c. The contractor will encourage his present employees to refer minority group applicants for employment. Information and procedures with regard to referring minority group 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 his 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 his avenues of appeal.

6. Training and Promotion:

- a. The contractor will assist in locating, qualifying, and increasing the skills of minority group and women employees, and applicants for employment.
- 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. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision.
- 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 minority group and women employees 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 his/her best efforts to obtain the cooperation of such unions to increase opportunities for minority groups and women within the unions, and to effect referrals by such unions of minority and female employees. 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 best efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minority group members and women for membership in the unions and increasing the skills of minority group employees and women so that they may qualify for higher paying employment.
- b. The contractor will use best 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 SHA 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 minority and women 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 minority group persons and women. (The DOL has held that it shall be no excuse that the union with which the contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees.) 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 SHA.

8. 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.

- a. The contractor shall notify all potential subcontractors and suppliers of his/her EEO obligations under this contract.
- b. Disadvantaged business enterprises (DBE), as defined in 49 CFR 23, shall have equal opportunity to compete for and perform subcontracts which the contractor enters into pursuant to this contract. The contractor will use his best efforts to solicit bids from and to utilize DBE subcontractors or subcontractors with meaningful minority group and female representation among their employees. Contractors shall obtain lists of DBE construction firms from SHA personnel.
- c. The contractor will use his best efforts to ensure subcontractor compliance with their EEO obligations.

9. 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 completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the SHA and the FHWA.

- a. The records kept by the contractor shall document the following:
 - (1) The number 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;
 - (3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees; and
 - (4) The progress and efforts being made in securing the services of DBE subcontractors or subcontractors with meaningful minority and female representation among their employees.
- b. The contractors will submit an annual report to the SHA 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. If on-the job training is being required by special provision, the contractor will be required to collect and report training data.

III. NONSEGREGATED FACILITIES

(Applicable to all Federal-aid construction contracts and to all related subcontracts of \$10,000 or more.)

- a. By submission of this bid, the execution of this contract or subcontract, or the consummation of this material supply agreement or purchase order, as appropriate, the bidder, Federal-aid construction contractor, subcontractor, material supplier, or vendor, as appropriate, certifies that the firm does not maintain or provide for its employees any segregated facilities at any of its establishments, and that the firm does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The firm agrees that a breach of this certification is a violation of the EEO provisions of this contract. The firm further certifies that no employee will be denied access to adequate facilities on the basis of sex or disability.
- b. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, timeclocks, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive, or are, in fact, segregated on the basis of race, color, religion, national origin, age or disability, because of habit, local custom, or otherwise. The

only exception will be for the disabled when the demands for accessibility override (e.g. disabled parking).

c. The contractor agrees that it has obtained or will obtain identical certification from proposed subcontractors or material suppliers prior to award of subcontracts or consummation of material supply agreements of \$10,000 or more and that it will retain such certifications in its files.

IV. PAYMENT OF PREDETERMINED MINIMUM WAGE

(Applicable to all Federal-aid construction contracts exceeding \$2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural minor collectors, which are exempt.)

1. General:

a. All mechanics and laborers 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 (29 CFR 3) issued by the Secretary of Labor under the Copeland Act (40 U.S.C. 276c)] the full amounts of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment. The payment shall be computed at wage rates not less than those contained in the wage determination of the Secretary of Labor (hereinafter "the wage determination") which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor or its subcontractors and such laborers and mechanics. The wage determination (including any additional classifications and wage rates conformed under paragraph 2 of this Section IV and the DOL poster (WH-1321) or Form FHWA-1495) 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. For the purpose of this Section, contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act (40 U.S.C. 276a) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of Section IV, paragraph 3b, hereof. Also, for the purpose of this Section, 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 paragraphs 4 and 5 of this Section IV.

b. 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.

c. All rulings and interpretations of the Davis-Bacon Act and related acts contained in 29 CFR 1, 3, and 5 are herein incorporated by reference in this contract.

2. Classification:

a. The SHA contracting officer shall require that any class of laborers or mechanics employed under the contract, which is not listed in the wage determination, shall be classified in conformance with the wage determination.

b. The contracting officer shall approve an additional classification, wage rate and fringe benefits only when the following criteria have been met:

- (1) the work to be performed by the additional classification requested is not performed by a classification in the wage determination;
- (2) the additional classification is utilized in the area by the construction industry;

(3) the proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination; and

(4) with respect to helpers, when such a classification prevails in the area in which the work is performed.

c. If the contractor or subcontractors, as appropriate, the laborers and mechanics (if known) to be employed in the additional classification 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 DOL, Administrator of the Wage and Hour Division, Employment Standards Administration, Washington, D.C. 20210. The Wage and Hour 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.

d. In the event the contractor or subcontractors, as appropriate, the laborers or mechanics to be employed in the additional 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. Said 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.

e. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 2c or 2d of this Section IV shall be paid to all workers performing work in the additional classification from the first day on which work is performed in the classification.

3. Payment of Fringe Benefits:

a. 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 or subcontractors, as appropriate, shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly case equivalent thereof.

b. If the contractor or subcontractor, as appropriate, does not make payments to a trustee or other third person, he/she may consider as a 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.

4. Apprentices and Trainees (Programs of the U.S. DOL) and Helpers:

a. Apprentices:

(1) 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 DOL, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau, or if a person is employed in his/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 Bureau of Apprenticeship and Training or a State apprenticeship agency (where appropriate) to be eligible for probationary employment as an apprentice.

(2) The allowable ratio of apprentices to journeyman-level employees 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 employee 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 listed in 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 or subcontractor 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-level hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

(3) 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 journeyman-level 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 for the Wage and Hour Division determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

(4) In the event the Bureau of Apprenticeship and Training, or a State apprenticeship agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor or subcontractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the comparable work performed by regular employees until an acceptable program is approved.

b. Trainees:

(1) 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 DOL, Employment and Training Administration.

(2) The ratio of trainees to journeyman-level employees on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. 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.

(3) Every trainee must be paid at not less than the rate specified in the approved program for his/her level of progress, expressed as a percentage of the journeyman-level 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-level wage rate on the wage determination which provides for less than full fringe benefits for apprentices, in which case such trainees shall receive the same fringe benefits as apprentices.

(4) In the event the Employment and Training Administration withdraws approval of a training program, the contractor or subcontractor 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. **Helpers:**

Helpers will be permitted to work on a project if the helper classification is specified and defined on the applicable wage determination or is approved pursuant to the conformance procedure set forth in Section IV.2. Any worker listed on a payroll at a helper wage rate, who is not a helper under an approved definition, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed.

5. 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.

6. Withholding:

The SHA shall upon its own action or upon written request of an authorized representative of the DOL withhold, or cause to be withheld, from the contractor or subcontractor 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, as 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 SHA contracting officer 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.

7. Overtime Requirements:

No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers, mechanics, watchmen, or guards (including apprentices, trainees, and helpers described in paragraphs 4 and 5 above) shall require or permit any laborer, mechanic, watchman, or guard in any workweek in which he/she is employed on such work, to work in excess of 40 hours in such workweek unless such laborer, mechanic, watchman, or guard receives compensation at a rate not less than one-and-one-half times his/her basic rate of pay for all hours worked in excess of 40 hours in such workweek.

8. Violation:

Liability for Unpaid Wages; Liquidated Damages: In the event of any violation of the clause set forth in paragraph 7 above, the contractor and any subcontractor responsible thereof shall be liable to the affected employee for his/her 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, mechanic, watchman, or guard employed in violation of the clause set forth in paragraph 7, in the sum of \$10 for each calendar day on which such employee was required or permitted to work in excess of the standard work week of 40 hours without payment of

the overtime wages required by the clause set forth in paragraph 7.

9. Withholding for Unpaid Wages and Liquidated Damages:

The SHA shall upon its own action or upon written request of any authorized representative of the DOL withhold, or cause to be withheld, from any monies 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 8 above.

V. STATEMENTS AND PAYROLLS

(Applicable to all Federal-aid construction contracts exceeding \$2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural collectors, which are exempt.)

1. Compliance with Copeland Regulations (29 CFR 3):

The contractor shall comply with the Copeland Regulations of the Secretary of Labor which are herein incorporated by reference.

2. Payrolls and Payroll Records:

a. Payrolls and basic records relating thereto shall be maintained by the contractor and each subcontractor during the course of the work and preserved for a period of 3 years from the date of completion of the contract for all laborers, mechanics, apprentices, trainees, watchmen, helpers, and guards working at the site of the work.

b. The payroll records shall contain the name, social security number, and address of each such employee; his or her correct classification; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalent thereof 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. In addition, for Appalachian contracts, the payroll records shall contain a notation indicating whether the employee does, or does not, normally reside in the labor area as defined in Attachment A, paragraph 1. Whenever the Secretary of Labor, pursuant to Section IV, paragraph 3b, has found 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 and each subcontractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, that the plan or program has been communicated in writing to the laborers or mechanics affected, and show the cost anticipated or the actual cost incurred in providing benefits. Contractors or subcontractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprentices and trainees, and ratios and wage rates prescribed in the applicable programs.

c. Each contractor and subcontractor shall furnish, each week in which any contract work is performed, to the SHA resident engineer a payroll of wages paid each of its employees (including apprentices, trainees, and helpers, described in Section IV, paragraphs 4 and 5, and watchmen and guards engaged on work during the preceding weekly payroll period). The payroll submitted shall set out accurately and completely all of the information required to be maintained under paragraph 2b of this Section V. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal stock number 029-005-0014-1), U.S. Government Printing Office, Washington, D.C. 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.

d. Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by

the contractor or subcontractor or his/her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) that the payroll for the payroll period contains the information required to be maintained under paragraph 2b of this Section V, and that such information is correct and complete;

(2) that such 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 the Regulations, 29 CFR 3;

(3) that each laborer or mechanic has been paid not less than the applicable wage rate and fringe benefits or cash equivalent for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

e. 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 2d of this Section V.

f. The falsification of any of the above certifications may subject the contractor to civil or criminal prosecution under 18 U.S.C. 1001 and 31 U.S.C. 231.

g. The contractor or subcontractor shall make the records required under paragraph 2b of this Section V available for inspection, copying, or transcription by authorized representatives of the SHA, the FHWA, or the DOL, 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 SHA, the FHWA, the DOL, or all may, after written notice to the contractor, sponsor, applicant, or owner, take such actions 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.

VI. RECORD OF MATERIALS, SUPPLIES, AND LABOR

1. On all Federal-aid contracts on the National Highway System, except those which provide solely for the installation of protective devices at railroad grade crossings, those which are constructed on a force account or direct labor basis, highway beautification contracts, and contracts for which the total final construction cost for roadway and bridge is less than \$1,000,000 (23 CFR 635) the contractor shall:

a. Become familiar with the list of specific materials and supplies contained in Form FHWA-47, "Statement of Materials and Labor Used by Contractor of Highway Construction Involving Federal Funds," prior to the commencement of work under this contract.

b. Maintain a record of the total cost of all materials and supplies purchased for and incorporated in the work, and also of the quantities of those specific materials and supplies listed on Form FHWA-47, and in the units shown on Form FHWA-47.

c. Furnish, upon the completion of the contract, to the SHA resident engineer on Form FHWA-47 together with the data required in paragraph 1b relative to materials and supplies, a final labor summary of all contract work indicating the total hours worked and the total amount earned.

2. At the prime contractor's option, either a single report covering all contract work or separate reports for the contractor and for each subcontract shall be submitted.

VII. SUBLETTING OR ASSIGNING THE CONTRACT

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 State. 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).

a. "Its own organization" shall be construed to include only workers employed and paid directly 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, assignee, or agent of the prime contractor.

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 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 VII 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 SHA 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 SHA 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 SHA has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

VIII. SAFETY: ACCIDENT PREVENTION

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 SHA 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. 333).

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. 333).

IX. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

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, the following notice 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:

NOTICE TO ALL PERSONNEL ENGAGED ON FEDERAL-AID HIGHWAY PROJECTS

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 not more than \$10,000 or imprisoned not more than 5 years or both."

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

(Applicable to all Federal-aid construction contracts and to all related subcontracts of \$100,000 or more.)

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

1. That any facility that is or will be utilized in the performance of this contract, unless such contract is exempt under the Clean Air Act, as amended (42 U.S.C. 1857 et seq., as amended by Pub.L. 91-604), and under the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., as amended by Pub.L. 92-500), Executive Order 11738, and regulations in implementation thereof (40 CFR 15) is not listed, on the date of contract award, on the U.S. Environmental Protection Agency (EPA) List of Violating Facilities pursuant to 40 CFR 15.20.
2. That the firm agrees to comply and remain in compliance with all the requirements of Section 114 of the Clean Air Act and Section 308 of the Federal Water Pollution Control Act and all regulations and guidelines listed thereunder.
3. That the firm shall promptly notify the SHA of the receipt of any communication from the Director, Office of Federal Activities, EPA, indicating that a facility that is or will be utilized for the contract is under consideration to be listed on the EPA List of Violating Facilities.
4. That the firm agrees to include or cause to be included the requirements of paragraph 1 through 4 of this Section X in every nonexempt subcontract, and further agrees to take such action as the government may direct as a means of enforcing such requirements.

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

1. Instructions for Certification - Primary Covered Transactions:

(Applicable to all Federal-aid contracts - 49 CFR 29)

- a. By signing and submitting this proposal, the prospective primary 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 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 primary 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 department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause of default.

d. The prospective primary participant shall provide immediate written notice to the department or agency to whom this proposal is submitted if any time the prospective primary 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," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the department or agency to which this proposal is submitted for assistance in obtaining a copy of those regulations.

f. The prospective primary 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 primary 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 Transaction," provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

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 may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the nonprocurement portion of the "Lists of Parties Excluded From Federal Procurement or Nonprocurement Programs" (Nonprocurement List) which is compiled by the General Services Administration.

i. 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.

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.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Primary Covered Transactions

1. The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a 3-year period preceding this proposal been convicted of or had a civil judgement 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;

c. 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 1b of this certification; and

d. Have not within a 3-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

2. Where the prospective primary 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 Covered Transactions:

(Applicable to all subcontracts, purchase orders and other lower tier transactions of \$25,000 or more - 49 CFR 29)

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," "primary covered transaction," "participant," "person," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.

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.

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 may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.

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 Covered Transactions:

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 participation in this transaction 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.

* * * * *

XII. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

(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 his or her bid or proposal that he or she 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.

Form FHWA-1273 (Rev. 3-94)

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 or 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 forth 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.

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.

Title 29 Del.C. §6960 relating to wages further stipulates "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", and ... "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."

Bidders are specifically directed to note the Department of Labor's 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 15, 2011

CLASSIFICATION	NEW CASTLE	KENT	SUSSEX
BRICKLAYERS	44.98	44.98	14.51
CARPENTERS	40.86	48.31	38.62
CEMENT FINISHERS	28.11	24.68	23.29
ELECTRICAL LINE WORKERS	22.50	54.05	54.05
ELECTRICIANS	57.10	57.10	57.10
IRON WORKERS	42.20	22.98	25.35
LABORERS	25.44	23.33	24.00
MILLWRIGHTS	16.11	15.63	13.49
PAINTERS	41.42	41.42	41.42
PILEDRIERS	59.23	23.75	26.95
POWER EQUIPMENT OPERATORS	31.46	26.00	26.31
SHEET METAL WORKERS	22.75	20.31	18.40
TRUCK DRIVERS	26.54	21.68	19.96

CERTIFIED: 8/26/11

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: CONTRACT #T200669001.01, C & D Canal Recreational Trail, New Castle
County**

GENERAL DECISION: DE120010 01/06/2012 DE10

General Decision Number: DE20100013

State: DELAWARE

Construction Type: HIGHWAY

COUNTY: New Castle County in Delaware

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

Modification Number	Publication Date
0	01/06/2012

SUDE2010-001	03/15/2011
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	Rates	Fringes
Bricklayer	44.98	
Carpenter	40.86	
Cement Mason/Concrete Finisher	28.11	
ELECTRICIAN		
Electrician	57.10	
Line Worker	22.50	
Ironworker	42.20	
Laborer	25.44	
Millwright	16.11	
Operator: Piledriver	59.23	
Painter	41.42	
Power Equipment Operation	31.46	
Truck Driver	26.54	

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.

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.

**THE FOLLOWING SUPPLEMENTAL
SPECIFICATIONS ONLY APPLY TO
CONTRACT T200666901.01 AND
SUPERCEDE THE INDIVIDUAL
SUPPLEMENTAL SPECIFICATIONS
REFERENCED ON PAGE 35**

THE FOLLOWING SUPPLEMENTAL SPECIFICATIONS ONLY APPLY TO CONTRACT T200666901.01

Delete Section 110-Erosion, Sediment Control and Water Pollution of the Supplemental Specifications in its entirety and modify as follows:

110.01 Definitions.

Clearing. The clearing of trees, brush, shrubs, downed timber, rotten wood, rubbish, and any other vegetation, except where excluded by the definition for grubbing, as well as the removal of fences and structures: See Subsection 201.01.

Disturbed Area. An area where any activity has been initiated which may result in soil erosion from water or wind or movement of sediments or pollutants into state waters or onto lands in the state, or which may result in accelerated stormwater runoff, including, but not limited to, clearing, grubbing, grading, excavating, transporting, filling and backfilling of land.

Grubbing. Shall mean the removal of trees, stumps, roots, brush, root mat, and debris from the ground.

Phasing. Staged construction sequencing as shown in the Plans.

Significant Rain Event. A rain event that generates erosion.

Site Reviewer. A person on the Contractor's staff assigned to erosion and sediment control review, implementation and maintenance. The level of training (Contractor's Certification or Certified Construction Reviewer) required for the Site Reviewer will be as follows:

Contractor's Certification (Blue Card). Introductory training for erosion and sediment control provided by the Department of Natural Resources (DNREC). The Contractor must submit, prior to award, the name and certification number for someone other than the Superintendent who has a Blue Card certification.

Certified Construction Reviewer (CCR, Gold Card). Advanced training for erosion and sediment control provided by the Department of Natural Resources (DNREC). The Contractor must submit, prior to award, the name(s) and certification number(s) for the individuals on his staff who have a CCR (Gold Card) certification.

110.02 Legal Authority. DNREC shall enforce compliance with Chapter 40, Title 7 of the Delaware Code and the Delaware Sediment and Stormwater Regulations for this project.

110.03 Sediment and Stormwater Permit Approval. These Plans were designed in accordance with applicable State and Federal stormwater regulations and the Sediment and Stormwater Permit is approved. All work on this project shall be completed pursuant to the Plans and as directed by the site reviewer and DNREC. Neither review and approval of the erosion, sediment control and water pollution control plans nor errors and omissions in the plans shall relieve the Contractor from its responsibilities for compliance with the Delaware Sediment and Stormwater Regulations or other applicable laws or regulations and the more stringent water pollution control requirements shall apply.

110.04 Description of Work. Erosion and sediment control measures shall be applied to erodible earth material exposed by any of the Contractor's land disturbing activities on the Project. The work shall consist of the application of temporary and permanent erosion and sediment control items as provided in the Contract or ordered by the Site Reviewer, DNREC or the Engineer. The temporary erosion control items shall be coordinated with the permanent erosion control items specified.

110.05 Completion of the Work. The contractor shall implement the temporary and permanent erosion control items for each phase of construction as detailed in the Contract documents. Additional erosion and sediment control items may be required during the Project as deemed necessary by the Site Reviewer, DNREC and/or the Engineer in order to provide continuous erosion and sediment control protection.

A. Construction Phasing. For Project sites in excess of 20 ac (8 ha), the construction must be phased in 20 ac (8 ha) increments. Once grading is initiated in one 20 ac (8a) increment, a second 20 ac (8 ha) increment may be cleared and grubbed provided the Contractor installs and maintains effective erosion and sediment control measures on both sections in such quantities and locations as deemed acceptable by the Site Reviewer, DNREC and the Engineer.

When balancing earthwork, such as when borrow from a cut is used as fill at a noncontiguous location distant from the cut, more than a total of 20 ac (8ha) may be allowed to be grubbed and graded within

the overall limits of the Project at any one time with prior written approval from DNREC. In such cases, one 20 ac (8 ha) increment in cut and one 20 ac (8 ha) increment in fill may be grubbed and graded at each separate location concurrently. Examples of when this would likely occur would be on interchange construction or on new alignment.

The Site Reviewer, DNREC or the Engineer may further limit the area of clearing, grubbing, stripping, and grading operations to the Contractor's capability and actual progress of keeping the finish grading, mulching, seeding, and other temporary or permanent erosion control measures current according to the approved progress schedule and construction sequence.

B. Construction Sequence. The Contractor shall sequence the construction as indicated on the Plans

110.06 Plan Changes. The Contractor shall not deviate from the erosion, sediment control, and stormwater management aspects of the Contract shown in the Plans and contract documents, other than as specified in 110.08 A.2.b without prior review and approval by the Engineer and DNREC.

For plan changes initiated by the Contractor, revised construction Plans shall be submitted for review and approval by the Engineer and DNREC. The revised Plans shall be prepared in accordance with current Department standards for roadway design, traffic control, erosion and sediment control, and stormwater management. Revised Plans shall also conform to all applicable Federal, State or municipal pollution control laws, rules, or regulations. All supporting design calculations and cost analyses required by the Engineer shall accompany the submission. The number of copies required to be submitted for review shall be determined by the Engineer depending on the nature of the proposed revision.

Contractor proposed revisions to the Plans, as well as review time by the Department, will not justify a delay in the progress schedule. All costs involved in preparing plan revision documents for changes proposed by the Contractor shall be the responsibility of the Contractor.

110.07 Limits of Construction. The Contractor shall not perform any work including, but not limited to, clearing, grubbing, construction phasing, equipment storage, and material stockpiling outside the limits of construction shown on the Plans without prior approval of the Engineer and DNREC.

If the Contractor should require additional lands that are not within Project limits, it shall be the Contractor's responsibility to make all arrangements with the property owners and to acquire all permits from the appropriate regulatory authorities for the use of these lands.

The Contractor shall acquire a statement signed by the property owners, which releases the Department from all claims arising from the use of the property being considered. The signed statement from the property owner and copies of all permits acquired by the Contractor shall be transmitted by the Contractor to the Engineer for the Engineer's records prior to initiating any operation on the property being considered for use.

110.08 Division of Responsibilities.

A. Site Reviewer. The Site Reviewer is responsible for the following:

1. The Site Reviewer shall review and become familiar with all elements of the approved sediment and stormwater management plan. Any questions or issues raised during this review should be discussed with the Contractor, Designer, DNREC and the Department at the pre-construction meeting. The Site Reviewer should bring up any questions about the plans at this meeting.
2. The Site Reviewer shall inspect all perimeter controls in accordance with the approved plan and the Construction Details for Erosion and Sediment Control prior to the Contractor beginning any earth disturbing activities and shall submit an Erosion and Sediment Control Report (E & S Report) to DNREC stating that all perimeter controls are in place and functioning.
3. The Site Reviewer shall perform sediment and stormwater reviews of the site jointly with a member of DelDOT's construction inspection staff. These inspections shall be completed at least weekly and immediately after any significant rain event. The Site Reviewer shall prepare and E & S Report, which details any corrective actions that need to be implemented and a completion date for each. If no deficiencies exist, the report shall document that all erosion and sediment control measures are in place and functioning. The Site Reviewer and the Inspector shall sign and date the E & S Report at the conclusion of the field inspection. By close of business that day, the report shall be forwarded, via email or FAX, to the Contractor's Superintendent for Implementation with copies sent to the Department's Construction Engineer, the Project Resident, DNREC and the Contractor's engineer.
4. With concurrence of the Engineer, once all land disturbing activities are completed and all permanent erosion and sediment controls and stormwater management elements are in place and vegetatively stabilized, the Site Reviewer shall contact DNREC and schedule an as-built inspection of these features.

B. Contractor's Professional Engineer. The Contractor's Professional Engineer is responsible for the following:

1. The Contractor's PE shall supervise the Site Reviewer and assure that he or she is performing all of his or her duties and completing all reporting requirements within the timeframes identified in this specification.
2. The Contractor's Professional Engineer shall review, sign and date all E & S Reports that proposed corrective actions that will require plan revisions.
3. The Contractor's Professional Engineer shall sign and seal any Plan Revisions the Contractor proposes to the stormwater management plan, the construction phasing, or the erosion and sediment control plans.

C. Engineer. The Engineer is responsible for the following:

1. The Engineer is responsible for ensuring that all work is completed in accordance with the approved erosion and sediment control / stormwater management plan. The Engineer shall designate an E & S inspector who shall accompany the Site Reviewer on-site inspections.
2. The Engineer is responsible for assuring the contractor is providing a Site Reviewer if required by the General Notes of the construction plans. The Engineer is also responsible for referring to DNREC any Site Reviewer who fails to perform the duties assigned by this Contract.

D. DNREC. DNREC is responsible for the following:

1. DNREC shall be represented at the pre-construction meeting and at any erosion and sediment control specific meetings. Any concerns about plan implementation or general procedures shall be discussed and resolved at these meetings.
2. The Engineer and DNREC shall perform an as-built inspection of the permanent erosion and sediment controls and Stormwater management features to determine compliance with the approved Sediment and Stormwater Management Plan. If the Engineer or DNREC identifies deficiencies during the inspection, a letter will be issued to the Contractor. These deficiencies must be satisfactorily corrected prior to project closeout.
3. The Engineer shall complete the Notice of Intent (NOI) at the start of the project and the Notice of Termination (NOT) at the end of the project to meet the requirements of the NPDES Permit.

110.09 Vegetative Stabilization.

A. Interim and Final Stabilization. An area of the work shall be considered vegetatively stabilized for erosion control if it meets the criteria in one of the following two cases:

1. *Interim Stabilization.* The seeding and mulching items, sod, or erosion and sediment control items as noted on the Plans are in place and accepted by the Engineer.
2. *Final Stabilization.* Meets the requirement for the removal of the temporary erosion controls placed during interim stabilization, and has complete vegetation growth in accordance with section 734 as determined by the Engineer. Complete growth of vegetation includes permanent grass reaching a height of 3" (75 mm) over all seeded areas.

B. Incremental Stabilization. Side slopes, and other slopes 1:3 (vertical to horizontal) or steeper require placement of either temporary or permanent seeding and mulching as the work progresses in height increments not to exceed 4' (1.2 m) of embankment. This will minimize exposed soil on the slopes to bands of 9-12 feet as measured along the slope face.

C. Tracking of Slopes. During grading operations the Contractor shall track all slopes 1:3 (vertical to horizontal) or steeper to prevent gully and sheet erosion. The tracking shall be accomplished by driving cleated equipment such as a bulldozer up and down the slopes so the cleats make horizontally oriented indentations in the soil. All costs associated with tracking of slopes at regular increments shall be incidental to Section 202.

Prior to applying seeding items on slopes 1:3 (vertical to horizontal) or steeper, the Contractor shall track the slopes as described above in order to prepare a stable seedbed. All costs associated with tracking of slopes to prepare a seedbed shall be incidental to the topsoil item being applied to the slope surface.

D. Maximum Soil Exposure Times. All erodible earth material exposed by the Contractor's activities shall be vegetatively stabilized within the time frames specified below:

<u>Location</u>	<u>Maximum Time to Vegetatively Stabilize</u>
Sediment controls	Seven calendar days from initial construction (berms, ditches, traps, basins, etc.)
Areas meeting final grades	Seven calendar days from completion of grading
Areas not meeting final grades	Fourteen calendar days from ceasing work in that location

110.10 Temporarily Stockpiled Material. Erodible earth material designated on the Plans or required by the Engineer to be excavated and temporarily stockpiled for later use in the Project shall be located away from live streams and wetlands and placed only in areas deemed appropriate by the Engineer and DNREC.

The Contractor shall install the erosion and sediment control items designated on the Plans or as directed by the Site Reviewer, DNREC and/or the Engineer about the base of the pile in advance of the actual stockpiling operation. Erodible earth material shall be placed in piles of neat conformations. Side slopes shall be seeded and mulched as the pile is placed. All remaining unstabilized surfaces shall be seeded and mulched immediately following completion of the stockpiling operation.

If the Contractor proposes to stockpile erodible earth material in areas not designated on the Plans, it shall be the Contractor's responsibility to prepare and submit erosion and sediment control plans for those proposed areas, which are located within the Project's limits for approval by the Site Reviewer, DNREC and the Engineer. Materials shall not be stockpiled until an erosion and sediment control plan for the proposed stockpile has been approved by the Site Reviewer, DNREC and the Engineer. The Contractor is also responsible for getting any permits that are necessary.

If the Contractor proposes to stockpile erodible earth material in area outside of the Project's limits, it shall be the Contractor's responsibility to prepare and submit for approval a plan for the use of the proposed site to the appropriate agencies having jurisdiction. No stockpiling operation shall commence in areas outside of the Project's limits until the Engineer has received copies of all plans and permits approved by the appropriate regulatory agencies and received copies of statements signed by the property owners, as required under Subsection 110.07, which release the Department from any claims arising from the use of the property. The Contractor shall be responsible for all costs associated with the installation of erosion and sediment controls required by other agencies having jurisdiction on stockpiles located outside the Project's limits.

110.11 Channel and Ditch Scour Protection. Riprap or other proposed channel lining items designated on the Plans at pipe, culvert, and bridge inlets and outlets and along channel lengths shall be placed before the pipes, culverts, bridges, and channels become operational.

110.12 Sediment-Laden Runoff. Stormwater runoff from disturbed areas shall be directed to an approved sediment control measure, such as a trap or basin, prior to release to ditches, storm drain systems, streams, or surface water bodies of any type. Any storm drain pipes, which convey sediment-laden runoff, shall discharge to a sediment trap or sediment basin prior to release from the Project limits of construction, or as directed by the Site Reviewer, DNREC and/or the Engineer.

110.13 Clean Water Diversions. Stormwater runoff from non-disturbed areas shall be directed away from work areas using any combination of berms, pipes, dikes, swales, pumps and slope drains or as shown on the Plans, or as directed by the Site Reviewer, DNREC and the Engineer.

110.14 Temporary Stream Crossings. Equipment shall not be operated in live streams without a stream diversion being installed to the satisfaction of the Engineer and DNREC. Temporary bridges or other structures shall be installed if the work requires the crossing of a stream by construction equipment.

110.15 Wash Water. If possible, equipment should be taken to off-site commercial facilities for washing and maintenance. If performed on-site, vehicles shall be washed with high-pressure water spray without detergents in an area contained by an impervious berm. Water containing sediment from any construction activity on the Project such as truck washing, saw cutting, milling, aggregate washing, and equipment washing and which is not regulated as a waste water under State or Federal statutes shall be discharged to a sediment trapping device and treated by filtration or settling. Sediment-laden wash water shall not be discharged directly to any ditches, storm drain systems, streams, or surface water bodies of any type. Water mixed with Bentonite (a natural material formed from clay particles) used for drilling or augering shall be collected and removed appropriately. Washout from concrete trucks shall be disposed of in a temporary pit for hardening and proper disposal. An appropriate use may be disposal in approved fill areas of the Project.

110.16 Waste Water. Water containing pollutants such as raw sewage, bitumens, fuels, lubricants, paint, or other harmful materials, is strictly regulated under State and Federal statutes and as such shall not be discharged into waters of the State as defined in Chapter 60, title 7 of the Delaware code or into natural or manmade channels or storm drain systems leading to waters of the State.

The Contractor is responsible for obtaining all permits required from the appropriate issuing authority for the discharge of waste waters from the Project site. The Contractor shall pay costs associated with waste water permit acquisition. The contractor shall submit copies of all permit approvals to the Engineer for the Engineer's records.

110.17 Water Pollution Violations. If a water pollution control violation exists on the Project which in the Engineer's judgment poses a public health or safety risk, such as a fuel or chemical spill or release of raw sewage, the Engineer shall refer the violation to the DNREC 24-Hour Toll Free Number, as shown in the Plans, for immediate action. The cost of cleanup shall be the sole responsibility of the Contractor if the DNREC investigation reveals the Contractor's actions caused the violation.

110.18 Maintenance. Erosion and sediment control items shall be maintained continuously throughout the duration of the Project, including periods when the Project is inactive or suspended. The Contractor shall repair, replace, or maintain any erosion and sediment control item promptly as noted on the E & S Report or as directed by the Site Reviewer, DNREC or the Engineer. Any eroded surface shall be stabilized, and any accumulated sediment not trapped by a control measure shall be removed and disposed of in an approved stockpile area or hauled off-site. Access shall be maintained to all sediment control devices until construction phasing and stabilization allow the removal of those controls that are no longer required.

Costs associated with repairing, replacing, and maintaining the erosion and sediment control items are incidental to the initial construction of each item. Sediment removal will be paid for separately under Section 250.

110.19 Erosion and Sediment Control Reports DNREC will provide standard Erosion and Sediment Control Report forms to the Contractor to be used for all E & S Reports. The reports will itemize work required to maintain compliance with the Contract. The Contractor shall complete the items of work listed on or before the completion dates indicated on the reports.

110.20 Failure to Implement and Maintain Erosion and Sediment control Measures. Controlling erosion and sedimentation is the Contractor's responsibility under the Contract. If the Contractor fails at any time to implement and maintain the required erosion and sediment control provisions of the Contract, fails to supply a Site Reviewer, or fails to routinely perform E & S Inspections, complete the E & S Reports and correct deficiencies identified in the E & S Reports, the Engineer or DNREC will notify the Contractor, orally or in writing, to comply with the required erosion and sediment control provisions. If the Contractor fails to perform the work as directed orally or in writing from the Engineer, the Engineer shall take any or all of the following actions listed below to gain compliance.

- A. Limited suspension of Activity.** The Engineer will order a "Limited Suspension of Activity" for the specific land disturbing activities that are not in compliance. Activities necessary to bring the site into compliance will be permitted. The Engineer will establish completion dates for the erosion and sediment control work. Time charges will continue during a Limited Suspension of Activity.
- B. Withhold Progress payment.** The Engineer may withhold monthly estimate and payment for all contract items.
- C. Stop Work order.** The Engineer may suspend the performance of all construction, as noted in Subsection 105.02, until all items of work on the E & S Reports are complete and accepted.

Time charges will continue during this "Shut-Down" period and no claims for additional time or money shall be considered due to "Shut-Downs" resulting from the Contractor's failure to implement and maintain the required erosion and sediment control items.
- D. Deduct Cost of Work Completed By Others.** The Engineer may proceed with adequate forces and equipment of its own or a third party contractor to implement or maintain the erosion and sediment control items necessary to bring the Project into compliance with the Contract documents.

The entire cost to engage either a third party contractor or the Department's Maintenance personnel, including administration costs, will be deducted from monies due the Contractor.
- E. Default of Contract.** More than one "Shut-Down" for erosion and sediment control noncompliance may be considered as a failure to perform the terms of the contract and will be grounds for finding the Contractor in default of the Contract in accordance with Subsection 108.10. If the Contractor defaults on the erosion and sediment control provisions of the Contract, the Project will be referred to the DNREC for enforcement action.

110.21 Contractor Payment. Payment will be made at the unit prices bid for the quantities of the various erosion and sediment control items provided in the contract that are installed by the Contractor and accepted by the Engineer. Approved changes to the Erosion and Sediment Control Plans shall be paid at the applicable unit bid prices. Any additional work or corrections brought about as a result of errors by the Contractor, such as nonconformance with the contract documents and the construction phasing, staging, or sequencing will be made at the Contractor's expense.

110.22 Fines Resulting from Non-Compliance. If the Department receives any fines from DNREC, the Army Corps of Engineers or the EPA as a direct result of the Contractor's refusal to implement and maintain

the required erosion and sediment control, fails to supply a Site Reviewer, or fails to routinely perform E & S Reports, the Contractor will be responsible to pay the fines or the money will be deducted from monies due the contractor.

Delete Section 111-Dewatering Operations of the Supplemental Specifications in its entirety and modify as follows:

111.01 Permit Required. The State of Delaware, through the Department of Natural Resources and Environmental Control, division of Water Resources, Water Supply Section regulates the pumping of ground water at depths, rates, and durations that have the potential to affect water supplies, and the pumping of surface water at rates and durations that have the potential to affect water supplies and aquatic environments.

A permit is required when the work described in the Plans requires the deliberate drawdown of the water table using well points, sump pits, or other similar dewatering devices to lower the water table below the work area.

A permit is required when the work described in the Plans requires pumping of water from an excavation and pumping at a rate exceeding 50,000 gallons per day.

111.02 Licensing Requirement. When a permit is required, the Contractor shall be responsible for acquiring any and all licenses needed to install or operate the dewatering equipment or shall employ the services of properly licensed subcontractors, such as a licensed well driller.

111.03 Permit Acquisition. The Contractor shall obtain all necessary permits for dewatering and disposal of pumped water as required to construct and complete the Work. The Contractor shall not commence any dewatering operation without having first obtained the necessary dewatering permit from the Delaware Department of Natural Resources and Environmental Control (DNREC), Water Resources Division, Water Supply Section.

111.04 Permit Acquisition Time. Withdrawal of water at a rate exceeding 50,000 gallons per day will require public notice and possibly a public hearing prior to the issuance of a permit by DNREC. The contractor shall account for this permit acquisition time in the project schedule. No time extensions will be considered by the Department for the contractor's failure to account for this time in the project schedule.

111.05 Permit Costs. The Contractor shall pay all costs associated with a dewatering permit acquisition.

111.06 Submission of Approved Permits. The Contractor shall submit copies of all permit approvals to the Engineer for the Engineer's records.

111.07 Submittals. When a permit is required, the Contractor shall submit working drawings of the proposed dewatering system for review and acceptance in accordance with Section 105 of the Standard Specifications.

111.08 Dewatering. The Contractor shall provide for dewatering of the work area using any combination of pumps, sumps, suction and discharge lines and other dewatering system components necessary to remove surface water and, if necessary, ground water in order to facilitate the work described in the Plans or as ordered by the Engineer. The Contractor shall provide back-up equipment and replacement as necessary in order to ensure the continuous dewatering of the work area. Surface and ground water shall not be allowed to rise around the proposed work. Dewatering shall be continued until such time as the work has been brought to finished lines and grades, and accepted by the Engineer. None of the proposed work shown on the Plans shall be laid in water, unless otherwise indicated on the Plans or directed by the Engineer.

111.09 Dewatering Discharge. The Contractor shall assure that no soil particles are present in the discharge from the dewatering system. All pumped water from open excavations shall be directed to an approved sediment trapping device such as a dewatering bag, dewatering basin, portable sediment tank, sediment trap or sediment basin, prior to release to ditches, storm drain systems, streams or surface water bodies of any type.

111.10 Dewatering of Temporary Cofferdams for Culvert Construction. Upon completion of erection of a temporary dike to create a temporary cofferdam, the sediment laden water impounded within the cofferdam shall be pumped into a geotextile dewatering bag. Once the water level has been pumped down, further dewatering shall be accomplished in conjunction with a sump pit (pumping pit) constructed in

conformance with the details.

111.10 Protection of Work Area. The contractor shall install clean water diversions outside excavation limits to prevent the flow of surface water from undisturbed areas into open excavations using any combination of berms, pipes, dikes, pumps, etc. in order to establish a clean water diversion. The Contractor shall comply with applicable sediment control measures.

111.11 Protection of Adjacent Property. The Contractor shall dispose of pumped water into a suitable conveyance system without flooding or damage to adjacent property, buildings, structures, utilities, and other work. The Contractor shall protect adjacent structures and property from any damage that may occur as a result of settlement or other effects related to the removal of ground water and lowering of the water table. No dewatering discharge shall be drained into work completed or under construction without prior consent of the Engineer. Water shall be disposed of in such a manner as not to be a menace to the Public health. No discharge to the sanitary sewer system shall be allowed

111.12 Well Impacts. In the event the Contractor's dewatering operations affect any public or private potable water supplies or wells within the project area, the Contractor shall take whatever steps are necessary to provide uninterrupted water service to those so affected.

12/13/11

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 or your bid will be considered Non-responsive** and not considered for award.

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 or your bid will be considered Non-responsive** and not considered for award.

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

MODIFICATIONS TO REQUIRED FEDERAL CONTRACT PROVISIONS

The following modifications to the enclosed REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS (located elsewhere in this document) are effective January 18, 2009. Modifications are shown below. Old language is shown crossed out, new language is shown underlined. The full text is not shown, only portions that were modified.

V. STATEMENTS AND PAYROLLS

2. Payrolls and Payroll Records:

b. The payroll records shall contain the name, ~~social security number~~, and ~~address~~ an individually identifying number for each employee (e.g., the last four digits of the employee's social security number) of each such employee . . .

c. Each contractor and subcontractor shall furnish, each week in which any contract work is performed, to the SHA resident engineer a payroll of wages paid each of its employees (including apprentices, trainees, and helpers, described in Section IV, paragraphs 4 and 5, and watchmen and guards engaged on work during the preceding weekly payroll period). The payroll submitted shall set out accurately and completely all of the information required to be maintained under ~~paragraph 2b of this Section V~~ 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). ~~This~~ The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and ~~may be purchased from the Superintendent of Documents (Federal stock number 029-005-0014-1), U.S. Government Printing Office, Washington, D.C. 20402;~~ 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 FHWA, if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit them to the applicant, sponsor, or owner, as the case may be, for transmission to the FHWA the contractor, 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 sponsoring government agency (or the applicant, sponsor, or owner).

d.

(1) that the payroll for the payroll period contains the information required to be ~~maintained under paragraph 2b of this Section V~~ provided under Sec. 5.5(a)(3)(i) of Regulations, 29 CFR part 5, the appropriate information is being maintained under Sec. 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

- end -

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 \$626.67 per ton (\$690.79 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.

272503 – TRASH RACK

Description:

This work consists of furnishing all materials, fabricating, delivering and constructing trash racks for HDPE flared end sections as shown on the details in the Plans, as directed by the Engineer and as required by these Special Provisions.

Materials:

Materials shall conform to the requirements of Sections 603, 605 and 708 and shall be galvanized in accordance with Subsection 826.07 including all rebar, hardware and fasteners as shown on the Plans.

Working drawings shall be submitted in accordance with Subsection 105.04.

Construction Methods:

Trash Racks for HDPE flared end sections shall be constructed based on the details shown on the Plans and at the size and locations shown on the Plans.

Basis of Payment:

The quantity of trash racks for HDPE flared end sections will be paid for at the Contract unit price Per Each. Price and payment will constitute full compensation for furnishing, hauling and installing materials, including bar reinforcement; and for all labor, materials, equipment, tools, and incidentals required to complete the work. Design services for the trash racks for HDPE flared end sections including the preparation and submittal of working drawings shall be incidental to this item.

8/19/11

302514 - MILLED HOT-MIX BASE COURSE

Description:

It is the intent of this Special Provision to qualify the use of milled hot-mix asphalt pavement material in lieu of graded aggregate as a base course. All requirements of Section 302 shall remain in effect except as modified below:

302.01 Description.

Delete the paragraph in its entirety and insert the following:

This work consists of furnishing, placing, and compacting milled hot-mix base course materials on a prepared subgrade or base.

302.02 Materials.

Delete the paragraph in its entirety and insert the following:

The material used to construct milled hot-mix asphalt pavement base courses shall be uniformly graded with a maximum size of 1 1/2" (38 mm).

302.04 Placement.

a. Equipment.

Replace "aggregate materials" with "milled materials"

b. Spreading and Compacting.

Replace the first and second paragraph with:

Milled material shall be placed in successive layers. Each layer shall be placed in a level, uniform cross-section not to exceed 12" in depth, loose measurement, unless otherwise approved by the Engineer. The milled material shall be deposited and spread parallel to the centerline and the layer shall extend to the full width as shown on the Plans. The milled material shall be handled so that no segregation of fine or coarse particles occurs. No more than 1,000 cu yd of material, as measured along the roadway centerline, shall be spread in advance of compaction operations. Each layer shall be properly compacted as specified, before starting the next layer.

The milled material shall be compacted by the following method: a sheepfoot roller (minimal 50 ton static roller) shall make the required number of passes on the base material to achieve the target density followed by a back-drag by either a bulldozer or a motor grader. After the pavement base material has been placed, a 15 ton/1800 vpm (minimum) vibratory steel wheel roller shall compact the base material. Compaction will be measured per subsection *Performance* below. In small areas where the above noted equipment cannot be used, the contractor must request approval from the Department to place the millings with other equipment. The Department reserves the right to reject or approve the areas for placement of millings as determined by the Engineer.

Replace the fourth paragraph with:

After compaction, all voids in the surface of each layer will be filled with millings and compacted (with the vibratory steel wheel roller) until the layer of base material is well bonded and firm, as determined by the Engineer.

c. Performance.

Delete the first three paragraphs and replace with the following:

Compaction of milled hot-mix asphalt pavement base courses will be monitored by measuring the in-place density using a nuclear density gauge and comparing it to a control strip target density. The mean base compaction shall be at least 98% of the control strip target density and sufficiently uniform that individual test results are at least 96% of the control strip target density, the base course represented by the test will be considered defective and the Contractor shall further compact the area. After further compaction, the original test site and one other randomly selected site within the area will be tested. The average of two test results will be included in the mean density for that day's placement.

To determine the control strip target density, a control strip with a minimum length of 300' (90 m) shall be constructed at the beginning of work on each pavement base. Each control strip is to remain in place and become a section of the completed roadway. A control strip shall have an area of at least 400 yd² (325 m²). For small areas, the Contractor may request to have a test strip waived. This request shall be submitted to the Engineer for review.

Upon completion of the rolling, the mean density of the control strip will be determined by averaging the results of ten nuclear density tests taken at randomly selected sites within the control strip. The mean density of the control strip shall be the target density for the remainder of the pavement base course which it represents. Compaction shall be expressed as a percentage of the target density.

302.05 Method of Measurement.

Delete the first paragraph and replace with:

The quantity of milled hot-mix base course will be measured by the cubic yard and will be paid for either under 302006 - Graded Aggregate Base Course, Type B, Patching or Item 302007 - Graded Aggregate Base Course, Type B. The volume of cubic yards will be measured as the number of square yards (square meters) of surface area of milled hot-mix base course, placed and accepted, multiplied by the depths shown on the Plans. If the depth of milled hot-mix base course, placed and accepted, is greater than the depth shown on the Plans, the Plan depth will be used to measure the quantity of payment.

Second paragraph:

Replace "graded aggregate base" with "milled hot-mix base course".

Delete the third paragraph.

Delete the fifth paragraph and replace with:

There will be no separate payment made for filling voids with millings as required under Subsection 302.04.

302.06 Basis of Payment.

Delete the first sentence and replace with:

Millings used for Base Course will be paid at the unit bid price for either Item 302006 - Graded Aggregate Base Course, Type B, Patching or Item 302007 - Graded Aggregate Base Course, Type B. All costs to bring the millings into compliance with the requirements of 302514 are incidental to either Item 302006 or 302007. No payment will be made under this item 302514.

Add:

No additional compensation will be made to the Contractor to crush, screen or otherwise modify the milled hot-mix base course to meet the necessary gradation.

401574 - PERVIOUS BITUMINOUS ASPHALT PAVEMENT

Description:

A. GENERAL

1. This specification is intended to be used for Pervious bituminous asphalt pavement in parking lots.
2. The work of this Section includes subgrade preparation, installation of the underlying Pervious media beds, and Pervious asphalt mix design, production, and installation. Pervious media beds refer to the material layers underlying the Pervious asphalt pavement. Pervious asphalt pavement refers to the compacted mix of modified asphalt, aggregate, and additives.
3. The primary requirements for the specifications of the mix are performance grade (PG) asphalt binder, binder content, binder draindown, aggregate gradation, air void content, retained tensile strength (TSR).
4. The work of this Section also includes pavement-marking paint.

B. SUBMITTALS

1. Material Certificates: For each paving material, from manufacturer.
2. Material Test Reports: For each paving material.

C. QUALITY ASSURANCE

All the quality assurance shall be done in accordance to DelDOT's quality assurance specifications.

D. DELIVERY, STORAGE, AND HANDLING

1. Deliver pavement-marking materials to Project site in original packages with seals unbroken and bearing manufacturer's labels containing brand name and type of material, date of manufacture, and directions for storage.
2. Store pavement-marking materials in a clean, dry, protected location within temperature range required by manufacturer. Protect stored materials from direct sunlight.

E. PROJECT CONDITIONS

1. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:
 - a. Asphalt Course: Minimum surface temperature of 60 °F at time of placement or actual ground above 50 °F.
2. Imprinted Asphalt Paving: Proceed with coating imprinted pavement only when air temperature is at least 50 oF and rising and will not drop below 50 oF within 8 hours of coating application. Proceed only if no precipitation is expected within two hours after applying the final layer of coating.

Materials:

A. PERVIOUS MEDIA INFILTRATION BEDS

1. Below the Pervious asphalt itself are located the Pervious media infiltration beds as shown in the Contract Documents from top to bottom: a 4-in. (minimum) thick layer of choker course of $\frac{3}{4}$ " crushed stone; an 8-in. (minimum) thickness layer of filter course of DelDOT

No.57; and a 4-in. (minimum) thick layer of reservoir course of $\frac{3}{4}$ " crushed stone.

2. Choker Course: Material for the choker course shall meet the following:
 - a. Maximum Wash Loss of 0.5%
 - b. Minimum Durability Index of 35
 - c. Maximum Abrasion Loss of 10% for 100 revolutions, and maximum of 50% for 500 revolutions.
 - d. Material for the choker course shall have the AASHTO No. 57 as specified in Table 1. AASHTO No. 3 gradation may also be used if approved by the Engineer.
3. Reservoir course
 - a. 4-in. (minimum) thickness of reservoir course to acts as a capillary barrier for frost heave protection.
 - b. 8-in. (30 cm) minimum thickness if subdrains are installed.
 - c. Subdrains, if included, are elevated a minimum of 4-in. from the reservoir course bottom to provide storage and infiltration for the water quality volume.

Table 1. Gradation Requirements for Choker and Reservoir Course Materials

U.S. Standard Sieve Size	Percent Passing %	
	Choker Course (Del No. 57)	Reservoir Course (Del No. 2)
3" (75 mm)	-	100
2 1/2" (63 mm)	-	90-100
2" (50 mm)	-	35-70
1 1/2" (37.5 mm)	100	0-15
1" (25 mm)	95-100	-
3/4" (19 mm)	-	0-5
1/2" (12.5 mm)	25-60	
3/8" (9.5 mm)	-	-
#4 (4.75 mm)	0-10	-
#8 (2.36 mm)	0-5	-
#10 (2.0 mm)	-	-
#40 (0.42 mm)	-	-
#200 (0.075 mm)	-	-

B. PERVIOUS ASPHALT MIX

1. Bituminous surface course for pervious paving shall be a minimum of 4 inches thickness with a bituminous mix of 5.75% to 6% by weight dry aggregate. In accordance with ASTM D6390, drain down of the binder shall be no greater than 0.3%. If more absorptive aggregates, such as limestone, are used in the mix, then the amount of bitumen shall be based on the testing procedures outlined in the National Asphalt Pavement Association's Information Series 131 – "Pervious Asphalt Pavements for Stormwater Management" (2008).
2. Use neat asphalt binder modified with an elastomeric polymer to produce a binder meeting the requirements of PG 76-22 as specified in AASHTO MP-1. The elastomer polymer shall be styrene-butadiene-styrene (SBS), or approved equal, applied at a rate of 3% by weight of the total binder. The composite materials shall be thoroughly blended at the asphalt refinery or terminal prior to being loaded into the transport vehicle. The polymer modified asphalt binder shall be heat and storage stable.
3. Hydrated lime shall be added at a dosage rate of 1.0% by weight of the total dry aggregate to mixes containing granite. Hydrated lime shall meet the requirements of ASTM C 977. The additive must be able to prevent the separation of the asphalt binder from the aggregate and achieve a required tensile strength ratio (TSR) of at least 80% on the asphalt mix when tested in accordance with NAPA IS131. The asphaltic mix shall be tested for its resistance to stripping by water in accordance with ASTM D 1664. If the estimated coating area is not above 95 percent, anti-stripping agents shall be added to the asphalt.
4. Pervious pavement shall not be installed on wet surfaces or when the ambient air temperature is 50 °F or lower. The temperature of the bituminous mix shall be between 300 °F and 350 °F (based on the recommendations of the asphalt supplier).
5. Coarse Aggregate.
 - a. Coarse aggregate shall be that part of the aggregate retained on the No. 4 sieve; it shall consist of clean, tough, durable fragments of crushed stone, or crushed gravel of uniform quality throughout. Coarse aggregate shall be crushed stone or crushed gravel and shall have a percentage of wear as determined by AASHTO T96 of not more than 40 percent. In the mixture, at least 75 percent, by mass (weight), of the material coarser than the 4.75 mm (No. 4) sieve shall have at least two fractured faces, and 90 percent shall have one or more fractured faces (ASTM D5821). Coarse aggregate shall be free from clay balls, organic matter, deleterious substances, and

a not more than 8.0% of flat or elongated pieces as specified in ASTM D4791 with a value of 5:1.

6. Fine Aggregate.

- a. The fine aggregate shall be that part of the aggregate mixture passing the No. 4 sieve. Fine aggregate shall consist of clean, sound, durable, angular shaped particles produced by crushing stone, or gravel that meets the requirements for wear and soundness specified for coarse aggregate. The aggregate particles shall be free from coatings of clay, silt, or other objectionable matter and shall contain no clay balls. The fine aggregate, including any blended material for the fine aggregate, shall have a plasticity index of not more than 6 and a liquid limit of not more than 25 when tested in accordance with ASTM D 4318.

7. Pervious Asphalt Mix Design Criteria.

- a. The Contractor shall submit a mix design at least 10 working days prior to the beginning of production. The Contractor shall make available samples of coarse aggregate, fine aggregate, mineral filler, fibers and a sample of the Performance Graded Asphalt Binder (PGAB) that will be used in the design of the mixture. A certificate of analysis (COA) of the PGAB shall be submitted with the mix design. The COA shall be certified by a laboratory meeting the requirements of AASHTO R18. The Laboratory will be certified by the Delaware DOT or qualified under ASTM D3666. HMA Plant/Field Technicians shall be certified by the Mid-Atlantic Region Technician Certification Program (MARTCP) and the Delaware Technician Certification Program.
- b. Bulk specific gravity (SG) used in air void content calculations shall not be determined and results will not be accepted using AASHTO T166 (saturated surface dry), since it is not intended for open graded specimens (>10% AV). Bulk SG shall be calculated using AASHTO T275 (paraffin wax) or ASTM D6752 (automatic vacuum sealing). Air void content shall be calculated from the bulk SG and maximum theoretical SG (AASHTO T209) using ASTM D3203.
- c. The materials shall be combined and graded to meet the composition limits by mass (weight) as shown in the Table 2 below.

Table 2. Pervious Asphalt Mix Design Criteria

Sieve Size (inch/mm)	Percent Passing (%)
0.75/19	100
0.50/12.5	85-100
0.375/9.5	55-75
No.4/4.75	10-25
No.8/2.36	5-10
No.200/0.075 (#200)	2-4
Binder Content (AASHTO T164)	5.75 - 6%
Fiber Content by Total Mixture Mass	0.3% cellulose or 0.4% mineral
Rubber Solids (SBR) Content by Weight of the Bitumen	1.5-3% or TBD
Air Void Content (ASTM D6752/AASHTO T275)	16.0-22.0%
Draindown (ASTM D6390)*	≤ 0.3 %
Retained Tensile Strength (AASHTO 283)**	≥ 80 %
Cantabro abrasion test on unaged samples (ASTM D7064-04)	≤ 20%
Cantabro abrasion test on 7 day aged samples	≤ 30%

*Cellulose or mineral fibers may be used to reduce draindown.

**If the TSR (retained tensile strength) values fall below 80% when tested per NAPA IS 131 (with a single freeze thaw cycle rather than 5), then in Step 4, the contractor shall employ an antistripping additive, such as hydrated lime (ASTM C977) or a fatty amine, to raise the TSR value above 80%.

Criteria

C. PERVIOUS ASPHALT MIX PRODUCTION

The pervious asphalt mix production shall meet the criteria set forth in DeIDOT's specifications. plant manufacturer's recommendations.

D. AUXILIARY MATERIALS

1. Sand: ASTM D 1073, Grade Nos. 2 or 3.
2. Paving Geotextile: nonwoven polypropylene; resistant to chemical attack, rot, and mildew; and specifically designed for paving applications.
3. Joint Sealant: ASTM D 6690 hot-applied, single-component, polymer-modified bituminous sealant.
4. Pavement-Marking Paint: Latex, waterborne emulsion, lead and chromate free, ready mixed, complying with FS TT-P-1952, Type II, with drying time of less than 45 minutes.
 - a. Color: White

Construction Methods:

The construction methods shall follow the DeIDOT's specifications except as noted below.

A. Subgrade Establishment

1. No work shall be performed in this section until subgrade is 100% completed and accepted by the Engineer.
2. Finish subgrade shall be compacted to a minimum 95% maximum dry density.

3. Subgrade shall be established to within the tolerance of +0.00' or -0.10' of the design subgrade elevation.
4. Where erosion of the native material subgrade has caused accumulation of fine materials and/or surface ponding, this material shall be removed with light equipment and the underlying soils scarified to a minimum depth of 6 inches with a York rake or equivalent and light tractor.
5. Bring subgrade to line, grade, and elevations indicated. Fill and lightly regrade any areas damaged by erosion, ponding, or traffic compaction before the placing of the stone subbase.
6. All bed bottoms shall be as level as feasible to promote uniform infiltration. For pavements subbases constructed on grade, soil or fabric barriers shall be constructed along equal elevation for every 6" of grade change to act as internal check dams. This will prevent erosion within the subbase on slope. The detail showing this construction is included in the Contract plans.

B. Aggregate Placement

1. Moisture Content: Aggregate shall contain 3.5% to 4.0% moisture content to ensure that fines do not migrate and to facilitate proper compaction. The Contractor must ensure that aggregate leaving the source plant meets this requirement and is required to apply water to aggregate on site to attain and maintain this minimum moisture content in stockpile and during all placement operations.
2. Prior to aggregate placement, remove any excess or contaminated backfill from the subsurface drainage trenches.
3. Surface must be free of standing water and subgrade stabilized prior to placement.
4. Materials to be placed in layers not exceeding 6" bulk and 4" compacted in depth. Each layer shall be spread uniformly with equipment that will not cause perceptible separation in gradation (segregation), preferably a self-propelled paving machine.
5. Should there occur, during any stage of the spreading or stockpiling, a separation of the material particles, the Contractor must immediately remove and dispose of segregated material and correct or change handling procedures to prevent further separation.

C. Aggregate Compaction

1. Use Static Tandem Drum-type roller of not less than five tons weight.
2. Each layer shall be compacted to a minimum density of not less than 95% of maximum dry density as determined by ASTM D698.
3. The density of aggregate courses shall be determined by AASHTO T 191 (Sand-Cone Method), AASHTO T 204 (Drive Cylinder Method), or AASHTO T 238 (Nuclear Methods) or other approved methods at the discretion of the Engineer.
4. The infiltration rate of the compacted aggregate courses shall be determined by ASTM D 3385 or approved alternate at the discretion of the Engineer. The infiltration rate shall be no less 5-30 ft/day or 50% of the hydraulic conductivity (ASTM D 2434) at 95% standard proctor compaction.

D. Aggregate Tolerances

1. The Contractor shall utilize a laser plane system for grade control.
2. The surface of the base course permeable aggregate in areas to be paved with Pervious asphalt shall not deviate from designated compacted grade within the range of -0.50" and 0.00".

3. Upon completion of fine grading, compaction, and Contractor confirmation of conformance with the tolerances, the Contractor shall notify the Engineer and schedule an inspection for approval. The Contractor shall have a laser plane system available to the Engineer for the inspections. The Contractor shall not be authorized to pave over the permeable aggregate until it has been inspected and approved by the Engineer.

E. Pervious Asphalt Concrete Paving Installation

1. Spreading and Finishing

- a. The Pervious asphalt shall be placed either in a single application at 4 inches (10 cm) thick or in two lifts. If more than one lift is used, sufficient care shall be taken to insure that the Pervious asphalt layer join completely by keeping the time between layer placements minimal, keeping the first layer clear from dust and moisture, and minimizing traffic on the first layer.
- b. The Contractor shall protect all exposed surfaces that are not to be treated from damage during all phases of the pavement operation.
- c. No material shall be produced so late in the day as to prohibit the completion of spreading and compaction of the mixture during daylight hours, unless night paving has been approved for the project.
- d. No traffic shall be permitted on material placed until the material has been thoroughly compacted and has been permitted to cool to below 100 °F. The use of water to cool the pavement shall not be permitted. The Engineer reserves the right to require that all work adjacent to the pavement, such as guardrail, cleanup, and turf establishment, is completed prior to placing the wearing course when this work could cause damage to the pavement. On projects where traffic is to be maintained, the Contractor shall schedule daily pavement operations so that at the end of each working day all travel lanes of the roadway on which work is being performed are paved to the same limits. Suitable aprons to transition approaches, where required, shall be placed at side road intersections and driveways as directed by the Engineer.

2. Compaction

- a. Any mixture that becomes loose and broken, mixed with dirt, or is in any way defective shall be removed and replaced with fresh hot mixture. The mixture shall be compacted to conform to the surrounding area. Any area showing an excess or deficiency of binder shall be removed and replaced. These replacements shall be at the Contractor's expense.
- b. The Contractor assumes full responsibility for the cost of repairing all damages that may occur to roadway or parking lot components and adjacent property if vibratory compaction equipment is used. After final rolling, no vehicular traffic of any kind shall be permitted on the surface until cooling and hardening has taken place, and in no case within the first 48 hours. For small batch jobs, curing can be considered to have occurred after the surface temperature is less than 100 °F. Curing time is preferably one week, or until the entire surface temperature cools below 100 °F. Provide barriers as necessary at no extra cost to the Owner to prevent vehicular use; remove at the discretion of the Engineer.

3. Surface Tolerances

- a. The surface will be tested by the Engineer using a straightedge at least 10 feet in length at selected locations parallel with the centerline. Any variations exceeding 1/8 inch between any two contact points shall be satisfactorily eliminated. A straightedge at least 10 feet in length may be used on a vertical curve. The straightedges shall be provided by the Contractor.
- b. Work shall be done expertly throughout, without staining or injury to other work.

Transition to adjacent Pervious asphalt pavement shall be merged neatly with flush, clean line. Finished pavement shall be even, without pockets, and graded to elevations shown on drawing.

- c. Pervious pavement beds shall not be used for equipment or materials storage during construction, and under no circumstances shall vehicles be allowed to deposit soil on paved Pervious surfaces.

4. Repair of Damaged Pavement

- a. Any existing pavement on or adjacent to the site that has been damaged as a result of construction work shall be repaired to the satisfaction of the Engineer without additional cost to the Owner.

5. Striping Paint

- a. Vacuum and clean surface to eliminate loose material and dust. Striping shall be performed in accordance with the plans. Paint shall be applied with mechanical equipment to produce uniform straight edges. Apply in two coats at manufacturer's recommended rates. Provide clear, sharp lines using white traffic paint
- b. Color for Handicapped Markings: Blue

G. Field Quality Control for Paving Operations

- 1. The full permeability of the pavement surface shall be tested by application of clean water at the rate of at least 5 gpm (23 lpm) over the surface, using a hose or other distribution device. Water used for the test shall be clean, free of suspended solids and deleterious liquids and will large puddle formation or surface runoff, and shall be observed by the Engineer.
- 2. Testing and Inspection: At Contractor's expense and as approved by the Engineer, soil inspection services, staking and layout control, and testing and inspection of site grading and pavement work shall be performed. Inspection and list of tests shall be reviewed and approved in writing by the Engineer prior to starting construction. All test reports must be signed by a licensed Professional Engineer in the State of Delaware.
- 3. Test in-place base and surface course for compliance with requirements for thickness and surface smoothness. Repair or remove and replace unacceptable work as directed by the Engineer.
- 4. Surface Smoothness: Test finished surface for smoothness using a 10 foot straightedge applied parallel with and at right angles to the centerline of the paved area. Surface will not be accepted if gaps or ridges exceed 3/16 of an inch.

Measurement and Payment:

The unit of measurement for pervious asphalt pavement will be square yard (SY). The Pervious bituminous asphalt pavement will be paid for at the contract unit price per square yard (SY). Payment will be full compensation for preparation and completion of the subgrade, furnishing all material including pervious asphalt, No. 57 Stone, No. 3 Stone, labor, equipment, supplies and incidentals to complete the work.

1/6/12

401699 - QUALITY CONTROL/QUALITY ASSURANCE OF BITUMINOUS CONCRETE

.01 Description.

This item shall govern the Quality Control/Quality Assurance Testing for supplying hot-mix asphalt plant materials and constructing hot-mix asphalt pavements.

The Contractor shall be responsible for providing the quality level of materials and construction incorporated into the Contract that will meet the requirements of the Contract. The Contractor shall perform all necessary quality control inspection, sampling, and testing. The Engineer will evaluate all materials and construction for acceptance. The procedures for Quality Control and Acceptance are described in this Section.

.02 Definitions.

- **Acceptable Quality Level (AQL):** That level of percent within limits (PWL) to which the Engineer will consider the work completely acceptable.
- **Acceptance Plan:** Factors that comprise the Engineer's determination of the degree of compliance with contract requirements and value of the product. These factors include the Engineer's sampling, testing, and inspection.
- **Delaware Asphalt Pavement Association (DAPA):** The organization representing the interests of hot-mix asphalt producers and Contractors. The Engineer has a copy of the DAPA officers' names and point(s) of contact.
- **Dispute Resolution:** The procedure used to resolve conflicts resulting from discrepancies between the Engineer's and the Contractor's results of sufficient magnitude to impact payment. The testing will take place at a location and time mutually agreeable by both the Engineer and the Contractor.
- **Full Depth Construction** – Construction of an adequate pavement box on a subgrade and subbase prepared by the contractor
- **Independent Assurance:** An unbiased and independent verification of the Quality Assurance system used, and the reliability of the test results obtained in regular sampling and testing activities. The results of Independent Assurance are not to be directly used as a basis of material acceptance.
- **Job Mix Formula (JMF)/Mixture Identification (ID):** The target values for individual aggregate size gradation percentages and the asphalt percentage, the sources of each of the component materials, the proposed proportions of component materials to be used to meet those target values, the asphalt proportion, and the mixing temperature. The Engineer will assign uniquely individual mixture identification for each JMF submitted and approved.
- **Lower Quality Index (QL):** The index reflecting the statistic related to the lower boundary to which a sample (or sample statistic) may deviate from the target value and still be considered acceptable.
- **Mean:** A statistical measure of the central tendency – the average value.
- **Operational Day:** A day in which the Engineer has approved a lane closure for the Contractor to perform work within an approved MOT plan.
- **Percent Within Limits (PWL):** That amount of material or workmanship that has been determined, by statistical method, to be within the pre-established characteristic boundary(ies).
- **Qualified Laboratory:** A laboratory mutually agreed upon by both DAPA and the Engineer as having proper test equipment that has been calibrated in accordance to AASHTO.
- **Qualified Technician:** Personnel mutually agreed upon by both DAPA and the Engineer as having adequate training, experience, and abilities to perform the necessary testing. The minimum qualifications are either a recognized nationally accredited or certified Superpave testing certificate or been working in hot-mix asphalt testing for at least one year.
- **Quality Assurance (QA):** All those planned and systematic actions necessary to provide adequate confidence that a product or service will satisfy given requirements for quality.
- **Quality Control (QC):** The sum total of the activities performed by the Contractor in order to assure that the product meets contract requirements.
- **Quality Control (QC) Plan:** The detailed description of the type and frequency of inspection, sampling, and testing deemed necessary to measure and control the various properties governed by the Specifications. The QC Plan must address the actions needed to keep the process in control, detect when the process is going out of control, and responses to correct the situation(s).
- **Quality Level Analysis:** A statistical procedure that provides a method for estimating the percentage of each lot or subplot of material, product, item of construction, or completed construction that may be expected to be within specified tolerances.

- **Standard Deviation:** A term used in statistics to indicate the value calculated from the square root of the difference between the individual measurements in a group and their average. Standard deviation is calculated by taking the square root of the sum of the squares of the differences of each of n values and the mean value, this sum first divided by (n-1).
- **Target Value:** The acceptable value for a controlling characteristic of a product. The JMF will establish each of these values for the material.
- **Test Methods:** Shall be AASHTO test methods. Copies of these test methods shall be available at each qualified laboratory.
- **Upper Quality Index (QU):** The index reflecting the statistic related to the upper boundary to which a sample (or sample statistic) may deviate from the target value and still be considered acceptable.
- **Volumetric Properties:** Air voids, voids in mineral aggregates (VMA), voids filled with asphalt (VFA), and dust to effective asphalt.

.03 Equipment.

(a) Material Production Test Equipment.

The Contractor shall 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. The Contractor shall 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 reject production. In the case of an equipment malfunction, and while waiting for repairs to equipment, the Engineer may elect to test the material at either another production facility or the Engineer's laboratory to obtain payment factors.

The following shall be the minimum calibrations 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.

(b) Pavement Construction Test Equipment.

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

.04 Quality Control (QC) Plan.

(a) Material Production QC.

(1) Job Mix Formula – Material Production.

The Contractor shall submit for approval to the Engineer the job mix formula (JMF) design of the component materials and target characteristic values for each mixture proposed for use. Once the JMF is submitted to the Engineer, the Engineer will have up to three weeks to review the submitted information. However, a provision for a more timely approval is available to the Contractor; first, the Contractor shall submit the proper documentation on Pinepave mixture design software for the Engineer's approval. After that approval from the Engineer, the Contractor shall produce the new mixture for a non-Department project. The Engineer will test the material, by taking three series per the specifications. If the Engineer's test results are within the specifications, then the mixture will be approved by the Engineer for Department projects.

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 hot-mix asphalt having the specified properties. For plant component

feed adjustments, RAP can be considered in the same manner as an individual aggregate component. 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.

The Contractor shall provide an ignition oven correction number for each JMF. The Contractor shall also supply to the Engineer weighed material of each JMF so correction numbers can be established for the Engineer's equipment for Dispute Resolution samples.

Prior to starting production of a new mixture, the Contractor shall submit a JMF. 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. In order to be approved, a re-design of the mixture will have to be completed by the Contractor for review and approval by the Engineer. The Contractor shall uniquely title each JMF. The Contractor shall submit 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.

If there is a change in the source of any of the component materials, other than asphalt, if there is a change in the proportions of the aggregate components or the percent passing for each sieve by more than 5 percent from the submitted JMF, or if there is a change in the percentage of the asphalt cement component by 0.2 percent or more, which causes the volumetrics to change from the originally submitted JMF, a new JMF is required. Also, if the asphalt cement target percentage is lowered, all volumetric criteria must still be achieved.

According to the Contractor's QC Plan, 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. The Engineer will reply to the proposed changes within one operational day and notify the Contractor of the effective date of the changes.

Although a new JMF is not required, the Contractor must notify the Engineer of any change in the proportions of the components. This notification shall include the total change made from the approved JMF proportions, and the effective time of the change.

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: G_{mm} : + / - 0.030 and G_{mb} : + / - 0.040

Table 1 - Aggregate Gradation - JMF and Control Point Information										
Sieves to be addressed by JMF/Range values are percentages passing by weight										
Sieve Size mm (inch)	4.75 mm	4.75mm Range	9.5 mm	9.5mm Range	12.5 mm	12.5mm Range	19.0 mm	19.0mm Range	25.0 mm	25.0mm Range
37.5(1.5)	No		No		No		No		Yes	100
25.0(1.0)	No		No		No		Yes	100	Yes	90-100
19.0 (3/4)	No		No		Yes	100	Yes	90-100	Yes	20-90
12.5(1/2)	Yes	100	Yes	100	Yes	90-100	Yes	23-90	Yes	
9.5 (3/8)	Yes	95-100	Yes	90-100	Yes	28-90	Yes		Yes	
4.75(#4)	Yes	90-100	Yes	32-90	Yes		Yes		Yes	
2.36(#8)	Yes		Yes	32-67	Yes	28-58	Yes	23-49	Yes	19-45
(#16)	Yes	30-60	Yes		Yes		Yes		Yes	
(#30)	Yes		Yes		Yes		Yes		Yes	

Table 1 - Aggregate Gradation - JMF and Control Point Information

Sieves to be addressed by JMF/Range values are percentages passing by weight										
Sieve Size mm (inch)	4.75 mm	4.75mm Range	9.5 mm	9.5mm Range	12.5 mm	12.5mm Range	19.0 mm	19.0mm Range	25.0 mm	25.0mm Range
(#50)	Yes		Yes		Yes		Yes		Yes	
(#100)	Yes		Yes		Yes		Yes		Yes	
.075(#200)	Yes	6-12	Yes	2-10	Yes	2-10	Yes	2-8	Yes	1-7

(2) Process Control – Material Production.

The Contractor shall submit in writing (letter or 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 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
- When the Contractor fails to comply to their approved QC Plan in reference to materials testing
- Substantial deviations to AASHTO or DelDOT procedures when running tests, sampling stockpiles, or testing hot mix.
- The use of any material not listed in the JMF.
- The use of the wrong PG graded asphalt.
- If samples fall within the Contractors action points in the QC Plan but the Contractor fails to take the corrective action in the approved QC Plan

If a Contractor is found in violation of any of these items, they will receive a written warning for their first violation. If the Contractor is found in violation a second time on any of the criteria, they will forfeit any bonus from that day's production. If the Contractor is found in violation a third time on any of the criteria, they will receive a five percent (5%) deduction for that day's production. If the Contractor is found in violation a fourth time, the plant will not be approved for production until such time that the Contractor addresses the violation of the QC plan to the satisfaction of the Engineer. If the Engineer approves the changes in advance, the Contractor may make changes to the QC Plan. All changes shall be submitted and approved in writing by the Engineer.

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, the Contractor 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.
- Locations where samples will be obtained and the sampling techniques for each test
- Load number of QC samples (1-10 if QA sample is not within trucks 1-10)
- 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 one working day as test results for each subplot 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 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.

(b) Pavement Construction – Process Control.

The Contractor shall perform Quality Control of pavement compaction by testing in-place pavement with a density gauge or by testing cores extracted from the pavement. The use of the nuclear density gauge shall conform to ASTM D2950; the use of other density gauges shall be as per the manufacturer's recommendations and approved by the Engineer. The Contractor may use any method to select locations for the Quality Control.

.05 Acceptance Plan.

(a) Material Production – Tests and Evaluations.

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. 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 Contractor shall supply, capture, and mark samples, as directed, from delivery trucks before the trucks leave the production plant. 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; if the Contractor visually observes the specified delivery truck sample and does not want this sample to be sampled and tested for acceptance, that delivery truck will not be sent to a Department project. The next visually acceptable delivery truck to the Contractor shall be sampled for acceptance testing.

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. Unacceptable samples may be a basis for rejection of material if the QC plan is not followed as approved for sample retrieval. If the Contractor wishes to perform parallel tests with the Engineer, or to capture samples to be retained for possible Dispute Resolution, each of the samples for these purposes shall be obtained at the same time and location as the acceptance test sample. Either splitting a large sample or getting multiple samples that equally represent the material is acceptable. The Engineer will perform all splitting and handling of samples after they are obtained by the Contractor.

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 subplot basis. The size for each subplot shall be 100 to 500 tons and testing for the sub lots will be completed on a daily basis. For each subplot, 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 a mixture samples using a gyratory compactor.
- AASHTO T166, Method C (Rapid Method) – Bulk specific gravity of compacted samples.
- AASHTO T308 – Asphalt cement content.
- AASHTO T30 – Aggregate gradations, using samples from the asphalt cement content test.
- AASHTO T209 – Theoretical maximum specific gravity.
- ASTM Provisional Test Method – Rapid Drying of Compacted and Loose Bituminous Asphalt Specimens using Vacuum Drying Method

(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 using lots.

Prior to paving a road segment, the Contractor shall notify the Engineer of any locations within that road segment that may not be suitable to achieve minimum (93%) compaction due to existing conditions. The Contractor shall 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 shall 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 **.05 Acceptance Plan (a) Material Production – 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 1.5 feet from the newly placed longitudinal joint and 50 feet from a new transverse joint. If the Contractor chooses to cut companion cores, they shall be located within one foot of the Engineers cores along the longitudinal direction and in-line with the Engineers cores in the longitudinal plane.

Exactly at the locations marked by the Engineer, the Contractor shall cut a core, 6 inches in diameter, through the full lift depth. Cores submitted that are not from the location designated by the Engineer will not be tested and will be paid at zero pay.

The Contractor shall notify the Engineer prior to starting paving operations with approximations of the 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 then have 24 hours to mark the core locations. 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.

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

The Contractor shall cut each core with care in order to prevent damaging the core. The pavement shall have a maximum temperature of 140°F when cores are cut from it. Immediately upon removal of a core from the roadway, the Contractor shall adequately label it. The Contractor shall protect the core by supplying a 6-inch plastic concrete cylinder mold, or an approved substitute, and placing the core in it. If more than one core is in the same mold, the Contractor shall place paper between them. The Contractor shall attach a completed QC test record for the representative area to the corresponding core. The Engineer will also complete a test record for areas tested for the QA report and provide to Materials & Research. At the end of every production day, the Contractor shall deliver the cores to the Engineer for testing, processing, and report distribution.

The Contractor shall repair the core hole per Appendix A, Repairing Core Holes in Hot-Mix 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) – to determine the bulk specific gravity of the cores.
- AASHTO T209 – to calculate the theoretical maximum specific gravity and the density of the non-compacted mixtures.
- ASTM Provisional Test Method – Rapid Drying of Compacted and Loose Bituminous Asphalt Specimens using Vacuum Drying Method.

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.

.06 Payment and Pay Adjustment Factors.

The Contractor shall 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 hot-mix asphalt. Payment to the Contractor for the hot-mix asphalt item(s) will be based on the Contract price per ton and the pay adjustments described in this specification. The Engineer will determine pay adjustments for the hot-mix asphalt item(s) based on the Acceptance Plan. The Engineer will determine both a pay adjustment for the material and a pay adjustment for the pavement construction. Note that the material portion of the total pay adjustment is 70 percent and the pavement construction portion is 30 percent. For replaced material or work, the Engineer will not apply the Pay Adjustment applicable to the material or work replaced; a new Pay Adjustment will be calculated based on the qualities of the new material. Even if one portion of the pay adjustment (material or construction) is not applied, the Engineer may apply the pay adjustment to the other portion. All adjustments (bonus or penalty) shall be paid under this item number in the contract.

(a) Material Production – Pay Adjustment.

The Engineer will determine the material pay adjustment by evaluating the production material based on the following parameters:

- Gradation of the 2.36 mm (#8) sieve.
- Gradation of the 0.075 mm (#200) sieve.
- Asphalt cement content.
- Air void content

Using the JMF target value, the single test tolerance (from Table 3), 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):

$$QU = ((\text{JMF target}) + (\text{single test tolerance}) - (\text{mean value})) / (\text{standard deviation}).$$
3. For each parameter, calculate the Lower Quality Index (QL):

$$QL = ((\text{mean value}) - (\text{JMF target}) + (\text{single test tolerance})) / (\text{standard deviation}).$$
4. For each parameter, locate the values for the Upper Payment Limit (PU) and the Lower Payment Limit (PL) from Table 2 – 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 3 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.
9. For each lot, determine the final material price adjustment:

Final Pay Adjustment =

(Lot Quantity) x (Item Bid Price) x (Pay Adjustment Factor) x 70%. This final pay calculation will be paid to the tenth of a percent.

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. If the PWL of any single material characteristic is below 60, the Engineer may require the removal and replacement of the material at no additional cost to the Department.

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 out of the acceptable tolerance for any Materials pay criteria, 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.

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. If this request is approved, and the Contractor has made a change, the third load after the change will be 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 2 – 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
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

Table 2 – 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
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 3 - Material Parameter Weight Factors		
Material Parameter	Single Test Tolerance (+/-)	Weight Factor
Asphalt Content	0.4	0.30
#8 Sive (19 mm or >)	7.0	0.30
#8 Sieve (12.5 mm or <)	5.0	0.30
#200 Sieve (0.075 mm) Sieve	2.0	0.30
Air Voids (4.0% Target)	1.5	0.10

Table 4 - PWL Pay Adjustment Factors	
PWL	Pay Adjustment Factor (%)
100	+5
99	+4
98	+3
97	+2
96	+1
95	0
94	(-1)
93	(-2)
92	(-3)
91	(-4)
PWL (when <91)	(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. Note that the material portion of the total pay adjustment is 70 percent and the pavement construction portion is 30 percent.

1. Calculate the average density values from the subplot tests values, to the nearest 0.1 unit.
2. Calculate the Degree of Compaction:
Degree of Compaction = $\frac{((\text{Core Bulk Specific Gravity}) / (\text{Theoretical Maximum Specific Gravity})) \times 100\%}{1}$
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 to the 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:
Pay adjustment = (Lot Quantity) x (Bid Price) x (Pay Adjustment Factor) x 30%.

Table 5: Compaction Price Adjustment Highway Locations	
Degree of Compaction (%)	Pay Adjustment Factor (%)
>97	-100*
96	-3
95	0
94	0
93	+5
92	0
91	-15
90	-25
89	-30
≤88	-100*

* or remove and replace it at Engineer's discretion

Table 5a: Compaction Price Adjustment Other¹ Locations	
Degree of Compaction (%)	Pay Adjustment Factor (%)
>96	-100*
95	-2
94	0
93	+3
92	0
91	0
90	0
89	-1
88	-5

Table 5a: Compaction Price Adjustment Other¹ Locations	
Degree of Compaction (%)	Pay Adjustment Factor (%)
87	-15
86	-25
85	-30
84	-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.

.07 Dispute Resolution.

Disputes or questions about any test result shall be immediately brought to the attention of the Contractor and the Engineer. When there is a significant alleged discrepancy regarding the Engineer's acceptance test results, the Contractor must claim a dispute within two operational days of the test date. 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.

For third party resolution testing, it can be either at 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 Contractor properly captured, labeled, and stored, as described in the second paragraph of the section of these specifications titled **.05 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. If the Dispute Resolution sample substantiates the original acceptance test result, the Contractor, after two such Dispute Resolution samples, will be charged a fee of \$125 for all further Dispute Resolution cores that substantiate the acceptance test result. If the Dispute Resolution sample substantiates the Contractor's test result, the Contractor will not be charged a 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.

7/28/11

Appendix A - Repairing Core Holes in Hot-Mix Asphalt Pavement

Description.

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

Materials and Equipment.

The following material shall be available to complete this work:

- Patch Material – A 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 – Shall be mechanical, with a flat, circular tamping face smaller than 6 inches in diameter. The tamping head shall be connected to an electrical, pneumatic, or gasoline driven tamping device.

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. 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.

Appendix 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 Hot-Mix 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
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:

$$\begin{array}{rclcl}
 \text{Existing HMA} & 2 * 0.32 & = & 0.64 \\
 \text{GABC} & 7 * 0.14 & = & \underline{0.98} \\
 & & & 1.62
 \end{array}$$

For the Type C lift the calculation would be:

$$\begin{array}{rclcl}
 \text{Newly Placed B} & 2.25 * 0.4 & = & 0.90 \\
 \text{Existing HMA} & 2 * 0.32 & = & 0.64 \\
 \text{GABC} & 7 * 0.14 & = & \underline{0.98} \\
 & & & 2.52
 \end{array}$$

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

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

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

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

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

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

401818 - WMA, SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 115 GYRATIONS,
PG 64-22

401819 - WMA, SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 160 GYRATIONS,
PG 64-22

401820 - WMA, SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 205 GYRATIONS,
PG 64-22

401821 - WMA, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22, PATCHING

401822 - WMA, SUPERPAVE, TYPE B, 160 GYRATIONS, PG 64-22, PATCHING

401823 - WMA, SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 160 GYRATIONS,
PG-64-22, PATCHING

401824 - WMA, SUPERPAVE, TYPE C, 160 GYRATIONS, PG-64-22, WEDGE

401825 - WMA, SUPERPAVE, TYPE B, 160 GYRATIONS, PG-64-22, WEDGE

401826 - WMA, SUPERPAVE, TYPE C, 115 GYRATIONS, PG 64-22, (NON-CARBONATE
STONE)

401827 - WMA, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22, (NON-CARBONATE
STONE)

401828 - WMA, SUPERPAVE, TYPE C, 205 GYRATIONS, PG 64-22, (NON-CARBONATE
STONE)

401829 - WMA, SUPERPAVE, TYPE C, 115 GYRATIONS, PG 70-22, (NON-CARBONATE
STONE)

401830 - WMA, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 70-22, (NON-CARBONATE
STONE)

401831 - WMA, SUPERPAVE, TYPE C, 205 GYRATIONS, PG 70-22, (NON-CARBONATE
STONE)

401832 - WMA, SUPERPAVE, TYPE C, 115 GYRATIONS, PG 76-22, (NON-CARBONATE
STONE)

401833 - WMA, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 76-22, (NON-CARBONATE
STONE)

401834 - WMA, SUPERPAVE, TYPE C, 205 GYRATIONS, PG 76-22, (NON-CARBONATE
STONE)

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

Description:

Warm mix asphalt (WMA) is the generic term used to describe the reduction in production, paving, and compaction temperatures achieved through the application of one or more WMA technologies.

WMA 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 from a comparable mix without the Warm Mix Technology.

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.

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. The Contractor shall also be aware that the pay adjustment factors in item 401699 will be applied to the Superpave item payments to determine the bonus or penalty for the item.

Materials:

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.

Conform to the requirements of Subsections 823.01, 823.05- 823.17, and 823.25 - 823.28 of the Standard Specifications and the following for bituminous materials:

Asphalt Binder:

The asphalt binder shall meet the requirements of Superpave performance-grade asphalt binder, as referenced in the Plans, according to M 320¹, 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, $G^*/\sin(\delta)$	T 315	1.00 - 2.20 kPa
RTFO DSR, $G^*/\sin(\delta)$	T 315	≥ 2.20 kPa
PAV DSR, $G^* \sin(\delta)$	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 RAP used, the low temperature properties, per T 313, may be different than stated in M 320 or the previous table.

Recycled Materials:

The percentage allowance of recycled asphalt pavement 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.

No recycled asphalt shingles shall be used in WMA.

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	10
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	

¹Coarse Aggregate Angularity is tested according to D5821.

²Fine Aggregate Angularity is tested according to TP33.

³Clay Content is tested according to T176.

⁴Flat and Elongated is tested according to D4791 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, T96 Percent Loss, Maximum	40
Soundness, T104 Percent Loss, Maximum for five cycles	20
Deleterious Materials, T112 Percent, Maximum	10
Moisture Sensitivity, T283 Percent, Minimum	80

Supply all polish values to the Engineer upon request. The polish value of the composite aggregate blend 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 shall be greater than 8.0 when tested according to Maryland State Highway Administration 'MSMT 411 - Laboratory Method of Predicting Frictional Resistance of Polished Aggregates and Pavement Surfaces'. RAP shall be assigned a value of 4.0.

Mineral Filler:

Conform to M17.

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.

The contractor shall follow the manufacturer's recommendation for incorporating additives and WMA technologies into the mix. The contractor shall also 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.

Mixture Requirements:

Mix Design. Develop and submit a job mix formula for each mixture according to R35. Each mix design shall be capable of being produced, placed, and compacted as specified. Apply all mix design requirements for Superpave to the development of the WMA mix design.

Gradation: The FHWA Superpave 0.45 Power Chart shall be used 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 Hot-Mix. Unless otherwise noted in the Plans, the Type C shall meet the 3/8" (9.5 mm) Nominal Maximum Aggregate Size. Type B Hot-Mix 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 T11.

Thin WMA, Type C shall be a No. 4 (4.75 mm) Nominal Maximum Aggregate Size Only.

In addition to the results of the material requirements specified above, the following material properties shall be provided by the Contractor: bulk specific gravity G_{sb} , apparent specific gravity G_{sa} , and the absorption of the individual aggregate stockpiles to be used, tested according to T84 and T85 and reported to three decimal places along with the specific gravity of the mineral filler to be used, tested according to 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_{Max} . Height data provided by the SGC shall be employed to calculate volumetric properties at $N_{INITIAL}$, N_{DESIGN} , and N_{MAX} .

Superpave Gyratory Compactive (SGC) Effort:

DESIGN TRAFFIC LEVEL (MILLION ESAL'S)	N _{INITIAL}	N _{DESIGN}	N _{MAX}
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 (% - MINIMUM)
	N _{INITIAL}	N _{DESIGN}	N _{MAX}	25.0	19.0	9.5	12.5	4.75	
	≥90.5	96.0	# 98.0	12.5	13.5	15.5	14.5	16.5	
	3 to < 10								
	10 < 30								
≥ 30									
	≥ 89.0								

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 effective 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 T11 and T27.

Nominal Maximum Aggregates Size Control Points, Percent Passing										
SIEVE SIZE	25.0 mm		19.0 mm		12.5 mm		9.5 mm		4.75 mm	
	MIN	MA X	MIN	MA X	MIN	MAX	MIN	MA X	MIN	MA X
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 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:

Volumetric Property	Superpave Criteria
Air Voids (V_a) at (%) N_{max}	2.0 (min)
Air Voids (V_a) at N_{design} (%)	5.5 (max)
Voids in Mineral Aggregate (VMA) at N_{design}	
25.0 mm Bituminous Concrete Base Course	-1.2
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	

Design Evaluation:

The contractor shall furnish a Job Mix Formula (JMF) for review and approval. The Engineer may elect to evaluate the proposed JMF and suitability of all materials. 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.

The proposed JMF shall include the following:

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

Plot of the three trial asphalt binder contents at $\pm 0.5\%$ 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 $N_{initial}$, N_{design} , and N_{max} .

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

% of G_{mm} at N_{design} , VMA at N_{design} , VFA at N_{design} , Fines to effective asphalt binder (P_{be}) ratio, and unit weight (kg/m³) at both N_{design} and N_{max} .

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 T209.

The JMF shall also include the NCAT Ignition Oven calibration for the specific materials utilized for this mix.

Construction:

Production Plants. The contractor shall modify and/or operate their production plant as required by the manufacturer to introduce the WMA technology.

Weather Limitations. Place mix only on dry, unfrozen surfaces.

The minimum ambient temperature shall be 32 degrees F.

The following table of ambient temperatures for various binder grades and lift thicknesses for placement with the following parameters:

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

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

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

Compaction:

Compaction shall be tested and paid per Item 401699 - Quality Control/Quality Assurance of Bituminous Concrete .05 (b) Pavement Construction - Tests and Evaluations.

Method of Measurement and Basis of Payment:

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

The item 401699, will define adjustment factor to be applied to the bituminous concrete payments for bonus or penalty.

9/6/11

602615 - MODULAR BLOCK RETAINING WALL

Description:

This work consists of furnishing all materials and constructing a modular block retaining wall in accordance with the locations, notes, details on Plans and as directed by the Engineer.

Submittals:

Contractors shall provide a system specific submittal package to the Engineer for approval at least thirty (30) days prior to construction for approval. Incomplete submittal packages will not be reviewed.

A. Submit the following at least thirty (30) days prior to construction for approval

1. Product Data:
 - a. Material description and installation instructions for each manufactured product specified including Modular Block Retaining Wall Units (MBRW) and Geosynthetic Reinforcement.
 - b. Name and address of the production facility where the proposed MBRW units will be manufactured. All units to be manufactured at the same facility.
 - c. Notarized letter from the MBRW manufacturer stating that the units supplied for this project are manufactured in complete compliance with Materials section of this specification. The letter shall state that the SRW units shown in the attached test reports are representative samples of the plants normal mix design and regular production runs.
2. Samples:
 - a. Furnish one unit demonstrating the color, face pattern, and texture of the MBRW unit.
 - b. Furnish 12-inch square or larger piece of the geosynthetic reinforcement specified.
3. Test Reports:
 - a. Independent laboratory reports indicating compressive strength, moisture absorption and freeze-thaw durability of the concrete retaining wall units from the proposed production facility. Only test performed within the past 12 months will be considered current and valid.
 - b. Independent test reports verifying the long-term design strength properties (creep, installation damage, and durability) and soil interaction properties of the geosynthetic reinforcement.
 - c. Independent test reports verifying the connection capacity between the geosynthetic reinforcement and the concrete retaining wall units.
4. Retaining Wall Installer Qualifications:
 - a. Notarized statement showing that the retaining wall installer has installed a minimum of 100,000 square feet of segmental retaining walls.
 - b. The Retaining Wall Installer shall have at least five years of experience and furnish ten (10) project references of similar size and scope to this project including the wall(s) height and square footage. References shall include the contact information of Owner or General Contractor.

Delivery, Storage and Handling:

- A. Concrete Retaining Wall Units and Accessories:** Deliver, store, and handle materials in accordance with manufacturer's recommendations, in such a manner as to prevent damage. Check the materials upon delivery to assure that proper material has been received. Store above ground on wood pallets or blocking. Remove damaged or otherwise unsuitable material, when so determined, from the site.

1. Exposed faces of concrete wall units shall be free of chips, cracks, stains, and other imperfections detracting from their appearance, when viewed from a distance of 10 feet.
 2. Prevent mud, wet cement, adhesives and similar materials that may harm appearance of units, from coming in contact with system components.
- B. Geosynthetics (including geosynthetic reinforcement, geotextile drainage filter) shall be delivered, stored, and handled in accordance with ASTM D4873.

Materials:

- A. Modular Block Retaining Wall units shall meet the following requirements:

- Physical Requirements:
 - a. Compression and Absorption: Concrete retaining wall units shall be tested in accordance with ASTM C140, Sections 6, 8 and 9. Concrete retaining wall units shall meet requirements of ASTM C1372, except the compressive strength requirements will be increased to a minimum of 3,500 psi and the maximum water absorption shall be limited to 7 percent, and unit height dimensions shall not vary more than plus or minus 1/16 inch from that specified in the ASTM reference, not including textured face. Test shall be performed within the past 6 months to be considered current and valid.
 - b. Freeze-Thaw Durability: Shall be tested in accordance with ASTM C1262 when required. Test shall be performed within the past 12 months to be considered current and valid.
 - c. Color: Grey Blend
 - d. Face Pattern Geometry: Beveled Cut
 - e. Size: Large, Medium and Small
 - f. Texture: Split Rock Face that exposes the natural aggregates.
 - g. Batter: Include an integral batter control shear connector to provide a consistent setback for each wall course. Initial wall batter shall not exceed 7 degrees.

- B. Examples of Approved Systems

- Anchor Wall Systems
- Allen Block Retaining Wall Systems
- KeyStone

Other systems can be approved at the discretion of DelDOT.

- C. Geosynthetic Reinforcement shall be manufactured with high-tenacity polyester or HDPE in a grid or textile structure. The geosynthetic reinforcement must meet the long-term design strength, soil interaction, and connection capacity requirements as required by the design of the retaining wall.

1. Long-term Design Strength: As determined in accordance with Method A of the NCMA Design Manual for Segmental Retaining Walls, Second Edition, Second Printing, 1997.
 - a. Ultimate Tensile Strength: The ultimate tensile strength of the geosynthetic reinforcement shall be determined in accordance with ASTM D4595 or ASTM D6637 and be greater than 4700 pounds per foot.
 - b. Creep: Creep testing of the geosynthetic shall be performed in accordance with ASTM D5262. The creep reduction factor shall be determined in accordance with FHWA-NHI-00-043 and be greater than 2,975 pounds per foot.
2. Soil Interaction: The soil interaction properties include the coefficient of direct sliding and coefficient of interaction as determined through direct shear and pullout testing, respectively.
 - a. Pullout: Shall be determined in accordance with ASTM D6706.
 - b. Direct Sliding: Shall be tested in accordance with ASTM D5321.

3. Connection Capacity: As determined in accordance with ASTM D6638.
- D. Leveling Pad – Crushed stone meeting requirements for DelDOT Type B Graded Aggregate Base. Minimum compacted base thickness shall be 6 inches.
- E. Free Draining Aggregate: The free draining aggregate shall meet the requirements for DelDOT No. 57 Stone.
- F. Reinforced Fill – Soil free of organics and debris and consisting of either GP, GW, SP, SW, or SM type, classified in accordance with ASTM D2487 and the USCS classification system and having an effective friction angle of at least 32 degrees. Maximum particle size for backfill is 4 inches.
- G. Drainage Pipe: Perforated or slotted PVC or corrugated HDPE pipe manufactured in accordance with D3034 and/or ASTM F405. The pipe may be covered with a geotextile filter to prevent fines migration into the pipe.
- H. Geotextile Filter: The geotextile filter shall meet the requirements for DelDOT Item 713002, Geotextiles, Separation.
- I. Impervious Material: Clay soil and/or low permeability geosynthetic shall have a coefficient of permeability of less than 10^{-6} cm/s as tested in accordance with ASTM D5084 or ASTM D4491, as applicable.
- J. Construction Adhesive: Exterior grade adhesive as recommended by the retaining wall unit manufacturer.

Construction Methods:

A. Site Inspection.

1. The Contractor's geotechnical engineer shall examine the areas and conditions under which the retaining wall system is to be erected, and submit a report sealed by a Professional Engineer registered in the State of Delaware to DelDOT of conditions detrimental to the proper and timely completion of the work. The Contractor shall not proceed with the work until unsatisfactory conditions have been corrected.
2. Promptly notify DelDOT of site conditions that may affect wall performance, soil conditions observed other than those assumed, or other conditions that may require a reevaluation of the wall design.
3. Verify the location of existing structures and utilities prior to excavation.
4. If unsuitable materials are encountered, it is the Contractor's responsibility, at no additional cost to DelDOT, to excavate the unsuitable material and replace with suitable material. The unsuitable material shall be disposed offsite.

B. Preparation.

1. Ensure surrounding structures are protected from the effects of wall excavation.
2. Excavation support, if required, is the responsibility of the Contractor, including the stability of the excavation and its influence on adjacent properties and structures.

C. Excavation.

Excavate to the lines and grades shown on the Plans. The Contractor shall replace any unsuitable soils discovered during excavation. Use care in excavating to prevent disturbance of the base beyond the lines shown.

D. Foundation Preparation.

1. Excavate foundation soil as required for footing or base dimension shown on the Plans, or as directed by the geotechnical engineer.
2. The geotechnical engineer will examine foundation soil to ensure that the actual foundation soil strength meets or exceeds that indicated on the Plans. Dispose soil not meeting the required strength.
3. The geotechnical engineer shall determine if the foundation soils will require special treatment or correction to control total and differential settlement.
4. Fill over-excavated areas with suitable compacted backfill, as recommended by the geotechnical engineer.

E. Base Course Preparation.

1. Place base materials to the depths and widths shown on the Plans, upon undisturbed soils, or foundation soils prepared in accordance with Section D above.
 - a. Extend the leveling pad laterally at least 6 inches in front and behind the lowermost concrete retaining wall unit.
 - b. Provide aggregate base compacted to 6 inches thick (minimum).
 - c. The Contractor may at their option, provide a concrete leveling pad in lieu of the granular base.
2. Compact aggregate base material to provide a level, hard surface on which to place the first course of units. A thin, less than 1 inch, can be used to assist in leveling the base units
3. Prepare base materials to ensure complete contact with retaining wall units.

F. Erection.

1. General: Erect units in accordance with manufacturer's instructions and recommendations, and as specified herein.
2. Place first course of concrete wall units on the prepared base material. Check units for level and alignment. Maintain the same elevation at the top of each unit within each section of the base course.
3. Ensure that foundation units are in full contact with natural or compacted soil base or lean concrete leveling pad.
4. Place concrete wall units side-by-side for full length of wall alignment. Alignment may be accomplished by using a string line measuring from the back of the block.
5. Place 12 inches (minimum) of drainage aggregate directly behind the concrete wall units. Fill voids in and between retaining wall units with drainage aggregate. Provide a drainage zone behind the wall units to within 12 inches of the final grade. Cap the backfill and drainage aggregate zone with 12 inches of impervious material.
6. Install drainage pipe at the lowest elevation possible, to maintain gravity flow of water to outside of the reinforced zone. Slope the main collection drainage pipe, located just behind the concrete retaining wall units, 2 percent (minimum) to provide gravity flow to the daylighted areas. Daylight the main collection drainage pipe to an appropriate location away from the wall system at each low point and at 50-foot (maximum) intervals along the wall.
7. Remove excess fill from top of units and install next course. Ensure drainage aggregate and backfill are compacted before installation of next course.

8. Check each course for level and alignment. Adjust units as necessary to maintain level and alignment prior to proceeding with each additional course. Install alignment devices (pins, clips, bars etc.) if required.
9. Install each succeeding course. Backfill as each course is completed. Pull the units forward until the locating surface of the unit contacts the locating surface/device of the units in the preceding course. Interlock wall segments that meet at corners by overlapping successive courses. Attach concrete retaining wall units at exterior corners with adhesive specified.
10. Install geosynthetic reinforcement in accordance with geosynthetic manufacturer's recommendations and the shop drawings.
 - a. Orient geosynthetic reinforcement with the highest strength axis perpendicular to the wall face.
 - b. Prior to geosynthetic reinforcement placement, place the backfill and compact to the elevation of the top of the wall units at the elevation of the geosynthetic reinforcement.
 - c. Place geosynthetic reinforcement at the elevations and to the lengths shown on the Drawings.
 - d. Lay geosynthetic reinforcement horizontally on top of the concrete retaining wall units and the compacted backfill soils. Ensure that the geosynthetic reinforcement extends to within one inch of the face of the concrete retaining wall units. Place the next course of concrete retaining wall units on top of the geosynthetic reinforcement.
 - e. The geosynthetic reinforcement shall be laid horizontally, pulled taut and be free from wrinkles prior to placement of the backfill soils. The geosynthetic reinforcement may be secured in place with staples, stakes, soil fill or by hand tensioning until the geosynthetic reinforcement is covered by 6 inches of loose fill.
 - f. The geosynthetic reinforcements shall be continuous throughout its embedment length. Splices in the geosynthetic reinforcement strength direction are not allowed.
 - g. Do not operate tracked construction equipment directly on the geosynthetic reinforcement. At least 6 inches of compacted backfill soil is required prior to operation of tracked vehicles over the geosynthetic reinforcement. Keep turning of tracked construction equipment to a minimum.
 - h. Rubber-tired equipment may pass over the geosynthetic reinforcement at speeds of less than 5 miles per hour. Turning of rubber-tired equipment is not allowed on the geosynthetic reinforcement.

G. Backfill Placement

1. Place reinforced backfill, spread and compact in a manner that will minimize slack in the reinforcement.
2. Place fill within the reinforced zone and compact in lifts not exceeding 6 to 8 inches (loose thickness) where hand-operated compaction equipment is used, and not exceeding 12 inches (loose thickness) where heavy, self-propelled compaction equipment is used.
 - a. Only lightweight hand-operated compaction equipment is allowed within 4 feet of the back of the retaining wall units. If the specified compaction cannot be achieved within 4 feet of the back of the retaining wall units, replace the reinforced soil in this zone with drainage aggregate material.
3. Compaction testing shall be done in accordance with ASTM D1556 or ASTM D2922.
4. Minimum Compaction Requirements for Fill Placed in the Reinforced Zone
 - a. At no time shall the soil compaction requirements be less than 95 percent of the soil's standard Proctor maximum dry density (ASTM D698) [modified Proctor maximum dry density (ASTM D1557)] for the entire wall height
 - b. Moisture Content: Within 2 percentage points of the optimum moisture content for all wall heights.
5. At the end of each day's operation, the wall installer shall slope the last level of compacted backfill away from the interior (concealed) face of the wall to direct surface water runoff away from the wall face.

- a. The Contractor is responsible for ensuring that the finished site drainage is directed away from the retaining wall system.
- b. In addition, the Contractor is responsible for ensuring that surface water runoff from adjacent construction areas is not allowed to enter the retaining wall area of the construction site.

H. Cap Unit Installation.

1. Apply adhesive to the top surface of the unit below and place the cap unit into desired position.
2. Cut cap units as necessary to obtain the proper fit.
3. Backfill and compact to top of cap unit.

I. Site Construction Tolerances.

1. Vertical Alignment: Plus or minus 1-1/2 inches over any 10-foot distance, with a maximum differential of 3 inches over the length of the wall.
2. Horizontal Location Control From Grading Plan
 - (i) Straight Lines: Plus or minus 1-1/2 inches over any 10-foot distance.
 - (ii) Corner and Radius Locations: Plus or minus 12 inches.
 - (iii) Curves and Serpentine Radii: Plus or minus 2 feet.
3. Immediate Post Construction Wall Batter: Within 2 degrees of the design batter of the concrete retaining wall units.
4. Bulging: Plus or minus 1-1/4 inches over any 10-foot distance.

J. Field Quality Control.

1. Installer is responsible for quality control of installation of system components.
2. The Contractor, at his/her expense, shall retain a qualified independent testing agency to perform quality assurance checks, evaluation of foundation soils, and compaction testing of the installer's work.
3. Installer shall correct work that does not meet these specifications or the requirements shown on the plans at no additional cost to DelDOT.
4. An independent testing agency, at the Contractor's expense, shall be retained to perform compaction testing of the reinforced backfill placed and compacted in the reinforced backfill zone. All the test results shall be submitted to DelDOT for approval.

(i) Testing Frequency

- a. One test for every 2 feet (vertical) of fill placed and compacted, for every 50 linear feet of retaining wall.
- b. Vary compaction test locations to cover the entire area of the reinforced soil zone, including the area compacted by the hand-operated compaction equipment.

K. Adjusting and Cleaning.

- A. Replace damaged units with new units as the work progresses.
- B. Remove debris caused by wall construction and leave adjacent paved areas broom clean.

Measurement and Payment:

The quantity of modular block retaining wall will be measured and paid at the Contract unit price per square foot. Square footage will be calculated by multiplying the height of the wall by the length of the wall. The height of the wall will be a vertical measurement from the top of the granular base or leveling pad to the top of the cap block. The length of the wall will be measured from outside edge of the wall to outside edge of the wall. Price and payment will constitute full compensation for placement of the wall, including modular

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blocks, geotextile, pipes, excavation, backfill, testing, design, and all labor, materials and equipment required to install the wall in accordance with these specifications and plans.

01/09/2012

612501 - PVC PIPE, 4"
612502 - PVC PIPE, 6"
612503 - PVC PIPE, 8"
612504 - PVC PIPE, 10"
612505 - PVC PIPE, 12"
612506 - PVC PIPE, 15"
612507 - PVC PIPE, 18"
612518 - PVC PIPE, 21"

Description:

This work consists of furnishing and installing PVC pipe, including all fittings, in accordance with the locations, details, notes on the Plans and as directed by the Engineer. The PVC pipe shall be used for subsurface drainage or for serving as conduit as specified on the Contract Plans.

Materials and Construction Methods:

The PVC pipe and fittings shall be free from defects and shall conform to the applicable requirements of ASTM D3034 Type PSM, and pipe shall be of Type PS46/SDR-35 for subsurface drainage pipe of the nominal size required by the Plans. Rubber gaskets shall be factory installed and conform to ASTM F 477. Pipe joints shall conform to ASTM D3212

The PVC pipe and fittings shall be free from defects and shall conform to the applicable requirements of ASTM D2466 PVC Pipe Fitting, Schedule 40 for conduit of the size required by the Plans.

The excavation and backfill for the pipe shall be performed in accordance with the applicable requirements of Section 612 of the Standard Specifications, unless otherwise modified on the Plans. The pipe shall be installed at the locations and to the lines, grades, and dimensions shown on the Plans or as directed by the Engineer.

Method of Measurement:

The quantity of PVC pipe will be measured as the actual number of linear feet of each size of pipe placed and accepted, measured from end to end of pipe, including structure wall thickness, but excluding structure interior.

Basis of Payment:

The quantity of PVC pipe will be paid for at the Contract unit price per linear foot for each size of pipe. Price and payment will constitute full compensation for furnishing, hauling, and installing pipe, for all cribbing or foundation treatment necessary to prevent settlement, for all shoring and sheeting, for the replacement of any pipe which is not true in alignment or which shows any settlement after laying, and for all material, labor, equipment, tools, and incidentals required to complete the work.

For pipe under 24" (600 mm) nominal inside diameter, the excavation, bedding, backfill and backfilling will be included in the price for this work. For pipe of nominal inside diameter 24" (600 mm and over), payment for excavation, bedding, backfill and backfilling will be in accordance with Section 208.

8/19/11

612519 - CORRUGATED POLYETHYLENE PIPE, TYPE C, 15"
612521 - CORRUGATED POLYETHYLENE PIPE, TYPE C, 12"
612527 - CORRUGATED POLYETHYLENE PIPE, TYPE C, 18"
612528 - CORRUGATED POLYETHYLENE PIPE, TYPE C, 24"

Description:

The item(s) shall consist of furnishing and installing corrugated polyethylene pipe with a corrugated surface both inside and outside in reasonably close conformity with lines and grades indicated on the plans, and as directed by the Engineer.

Materials:

Pipes, couplings and fittings shall be made of polyethylene compounds; and shall meet all applicable requirements of AASHTO M294 current edition Type C. The pipes and fittings shall be free of foreign inclusions and visible defects and pipe shall be cut squarely and cleanly so as not to adversely affect joining or connecting. Visible defects such as cracks, creases, unpigmented or nonuniformly pigmented pipe are not permissible in the pipe as furnished.

The pipe as noted below shall have minimum pipe stiffness at five percent deflection when tested in accordance with the requirements of ASTM D-2412:

Diameter [Inches (mm)]	Pipe Stiffness [psi (KPa)]
12 (300)	50 (345)
15 (375)	42 (240)
18 (450)	40 (276)
24 (600)	34 (234)

The fittings shall not reduce or impair the overall integrity or function of the pipe line, and shall include in-line joint fittings, such as couplings and reducers, and branch or complimentary assembly fittings such as tees, wyes, and end caps. These fittings may be installed by various approved methods, such as snap-on, screw-on, and wrap around. Fittings produced by the manufacturer's other than the supplier of the pipe shall not be permitted without the approval of the Engineer.

All fittings shall be within an overall length dimensional tolerance ± 0.5 inch (13 mm) of the manufacturer's specified dimensions when measured in accordance with AASHTO M-294 and shall not reduce the inside diameter of the pipe being joined by more than 0.5 inch (13 mm).

Reducer fittings shall not reduce the cross-sectional area of the small size.

Couplings shall be corrugated to match the pipe corrugations and shall provide sufficient longitudinal strength to preserve pipe alignment and prevent separation at the joint. Couplings shall be bell and spigot, split collar, or screw-on collar. Split collar couplings shall engage at least two full corrugation on each pipe section and screw on collars shall be in width at least one-half the nominal diameter of the pipe.

Pipe connections shall not separate to create a gap exceeding 3/16 inch (4.8) when measured in a radial direction between pipe and coupling, or between tongue and groove portions of pipe.

The Engineer may demand a manufacturer's certificate signed by the manufacturer's representation stating the product was manufactured, tested and supplied in accordance with all the applicable requirements of AASHTO M-294.

Construction Methods:

Pipe shall be installed in accordance with the applicable requirements of Section 614 of the Standard Specifications and notes on the plans. Backfill materials, and placement of the material shall conform to the applicable requirements of Section 208 of the Standard Specifications.

Joint shall be made with split couplings, corrugated to match the pipe corrugations; and shall engage a minimum of two full corrugations for on each pipe section at the joint. A neoprene gasket shall be used with the couplings to provide a soil tight joint.

Method of Measurement:

The number of feet of polyethylene pipe to be paid under the item(s) shall be the number of linear feet (meters) of pipe installed in place complete and accepted, measured from end to end of pipe.

Basis of Payment:

The number of linear feet of polyethylene pipe measured and as provided above shall be paid for at the contract unit price per Linear Foot (meter) bid for the item "Corrugated Polyethylene Pipe, Type C" of the diameter size(s) required by this contract, which price and payment shall constitute full compensation for furnishing, hauling and installing as described herein and required at the site, excavating, cribbing, shoring, and sheeting, and backfilling, for all labor, tools, equipment and necessary incidentals to complete the work.

1/20/12

612520 - CORRUGATED POLYETHYLENE PIPE, TYPE S, 15"
612522 - CORRUGATED POLYETHYLENE PIPE, TYPE S, 12"
612523 - CORRUGATED POLYETHYLENE PIPE, TYPE S, 18"
612524 - CORRUGATED POLYETHYLENE PIPE, TYPE S, 24"
612525 - CORRUGATED POLYETHYLENE PIPE, TYPE S, 30"
612526 - CORRUGATED POLYETHYLENE PIPE, TYPE S, 36"
612530 - CORRUGATED POLYETHYLENE PIPE, TYPE S OR D, 42"
612531 - CORRUGATED POLYETHYLENE PIPE, TYPE S OR D, 48"
612534 - CORRUGATED POLYETHYLENE PIPE, TYPE S, 8"
612544 - CORRUGATED POLYETHYLENE PIPE, TYPE S, 60"

Description:

This work consists of furnishing and installing corrugated polyethylene pipe with a smooth interior in a reasonably close conformity with lines and grades indicated on the Plans, and as directed by the Engineer.

Materials:

Pipes, couplings and fittings shall be made of polyethylene compounds, and shall meet all applicable requirements of AASHTO M294 current edition Type S or Type D for pipe sizes 12" (300 mm) and larger. Polyethylene pipes, couplings and fittings less than 12" (300 mm) in diameter shall meet the requirements of AASHTO M252 current edition. The pipes and fittings shall be free of foreign inclusions and visible defects and pipe shall be cut squarely and cleanly so as to not adversely affect joining or connecting. Visible defects such as cracks, creases, unpigmented or nonuniformly pigmented pipe are not permissible in the pipe as furnished.

Joints for all pipe and fittings shall use gasketed watertight bell/spigot or bell/bell couplers. The gaskets shall meet the requirements of ASTM F477 and the joint system shall be certified to meet a 10.8 psi (74 kPa) laboratory test per ASTM D3212. In addition, the joint system shall provide sufficient longitudinal strength to preserve pipe alignment and prevent separation at the joint.

The Contractor shall provide a manufacturer's certificate signed by the manufacturer's representative stating the product was manufactured, tested and supplied in accordance with all the applicable requirements of AASHTO M-294 (or ASSHTO M252 as applicable), ASTM F477 and ASTM D3212. The manufacturer shall verify compliance with AASHTO M294 through the National Transportation Product Evaluation Program.

Construction Methods:

General. The pipe shall be installed per the notes and details shown on the plans and in accordance with the requirements of ASTM D2321 or the manufactures published guidelines whichever is more stringent. The manufactures representative must be present at the beginning of the installation unless the engineer is confident in the contractors work. Having a representative on the site or not does not dismiss the contractor's liability.

Excavation. The trench in which the pipe is laid shall be excavated in accordance with Section 208 and The Standard Construction Details to the required depth. The width of the trench shall provide a minimum clearance of 18" (450 mm) between the trench wall and the O.D. of the pipe. If flowable fill is used, trench width shall provide 6" (150 mm) between the trench wall and O.D. of the pipe. Floating of pipe must be controlled. When multiple pipes are place side by side, a minimum of 18" (450 mm) shall be allowed between pipes or 6" (150 mm) if flowable fill is used.

Minimum cover for pipe under pavement, including local roads, subdivision roads and non-residential

driveways, shall be 1' measured from the top of pipe to bottom of pavement. The minimum cover for pipe under the travel way of roads with higher classifications shall be 2' measured from the top of pipe to the bottom of pavement. Otherwise, the cover shall be 1' measured from the top of pipe to top of grade unless otherwise recommended by the manufacturer to prevent pipe flotation.

Bedding of Pipe. Unless noted otherwise, all pipes shall be placed on Class C bedding as shown on The Standard Construction Details. The outside thirds of the bedding material shall be compacted. The areas around the joints shall be hand excavated to accommodate the bell when the outside diameter of the bell is greater than the pipe.

Joints. The spigot of the pipe shall be fully inserted into the bell to ensure a tight joint.

Laying Pipe. All pipe shall be laid in an upgrade direction unless otherwise directed. The pipe shall be laid with the lowest point of the inside diameter conforming to the flow line shown on the Plans. All pipe shall be carefully laid with the bell ends upgrade, with the spigot ends fully entered into the adjoining bell, and true to the lines and grades shown on the Plans, or as directed. Any pipe which is not in true alignment, or which shows any settlement after laying, shall be taken up and re-laid. Unsuitable material encountered below the flow line of the pipe shall be removed to a depth and replaced, as directed.

Backfill. Placement of backfill shall conform to Section 208 except as follows:

The initial backfill lift shall not exceed 12" (300 mm) of loose material or be higher than the spring line of the pipe. The material shall be sliced into the haunches of the pipe using a shovel. A maximum of 8" (200 mm) of loose material shall be placed for each remaining lift. Caution shall be taken not to hit the pipe with any mechanical compaction equipment. Caution shall also be taken not to disturb the pipe alignment.

Where heavy construction equipment is expected to travel over the shallow buried pipe the pipe shall be protected by temporarily placing a cover of material as recommended by the manufacturer.

Video Inspection:

Video inspection will be required for all pipe and in accordance with Section 612529 - Pipe Video Inspection and DelDOT's CCTV Policy Manual. If deflection in the pipe is clearly visible it will be assumed to be more than 5% and will have to be corrected. If the contractor wishes to challenge this decision they may do so either by direct internal measurement or by the use of a go-no-go mandrel with a minimum of nine points.

Method of Measurement:

The quantity of polyethylene pipe will be measured as the actual number of linear feet (linear meters) of each type of pipe placed and accepted, measured from end to end of pipe, including structure wall thickness, but excluding structure interior.

Basis of Payment:

The quantity of polyethylene pipe will be paid for at the Contract unit price per linear foot (linear meter) for each type of pipe. Price and payment will constitute full compensation for furnishing, hauling, and installing pipe; for excavation and backfill, for furnishing and placing Type C Borrow, (#57 stone may be substituted under roadway), for all cribbing or foundation treatment (Class C bedding) necessary to prevent settlement; for all shoring and sheeting; for the replacement of any pipe which is not true in alignment or which shows any settlement after laying; for verifying and correcting deflection, for protection of shallow buried pipe and for all material, labor, equipment, tools, and incidentals required to complete the work. Payment for excavation and replacement of unsuitable material encountered below the Class C bedding will be provided for under Section 208. Payment for Video inspection will be provided for under Section 612529 - Pipe Video Inspection.

9/14/05

612529 - PIPE VIDEO INSPECTION

Description:

This work consists of the video inspection of the storm drain systems, and/or sanitary sewer systems (all pipe sizes included) in accordance with these Specifications, and the details and locations shown on the Plans and by the Engineer.

Construction Methods:

The entire system(s) involved shall be numbered and then inspected by means of a closed-circuit television. The inspection will be done one section at a time in the presence of the Department's inspector. This work shall not be performed until just prior to the placement of the final pavement surface in case repairs need to be done. But, shall be done no sooner than thirty days from the date of pipe placement. The contractor shall correct any deficiencies in the existing and newly constructed pipe run at their expense.

The television camera used for the inspection shall be specifically designed and constructed for such inspection, capable of producing color video. Lighting for the camera shall be suitable to allow a clear picture of the entire periphery of the pipe. The camera shall be operative in 100% humidity conditions. The camera shall be equipped with Pan and Tilt, capable of scanning 360° to view the entire joint. The camera, television monitor, and other components of the video system shall be capable of producing quality to the satisfaction of the Department. If unsatisfactory, the equipment shall be removed and replaced.

The condition of the entire pipe run shall be documented by moving the camera through the pipe in either direction. At each joint the camera shall stop and pan the entire circumference of the joint. Between joints, the camera shall move at a nominal speed of 10 to 15 feet (3 to 4.5 m) per minute never exceeding 30 feet (9 m) per minute. Manual winches, power winches, television cable and power rewinds or other devices shall not obstruct the camera view or interfere with proper documentation of the pipe condition.

The technician operating the camera shall be experienced and qualified in conducting video pipe inspections. The technician shall have the capability of controlling the movement of the television camera, adjusting the brightness of the built-in lighting system and focusing the television camera by remote control. The importance of accurate distance measurements is emphasized. A distance meter and location indicator shall appear on the monitor and video indicating the exact location of the camera in the pipe between (2) structures.

The view scanned by the television camera shall be transmitted to a color monitor of not less than 12 in. (300 mm), measured diagonally across the screen. The monitor shall be located such that the State inspector has full visual access.

Documentation:

Television Inspection Logs: Typed reports shall be submitted to the Department for each location clearly showing the relation to the video meter at each problem point observed during inspection. In addition, other points of significance such as locations of catch basins, junction boxes, manholes, open joints, areas of settlement, misaligned pipe, unplugged lift holes, unusual conditions such as a change of pipe size or type within a run, roots, laterals, storm sewer connections, broken or spalled pipe, presence of scale or corrosion and other discernible features shall be recorded and a copy of such records shall be supplied to the Department.

For the purposes of documentation of a storm drain system, the following criteria shall be used to determine if a joint shall be considered an open joint:

ALL PIPE TYPES

MAXIMUM JOINT OPENING ALLOWED

12-36" (300 - 900 mm) ROUND	0.75" (19 mm)
42" (1050 mm) & LARGER	1.25" (32 mm)
ALL ELLIPTICAL	1.50" (38 mm)

DVD Recordings: The Contractor shall supply a minimum of two visual and audio recordings of the drainage and/or sanitary system that may be replayed. A minimum of one videos shall be submitted for each location but separate locations shall not be combined on the same DVD. Video recording playback shall be at the same speed that it was recorded. Good quality labeled DVDs in a hard plastic case shall be submitted and become the property of The Delaware Department of Transportation.

The report shall be submitted electronically in Excel format and list the Delaware State Plane NA D 83 Coordinates for each structure within the drainage system including catch basins, manholes and all inlet and outlet ends of pipes. This record shall be listed by structure number and record each structure's Northing and Easting coordinates along with street address. This Excel report is to be forwarded to the Department's NPDES electronically after review by the construction staff.

Method of Measurement:

The quantity of pipe video inspection will be measured by the linear feet (linear meter) as indicated on the video monitor and verified by the Engineer.

Basis of Payment:

The quantity of pipe video inspection will be paid for at the Contract unit price per linear foot (linear meter). Price and payment will constitute full compensation for furnishing all materials and equipment, obtaining coordinate and elevations, typed reports, DVD recordings, safety equipment, correcting any deficiencies in the existing and newly constructed pipe run and for all labor, tools and incidentals necessary to complete the work.

3/11/2011

612535 - CLEANING DRAINAGE PIPE, 15" - 24" DIA.
612536 - CLEANING DRAINAGE PIPE, GREATER THAN 24" DIA.

Description:

This work consists of cleaning existing drainage pipe. It is the intent that equipment and cleaning methods used to perform this work conform to Specification Guidelines prepared by the National Association of Sewer Service Companies (NASSCO) hereinafter referred to as the NASSCO Specifications.

Materials and Construction Methods:

Water used for cleaning shall be safe for all downstream environments. The source for the cleaning water shall be approved by the Engineer.

Equipment and construction methods shall be in accordance with the requirements under Sewer Line Cleaning, High-Velocity Jet (Hydrocleaning) found in the NASSCO Specifications. Equipment shall be operated in accordance with the manufacturer's instructions. The cleaning operation shall consist of up to three passes of the hydrocleaning equipment. If three passes do not adequately clean the pipe, the Engineer may direct the Contractor to use other procedures covered by other item(s) of work.

Material removed during the pipe cleaning operation shall be disposed by the Contractor at a site approved by the Engineer.

Method of Measurement:

The quantity of drainage pipe cleaned will be measured as the actual number of linear feet (linear meters) of pipe cleaned and accepted measured from end to end.

Basis of Payment:

The quantity of pipe cleaned will be paid for at the Contract unit price per linear foot (linear meter). Price and payment will constitute full compensation for furnishing equipment and water, disposing of removed material and for all labor, equipment, tools and incidentals to complete the work.

12/13/11

612537 - HEAVY CLEANING OF DRAINAGE PIPE

Description:

This work consists of cleaning existing drainage pipe that is blocked by deposits, roots, etc. that cannot be removed by normal hydrocleaning procedures. It is the intent that equipment and methods used to perform this work conform to the Specification Guidelines prepared by the National Association of Sewer Service Companies (NASSCO) hereinafter referred to as the NASSCO Specifications.

Materials and Construction Methods:

Equipment and construction methods shall be in accordance with the guidelines under Sewer Line Cleaning found in the NASSCO Specifications. The method(s) to be employed under this item of work shall address the situation encountered and shall be approved by the Engineer before starting work.

Method of Measurement:

The quantity of heavy pipe cleaning will be measured as the actual number of hours the Contractor is actively engaged in heavy pipe cleaning work.

Basis of Payment:

The quantity of heavy pipe cleaning will be paid for at the Contract price per hour. Price and payment will constitute full compensation for furnishing all labor, equipment, tools and incidentals required to complete the work.

12/13/11

617509 - CORRUGATED POLYETHYLENE FLARED END SECTION, 12"
617510 - CORRUGATED POLYETHYLENE FLARED END SECTION, 15"
617511 - CORRUGATED POLYETHYLENE FLARED END SECTION, 18"
617512 - CORRUGATED POLYETHYLENE FLARED END SECTION, 24"
617513 - CORRUGATED POLYETHYLENE FLARED END SECTION, 30"
617514 - CORRUGATED POLYETHYLENE FLARED END SECTION, 36"

Description:

The item(s) shall consist of furnishing and installing corrugated polyethylene flared end section in conformance with the locations, notes on the plans and as directed by the Engineer.

Materials and Construction Methods:

The flared end section shall be made of polyethylene compounds conforming to the requirements of AASHTO M294-90.

The flared end Section shall be attached to the end of the polyethylene pipe in accordance with the recommendations of the manufacturer's.

Basis of Payment:

The payment for the item(s) shall be made for at the contract unit price bid per Each for the item "Corrugated Polyethylene Flared End Section" of the diameter required by the contract, which price and payment shall constitute full compensation for furnishing and installing all materials, hauling, excavation and backfill, for cribbing, shoring, sheeting, for all labor, tools, equipment and necessary incidents to complete the work.

4/7/04

705504 - BRICK AND/OR BLOCK SIDEWALK
705506 - BRICK AND/OR BLOCK ROADWAY

Description:

This work consists of furnishing all materials and constructing brick and/or block sidewalk/roadway in accordance with these specifications and in reasonably close conformity with the lines, grades, dimensions, and notes on the Plans and as established by the Engineer.

Materials:

The brick/block, referred to as "pavers" elsewhere in this special provision, shall be the shape, style, size and color as specified on the Plans.

1. If the pavers specified are concrete unit pavers, they shall have an average compressive strength of 8000 psi (55 MPa) with no single paver having a compressive strength less than 7200 psi (52 MPa) at the time of delivery to the project. The pigment loading shall be a minimum of 3% and the pigmentation shall be uniform throughout the paver.
2. If the pavers specified are clay brick, the pavers shall meet the requirements of ASTM C902, Class SX, Type I.

In cases of existing sidewalk, the new pavers shall match the existing bricks in material, color and size, unless noted otherwise on the Plans.

If the Plans are silent regarding pavers, the Contractor shall supply clay brick in a color approved by the Engineer.

Sample pavers shall be submitted for approval and if requested by the Engineer, 3' x 3' (0.9 m x 0.9 m) sample panels shall be constructed for approval.

The edge restraint system shall be as specified on the Plans.

Sand for bedding shall conform to the requirements of Section 804 - Fine Aggregate.

Sand for filling joints shall conform to the requirements of Section 818 - Mortar Sand.

Portland Cement Concrete for sidewalk shall conform to the requirements of Section 812, Class B.

Expansion for sidewalk shall conform to the requirements of Subsection 808.06.

Construction Methods:

Place concrete for sidewalk to depths shown on plans and construct in accordance with Section 705 of the Standard Specifications.

Install the edge restraint system on the approved base as shown on the Plans where existing conditions do not provide edge restraint.

Spread a leveling course of bedding sand 1 to 1 1/2 inches (25 to 38 mm) thick, taking care that moisture is constant and the density is loose until the unit pavers are set and compacted. Place a material such as geotextile, or other approved material at curb joints to prevent sand from bleeding through.

Place pavers in patterns as designated on the Plans. If a joint spacing is not noted on the Plans, place the pavers with a tight joint. Select pavers from 4 or more cubes to blend color and texture variations. Do not use pavers with chips, cracks, discolorations, or other defects. Cut pavers with a motor driven masonry wet saw to provide clean, sharp, unchipped edges. Cut pavers to fit pattern specified and to neatly fit adjoining material.

Vibrate the pavers into the sand leveling course with a low amplitude plate vibrator capable of a 3,500 to 5,000 pound (1,600 to 2,300 kg) compaction force. Perform at least 3 passes across paving with vibrator. Protect paver face and edges by spreading a cushion of sand over the surface. Be careful not to destroy edges.

Spread dry sand and fill joints immediately after vibrating the pavers into leveling course. Brush and vibrate sand until joints are completely filled, then remove excess sand.

Prior to acceptance, any pavers that are chipped, broken, stained, or damaged shall be replaced at the contractor's expense.

Method of Measurement:

The quantity of brick and/or block paving will be measured as the number of square feet (square meters) of sidewalk and/or roadway completed in-place and accepted.

Basis of Payment:

The quantity of brick and/or block paving will be paid for at the Contract unit price per square foot (square meter). Price and payment will constitute full compensation for excavation, furnishing and installing portland cement concrete, expansion material, brick pavers, restraint system, bedding sand, geotextile and sand for filling joints and for all labor, equipment, tools, and incidentals necessary to complete the work.

12/13/2011

708512 - DRAINAGE INLET, SPECIAL I
708513 - DRAINAGE INLET, SPECIAL II
708514 - DRAINAGE INLET, SPECIAL III
708515 - DRAINAGE INLET, SPECIAL IV
708516 - DRAINAGE INLET, SPECIAL V
708517 - DRAINAGE INLET, SPECIAL VI
708518 - DRAINAGE INLET, SPECIAL VII

Description:

This work consists of furnishing all materials and constructing special drainage inlets (catch basins) in accordance with locations, notes, details on Plans and as directed by the Engineer.

Materials and Construction Methods:

Materials and construction methods for special drainage inlets shall conform to the applicable requirements of Section 708 of the Standard Specifications, and notes with details on the Plans.

Method of Measurement and Basis of Payment:

Measurement and payment for the special drainage inlets shall be made in accordance with the Subsections 708.15 and 708.16 of the Standard Specifications.

10/29/01

709518 - SANITARY CLEANOUT

Description:

This item shall consist of furnishing and installing cleanouts in accordance with the locations, details, notes on the Plans and as directed by the Engineer. The cleanout shall be used for accessing subsurface drainage as specified on the Contract Plans.

Materials and Construction Methods:

The cleanouts shall be free from defects and shall conform to the applicable requirements of ASTM D3034 Type PSM and pipe shall be of SDR-35 for subsurface drainage pipe of the nominal size required by the Plans. Rubber gaskets shall be factory installed and conform to ASTM F 477. Pipe joints shall conform to ASTM D3212.

The PVC pipe and fittings shall be free from defects and shall conform to the applicable requirements of ASTM D2466 PVC Pipe Fitting, Schedule 40 for conduit of the size required by the Plans.

The excavation and backfill for the cleanouts shall be performed in accordance with the applicable requirements of Section 612 of the Standard Specifications, unless otherwise modified on the Plans. The cleanouts shall be installed at the locations and to the lines, grades, and dimensions shown on the Plans or as directed by the Engineer.

All materials required for the completion of the cleanout shall be furnished and installed under this item, including wyes, riser pipes, standard stoppers, elbows, and plugs.

Method of Measurement:

The quantity of cleanouts will be measured per each.

Basis of Payment:

The payment for the cleanout shall be made at the contract unit price bid per Each and constructed and accepted in place in accordance with the Plans and Special Provisions. Price and payment shall constitute full compensation for furnishing and installing all materials, excavation, backfill, backfilling, disposal of surplus materials, and for all labor, equipment, tools and incidentals necessary to complete this item.

12/13/11

712540 - GEOGRID STABILIZATION**Description:**

This work shall consist of furnishing and placing a layer of geogrid to bridge unstable material and minimize the depth of undercutting. This item shall be used as directed by the Engineer and as specified herein. Verify all modes of stability and required minimum performance ratios.

This work includes providing a geogrid supplier representative or an independent QA personnel on-site at all times during the placement of the geogrid reinforcement.

Materials:

Geogrid.

- (i) Geogrid. The geogrid shall be an integrally formed grid structure manufactured of a stress resistant polypropylene material with molecular weight and molecular characteristics which impart: (a) high resistance to loss of load capacity or structural integrity when the geogrid is subjected to mechanical stress in installation; (b) high resistance to deformation when the geogrid is subjected to applied force in use; (c) high resistance to loss of load capacity or structural integrity when the geogrid is subjected to long-term environmental stress and (d) positive mechanical interlock load transfer mechanism.
- (ii) Geogrid Properties. The geogrid shown on the plans shall meet the property requirements listed in the table below. Reinforcement strength requirements represent minimum average roll values determined in accordance with ASTM D-4759.

<u>Property</u>	<u>UNITS</u>	<u>MD VALUES</u>
Aperture Dimensions ¹	mm (in.)	25 (1.0)
Minimum Rib Thickness ¹	mm (in.)	1.27 (0.05)
Ultimate Tensile Strength ²	kN/mm (lb/ft.)	19.2 (1,310)
True Tensile Strength @2% Strain ²	kN/mm (lb/ft.)	6.0 (410)
True Tensile Strength @5% Strain ²	kN/mm (lb/ft.)	11.8 (810)
Junction Efficiency ³	%	93
Flexural Stiffness ⁴	mg-cm	750,000
Aperture Stability ⁵	m-N/deg	0.65
Resistance to Installation Damage ⁶	%SC / %SW / %GP	95 / 93 / 90
Resistance to Long Term Degradation ⁷	%	100
Resistance to UV Degradation ⁸	%	100

Notes.

1. Nominal Dimensions.
2. True resistance to elongation when initially subjected to a load measured via ASTM D6637-01 without

deforming test materials under load before measuring such resistance or employing "secant" or "offset" tangent methods of measurement so as to overstate tensile properties.

3. Load transfer capability measured via GRI-GG2-05 and expressed as a percentage of ultimate tensile strength.

4. Resistance to bending force measured via ASTM D-5732-01, using specimens of width two ribs wide, with transverse ribs cut flush with exterior edges of longitudinal ribs (as a "ladder"), and of length sufficiently long to enable measurement of the overhang dimension. The overall Flexural Stiffness is calculated as the square root of the product of machine-and cross-machine-direction Flexural Stiffness values.

5. Resistance to in-plane rotational movement measured by applying a 20 kg-cm moment to the central junction of a 9 inch x 9 inch specimen restrained at its perimeter (U.S. Army Corps of Engineers Methodology for measurement of Torsional Rigidity).

6. Resistance to loss of load capacity or structural integrity when subjected to mechanical installation stress in clayey sand (SC), well graded sand (SW), and crushed stone classified as poorly graded gravel (GP). The geogrid shall be sampled in accordance with ASTM D5818-06 and load capacity shall be measured in accordance with ASTM D6637-01.

7. Resistance to loss of load capacity or structural integrity when subjected to chemically aggressive environments measured via EPA 9090 immersion testing.

8. Resistance to loss of load capacity or structural integrity when subjected to 500 hours of ultraviolet light and aggressive weathering in accordance with ASTM D4355-05.

Submittals:

(a) Submit geogrid product data sheet and certification from the Manufacturer that the geogrid product supplied meets the requirements listed in the table in Materials Section.

(b) Submit Manufacturer's installation instructions and general recommendations.

Manufacturer:

The Contractor shall submit a summary of the manufacturer's qualifications and 4 copies of the manufacturer's quality control manual, as specified in the Submittals section. The reinforcement manufacturer shall provide a qualified and experienced representative to be available on an as-needed basis during construction. The representative shall visit the site for consultation as requested by the Project Engineer.

Quality Assurance:

Pre-Construction Conference - Prior to the start of construction, the Contractor shall arrange a meeting at the site with the geogrid material supplier and, where applicable, the geogrid installer. DelDOT and the Engineer shall be notified at least 3 days in advance of the time of the meeting. A representative of the geogrid supplier shall be available on an "as needed" basis during construction, and as a minimum, shall be on site 2 hours on Day 1 and Day 2 of geogrid installation. Provide a written report of progress and findings to DelDOT each day at the completion of work.

Delivery, Storage and Handling:

The Contractor shall check products upon delivery to assure that the proper material has been received and is dry and undamaged. The Contractor shall protect the materials from damage and exposure following the guidelines presented in ASTM D 4873.

(a) Labeling. Each roll shall be labeled with the manufacturer's name, product identification, roll dimensions, lot number, and date manufactured.

(b) Handling. Geogrid rolls shall be handled and unloaded by hand, or with load carrying straps, a fork lift with a stinger bar, or an axial bar assembly. Geosynthetic rolls shall not be dragged,

lifted by one end, lifted by cables or chains, or dropped to the ground.

- (c) Storage. Geogrid shall be protected from deleterious materials, chemicals, sparks and flames, temperatures in excess of 160 degrees F, and any other environmental condition that may degrade the physical properties. Store at temperatures above -20 degrees F (-29 degrees C). Rolled materials may be laid flat or stood on end. Geogrid materials should not be left directly exposed to sunlight for a period longer than the period recommended by the manufacturer.

Construction Methods:

(a) Installation

- (i) Subgrade Preparation. Immediately prior to placement of the geogrid, the surface on which the geogrid will be placed shall be free of rock and other material that could damage the geogrid or the underlying geosynthetics.
- (ii) Placement. The geogrid shall be installed in accordance with the Manufacturer's recommendations. Geogrid shall be unrolled in the direction of reinforcement. After a layer of geogrid has been placed, suitable means that do not damage the underlying geogrid, shall be used to hold the geogrid flat and in place until cover material can be placed. Geogrid damaged during placement and covering shall be removed and replaced at no additional cost to DelDOT.
- (iii) Overlaps. Adjacent rolls of geogrid shall be positioned and overlapped as recommended by the manufacturer and approved by the Project Engineer.

(b) Cover GABC Placement

GABC shall be placed in lifts and compacted, in accordance with manufacturer's published instructions in such a manner that minimizes the development of wrinkles in the geogrid and/or movement of the geogrid. Final lap width at ends and sides shall be 2.5 feet. If the grid moves during fill placement, the grid must be adjusted to restore the 2.5 foot lap.

A minimum loose fill thickness of 6 inches is required prior to operation of tracked vehicles over the geogrid. Turning of tracked vehicles should be kept to a minimum to prevent tracks from displacing the fill and damaging the geogrid. When underlying substrate is trafficable with minimal rutting, rubber-tired equipment may pass over the geogrid reinforcement at slow speeds (less than 5 mph). Sudden braking and sharp turning movements shall be avoided. The performance requirement for GABC shall be in accordance to Section 302.

Inspection:

DelDOT or DelDOT's representative may randomly inspect geogrid before, during and after (using test pits) installation. Any damaged or defective geogrid (i.e. frayed coating, separated junctions, separated layers, tears, etc.) will be repaired/replaced at no additional cost to DelDOT.

Repair:

Any roll of geogrid damaged before, during and after installation shall be replaced by the Contractor at no additional cost to DelDOT. Proper replacement shall consist of replacing the affected area adding 3 ft. (1m) of geogrid beyond the limits of the affected area.

Measurement and Payment:

The unit of measurement for geogrid reinforcement will be square feet (SF). Payment will be made at the respective unit price listed on the bidding schedule. Payment will be full compensation for furnishing all material, labor, equipment, supplies and incidentals to complete the work.

8/17/11

715517 - PERFORATED PVC PIPE UNDERDRAIN, 6"

Description:

The item shall consist of fabricating and placing a 6" perforated PVC underdrain system as shown on the Plans, and as directed by the Engineer.

Materials:

Perforated 6" PVC pipe shall conform to the requirements of ASTM D3034 Type PSM, and pipe shall be of SDR-35 Type PS 46. The perforated PVC pipe shall have six 1/2" diameter holes spaced approximately 3.25" on center around the perimeter of the pipe. Rows shall be spaced 6" on center and rotated 30° from the last row.

PVC pipe fittings shall conform to the requirements of ASTM D3034. Rubber gaskets shall be factory installed and conform to ASTM F 477. Pipe joints shall conform to ASTM D3212

Construction Methods:

The underdrain shall be constructed in accordance with the details shown on the Plans and at the locations shown on the Plans. All joints shall be finished in accordance with the manufacturer's recommendations. Stone backfill shall be placed in 6 inch lifts and compacted with a vibratory plate to the satisfaction of the Engineer.

Method of Measurement:

The quantity of perforated underdrain will be measured as the number of linear feet of perforated 6" PVC underdrain complete in-place and accepted.

Basis of Payment:

The quantity of perforated 6" PVC underdrain will be paid for at the Contract unit price per linear foot. Price and payment will constitute full compensation for excavation, furnishing and installing 6" PVC pipe, and pipe fittings and for all labor, equipment, tools and incidentals necessary to fabricate perforations and complete the work. Geotextile required for the installation of underdrain shall be paid separately under item 713002 - Geotextiles, Separation.

8/19/11

727510 - WOOD RAIL FENCE

Description:

This work consists of furnishing all materials and constructing wood rail fence in accordance with the plans, details and specifications at the locations shown on the Plans and as directed by the Engineer.

Material and Construction Methods:

All materials, such as fence, posts, hardware and accessories shall be new. Concrete, if necessary, shall conform to Section 812, Class B of the Standard Specifications.

Lumber shall be grade 2, conforming to Subsection 601.02 of the Standard Specifications.

Lumber shall be treated in accordance with Subsection 814 (b) water borne preservative of the Standard Specifications.

All hardware shall conform to the requirements and Subsection 601.07 of the Standard Specifications.

Method of Measurement:

The quantity of wood rail fence will be measured by the linear feet along the actual fence constructed and accepted.

Basis of Payment:

The quantity of wood rail fence will be paid for at the Contract unit price per linear foot. Price and payment will constitute full compensation for all new materials and installing fence, concrete if required, excavation and backfilling, for all labor, tools, and incidentals necessary to complete the item.

1/16/01

735531 - SOIL RETENTION BLANKET MULCH, TYPE 1
735532 - SOIL RETENTION BLANKET MULCH, TYPE 2
735533 - SOIL RETENTION BLANKET MULCH, TYPE 3
735534 - SOIL RETENTION BLANKET MULCH, TYPE 4
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 Texas Department of Transportation/Texas Transportation Institute (TxDOT/TTI).

Soil Retention Blanket Mulch, Types 1, 2, 3, 4 and 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 TxDOT/TTI. The Department will remove products from the APL when field performance is unsatisfactory.

Types of Soil Retention Blanket Mulch Application

Type 1. Sandy soils on slopes steeper than 3H:1V

Type 2. Sandy soils on slopes equal to or flatter than 3H:1V

Type 3. Top-soiled slopes steeper than 3H:1V

Type 4. Top-soiled slopes equal to or flatter than 3H:1V

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 Types 1 through 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.

01/24/01

737523 - PLANTING

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 contaminants 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

743501 - WARNING LIGHTS, TYPE B
743504 - WARNING SIGNS
743507 - TEMPORARY BARRICADES, TYPE III
743525 - TEMPORARY WARNING SIGNS

Description:

This work consists of furnishing, installing and maintaining these temporary traffic control devices in accordance with the contract documents and with the latest edition of the manual titled "Delaware Manual on Uniform Traffic Control Devices (MUTCD)," hereafter referred to as the "Delaware MUTCD", including all revisions as of the date of the advertisement of this Contract and as directed by the Engineer.

As required under the section entitled "Certification" temporary traffic control devices shall be crashworthy in accordance with the National Cooperative Highway Research Program (NCHRP) Report 350, the memorandum issued August 28, 1998 by The USDOT Federal Highway Administration, and/or in accordance with the latest edition of the Manual for Assessing Safety Hardware (MASH), published by the American Association of State Highway and Transportation Officials (AASHTO). In case of conflict between the Delaware MUTCD and the requirements of NCHRP Report 350 and/or MASH, the requirements of NCHRP Report 350 and/or MASH shall govern.

Materials and Construction Methods:

Materials and construction of all signs and barricades shall meet all requirements including retroreflectorization of the Delaware MUTCD.

Unless specified on the Plans, all temporary traffic control devices shall be either new or restored to a satisfactory condition. All reconditioned and/or restored temporary traffic control devices must be approved by the Engineer before their use. Bases of warning signs, when required, shall be weighted with sandbags to resist overturning.

Lane closures necessary for the installation of barricades and the placement of other temporary traffic control devices shall be in accordance with the requirements of the Delaware MUTCD. Type III barricades shall have a minimum width of 4' and shall be placed in accordance with the applicable sections of the Delaware MUTCD. Type B warning lights with yellow lenses shall be placed above all diversion barricades as shown on the plans or as directed by the Engineer. Type B warning lights with red lenses shall be placed above all closure barricades as shown on the plans or as directed by the Engineer. Type B warning lights shall not be used for any other purpose except as described above.

Temporary traffic protection devices shall be suitably maintained at all times. Such maintenance shall include washing sign faces, replacing deficient batteries and lights, aligning lights properly, replacing retroreflective materials, relocating barriers, and any other maintenance of traffic protection devices deemed necessary by the Engineer to maintain traffic in a safe and effective manner.

Warning signs and temporary warning signs shall be retroreflective and shall have rounded corners as per FHWA publication "Standard Highway Signs". Warning signs shall be installed in accordance with the applicable sections of the Delaware MUTCD.

For purposes of measurement and payment the following definitions for signs shall apply:

Warning Signs (Item 743504) are those signs that are generally permanently installed at the beginning of a sustained construction phase (i.e., a construction phase exceeding 24 hours) and/or at the beginning of the project and shall remain in place for the duration of the sustained

phase and/or project.

Temporary Warning Signs (Item 743525) are those signs erected for a particular operation or phases of the project that do not exceed 24 hours and may remain in place just during working hours such as "Flagger Ahead" signs.

Any permanent warning signs used on the project shall be securely mounted on break away supports such that the supports are installed in the ground per the sign post manufacturers recommendations. Permanent warning signs shall not be mounted on portable sign stands except in the following situations:

- Any signs that are placed on a concrete island in the median of a divided highway may be mounted on portable sign stands with proper ballasting material in order to avoid drilling through the concrete to ground mount the sign.
- If a documented utility conflict exists and field adjustments to the sign location cannot be made, the sign may be mounted on a portable sign stand with proper ballasting material. Documentation of the utility conflict shall be provided to the Engineer.

All holes or trenches within paved roadways or sidewalks which could not be practically backfilled and paved prior to restoring the area to traffic, shall be covered by protective covers consisting of temporary steel plates, furnished, installed and secured in place by the Contractor at no extra cost to the Department.

All temporary traffic control work and related items shall either be performed entirely by the Contractor's own organization or totally subcontracted. Maintenance of the equipment shall not be subject to this requirement.

Certification:

Temporary traffic control devices used on all highways open to the public in this State shall conform to the Delaware MUTCD. All devices shall be crashworthy in accordance with the National Cooperative Highway Research Program (NCHRP) Report 350, the memorandum issued August 28, 1998 by The USDOT Federal Highway Administration, and/or in accordance with the latest edition of the Manual for Assessing Safety Hardware (MASH), published by the American Association of State Highway and Transportation Officials (AASHTO).

The Contractor shall submit certification for temporary traffic control devices used specifically on this project at or prior to the pre-construction meeting.

Certification of compliance with NCHRP report 350 and/or MASH is required for the following categories of temporary traffic control devices:

Category I contains small and lightweight channelizing and delineating devices, which includes cones, tubular markers, flexible delineator posts and drums, all without any accessories or attachments.

Category II includes temporary traffic control devices that are not expected to produce significant vehicular velocity changes to impacting vehicles. These devices, which shall weigh 45 kg (100 lbs.) or less, include Type III barricades, portable sign supports with signs, and intrusion alarms. Also included are drums, cones, and vertical panels with accessories or attachments.

For Category I devices, the manufacturer or Contractor may self-certify that the devices meet the NCHRP-350 and/or MASH criteria. The Contractor shall supply the Federal Highway Administration 2000, that have not been crash tested in accordance with NCHRP that falls under Category II and III devices.

Method of Measurement:

Temporary Barricades, Type III erected by the Contractor shall be measured in unit of L.F./Day furnished and used as required and approved by the Engineer.

Warning Lights, Type B will be measured in units of Each/Day furnished and used, and approved by the Engineer.

Warning Signs shall be furnished and erected by the Contractor and measurement shall be made per Each for the duration of the sustained phase and/or project. Temporary Warning Signs shall be measured in unit of Each/Day furnished and erected.

Basis of Payment:

The number of temporary barricades measured as described above, shall be paid for at the Contract unit price bid per L.F./Day barricade for the item "Temporary Barricades, Type III" which prices and payments shall be 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. Barricades stolen or damaged shall be replaced at the Contractor's expense.

The number of each type of warning lights measured as described above shall be paid for at the Contract unit price bid per Each/Day for the item, "Warning Lights, Type B" as required by the Contract, which prices and payments shall be full compensation for providing certification, furnishing, placing, maintaining and relocating the lights, all labor, equipment, tools, and all incidentals necessary to complete the work. Warning lights stolen or damaged shall be replaced at the Contractor's expense.

The number of Warning Signs, measured as described above, shall be paid for at the Contract unit price bid per Each for the item, "Warning Signs", and the Contract unit price bid per Each/Day for "Temporary Warning Signs" which prices and payments shall be full compensation for providing certification, furnishing, placing, maintaining, and relocating warning signs, and any temporary sign supports, hardware, materials and all labor, equipment, tools, and incidentals necessary to complete the work. Signs stolen or damaged shall be replaced at the Contractor's expense.

Payment for traffic control devices shall be based on the Contractor's daily certification, on a Department's form, that the number of temporary traffic control devices are fully operational (i.e., lights working, signs in good legible condition and in their proper position).

03/04/2010

743521 - BARRICADE WARNING LIGHTS, TYPE A
743522 - BARRICADE WARNING LIGHTS, TYPE B
743504 - WARNING SIGNS, STATIONARY
743524 - TEMPORARY BARRICADES, TYPE III

Description:

This work consists of furnishing, installing and maintaining these traffic control devices in accordance with the "Delaware Traffic Controls for Streets and Highways Construction, Maintenance, Utility & Emergency Operations" (latest edition with all revisions made up to the date of the Advertisement of this Contract), and from hereon called as the Traffic Manual, notes and details on the Plans and as directed by the Engineer.

As required under the section entitled "Certification" traffic control devices shall be certified as crashworthy in accordance with NCHRP Report 350. In case of conflict between the Traffic Manual and the requirements of NCHRP Report 350, the requirements of NCHRP Report 350 shall govern.

Materials and Construction Methods:

Materials and construction of all signs and barricades shall meet all requirements including reflectorization of the Traffic Manual.

Unless specified on the Plans, all traffic control devices shall be either new or restored to a satisfactory condition. All reconditioned and/or restored traffic control devices must be approved by the Engineer before their use. Bases of warning signs, when required, shall be weighted with sandbags to resist overturning.

Lane closings necessary for the installation of barricades and the placement of other traffic protection devices shall be in accordance with the requirements of the Traffic Manual. Type III barricades shall have a minimum width of 6'.

Traffic protection devices shall be suitably maintained at all times. Such maintenance shall include washing sign faces, replacing deficient batteries and lights, aligning lights properly, replacing reflective materials, relocating barriers, and any other maintenance of traffic protection devices deemed necessary by the Engineer to maintain traffic in safe and effective manner.

Warning signs and temporary warning signs shall be retroreflective and shall have rounded corners as per FHWA publication "Standard Highway Signs".

For purposes of measurement and payment the following definitions for signs shall apply:

Warning Signs (Item 743504) are those signs that are generally permanently installed at the beginning of a project and remain in place for the duration of the project.

Temporary Warning Signs (Item 743525) are those signs erected for a particular operation or phase of the project and may remain in place just during working hours such as "Flagger Ahead" signs or may remain in place for several days or more such as "Right Lane Closed" signs.

All holes or trenches within paved roadways or sidewalks which could not be practically backfilled and paved prior to restoring the area to traffic, shall be covered by protective covers consisting of temporary steel plates, furnished, installed and secured in place by the Contractor at no extra cost to the Department.

All traffic control work and related items shall either be performed entirely by the Contractor's own organization or totally subcontracted. Maintenance of the equipment shall not be subject to this requirement.

Certification:

Temporary traffic control devices used on all highways open to the public in this State shall be crashworthy in accordance with the National Cooperative Highway Research Program (NCHRP) Report 350 and the memorandum issued August 28, 1998 by The USDOT Federal Highway Administration **Information:** Crash Tested Work Zone Traffic Control Devices. It is the requirement of the Department that such certification be submitted for traffic control devices used on **all** projects, not just those involving the National Highway System.

In brief, certification of compliance with NCHRP report 350 is required for the following categories of traffic control devices:

Category I contains small and lightweight channelizing and delineating control devices which includes cones, tubular markers, flexible delineator post and drums, all without any accessories or attachments.

Category II includes traffic control devices that are not expected to produce significant vehicular velocity changes to impacting vehicles. These devices which shall weigh 100 pounds (45 kg) or less, include Type I, II and III barricades, portable sign supports with signs, and intrusion alarms. Also included are drums, cones, and vertical panels with accessories or attachments.

The schedule for implementation of certification is as follows:

Category I - Effective October 1, 1998, all devices shall be certified as conforming to NCHRP Report 350 criteria.

Category II - Effective October 1, 2000, all new devices shall be certified as conforming to NCHRP Report 350 criteria. Prior to October 1, 2002, the Contractor may use devices acquired before October 1, 2000, that have not been crash tested in accordance with NCHRP Report 350 criteria, provided the Contractor certified the such devices were acquired prior to October 1, 2000. If such devices are crash tested and fail, the Department reserves the right to have them replaced with aproved devices. Effective October 1, 2002, all devices shall be certified as conforming to NCHRP Report 350 criteria.

For DelDOT administered projects the certification shall be submitted to the Engineer prior to installation or use of traffic control devices. For Category I devices, the manufacturer may self-certify that the devices meet NCHRP-350 criteria. For Category II and Category III devices, the Contractor shall supply the Federal Highway Administration's NCHRP-350 acceptance letter for each type of device.

Method of Measurement:

Temporary Barricades, Type III, erected by the Contractor shall be measured per Each actually furnished and used for the duration of the Contract and approved by the Engineer. This payment shall include installation, maintenance, replacement, cleaning and removal. No separate compensation shall be made for shifting the barricades to different location(s) required after initial installation.

Barricade Warning Lights, Types A and B will be measured per Each for each type, actually furnished and used for the duration of the contract, as required and approved by the Engineer for the duration of the project.

Warning Signs (Stationary) shall be furnished and erected by the Contractor and measurement shall be made per Each. This installation payment shall include the installation, maintenance, replacement, relocation and cleaning for the duration of the contract, and final removal. Temporary Warning Signs shall be measured

in unit of Each/Day furnished, erected and removed.

Basis of Payment:

The number of each type of temporary barricade measured as described above, shall be paid for at the Contract unit price bid per Each for the item, "Temporary Barricades, Type III for the duration of the contract," as required by the Contract, which prices and payments shall be full compensation for furnishing, placing, maintaining, and relocating the barricades, all labor, equipment, tools, and all incidentals necessary to complete the work. Barricades stolen or damaged shall be replaced at the Contractor's expense.

The number of each type of barricade warning lights measured as described above shall be paid for at the contract unit price bid per Each for the item, "Barricade Warning Lights, Type A and/or Type B" as required by the contract for the duration of the contract, which prices and payments shall be full compensation for furnishing, placing, maintaining, and relocating the lights, furnishing all labor, equipment, tools, vehicles and all incidentals necessary to complete the work. Lights stolen or damaged shall be replaced at the Contractor's expense.

The number of Warning Signs, measured as described above, shall be paid for at the Contract unit price bid per Each for the item, "Warning Signs, Stationary" and "Temporary Warning Signs" paid for at the contract unit price per Each/Day, which price and payment shall be full compensation for maintaining, furnishing, placing and relocating warning signs, and any temporary sign supports, hardware, materials and all labor, equipment, tools, and incidentals necessary to complete the work. Signs stolen or damaged shall be replaced at the Contractor's expense. There shall be only one payment for each type of sign used for the duration of the contract.

Payment for traffic control devices shall be based on the Contractor's daily certification, on a Department's form, that the number of traffic control devices are fully operational (i.e., lights working, signs in good legible condition and in their proper position).

743538 - WOODEN SIGN SUPPORTS, 4" x 4"
743539 - WOODEN SIGN SUPPORTS, 4" x 6"
743540 - WOODEN SIGN SUPPORTS, 6" x 6"
743541 - WOODEN SIGN SUPPORTS, 6" x 8"

Description:

This work consists of furnishing and placing wooden sign support(s) of the size required by the Contract and the size of the sign panel to be placed on it and in accordance with these Specifications and in reasonably close conformity with the lines, grades, dimensions, and locations shown on the Plans or established by the Engineer. Wooden sign support(s) shall be of the size, type, and installed in such a manner so to break off when hit by a vehicle. The item(s) shall also include, but not be limited to, excavation of the foundation, furnishing and placing Class C concrete, and placing of foundation backfill, as may be required to complete the work as indicated on the Plans or as directed by the Engineer.

Materials:

Wooden sign support(s) shall range in size from a minimum nominal size of 4" x 4" (100 mm x 100 mm), to a maximum nominal size of 6" x 8" (150 mm x 200 mm). All wooden sign support(s) shall meet or exceed the requirements of Section 601 - Timber Structures and comply with the preservative treatment of timber as found in Section 814 of the Standard Specification, and AASHTO Standard Specification Section M 133.

The size of the wooden sign support(s) in relation to the size of the sign panel can be found on the following chart:

MAXIMUM SIGN PANEL / POST SIZES

MAXIMUM SIZE OF SIGN PANEL	POST SIZE (NOMINAL)
18" x 24" (450 x 600 mm)	4" x 4" (100 x 100 mm)
30" x 30" (750 x 750 mm)	4" x 6" (100 x 150 mm)
36" x 48" (900 x 1200 mm)	6" x 6" (150 x 150 mm)
> 36" x 48" (900 x 1200 mm)	6" x 8" (150 x 200 mm)

Sign panels 36" x 48" (900 mm x 1200 mm) or greater may require multiple 6" x 6" (150 mm x 150 mm) or 6" x 8" (150 mm x 200 mm) supports.

Construction Methods:

Wooden sign support(s) larger than 4" x 4" (100 mm x 100 mm), nominal size, shall be supplied with drilled breakaway holes adjacent to the post base. The breakaway hole may be either pre-drilled or field-drilled and centered on the support with the first hole located 4" (100 mm) and the second hole located 18" (450 mm) from the proposed finished grade and perpendicular to the travelway.

The breakaway hole size may be found for that sized post on the following chart:

BREAKAWAY HOLE SIZE CHART

POST SIZE	HOLE DIAMETER
4" x 4" (100 mm x 100 mm)	NOT REQUIRED
4" x 6" (100 mm x 150 mm)	1 1/2" (38 mm)
6" x 6" (150 mm x 150 mm)	2" (50 mm)
6" x 8" (150 mm x 200 mm)	3" (75 mm)

Wooden Sign Supports found protected by physical traffic barriers and located beyond the proper minimum deflection distance of the traffic barrier may not require drilled breakaway holes at the direction of the Engineer.

Wooden Sign Supports shall be placed in pre-excavated foundation holes of the width and depth found on the following chart:

FOUNDATION WIDTH AND DEPTH

SUPPORT SIZE	MINIMUM WIDTH	MINIMUM DEPTH
4" x 4" (100 x 100 mm)	14" (350 mm)	5' (1.5 m)
4" x 6" (100 x 150 mm)	14" (350 mm)	5' (1.5 m)
6" x 6" (150 x 150 mm)	18" (450 mm)	6' (1.8 m)
6" x 8" (150 x 200 mm)	18" (450 mm)	6' (1.8 m)

The support shall be installed plumb and true in the foundation and backfilled with material meeting the requirements of Borrow, Type C. When backfilling the Wooden Sign Supports, borrow shall be placed in six (6) inch (150 mm) lifts and compacted thoroughly in order to achieve maximum compaction. It is important to provide a rigid subsurface condition around the support to facilitate the breakage of the support when hit by a vehicle. Therefore, supports placed in non-excavated foundation holes, driven supports, or supports placed in loose or non-compacted fill shall not be allowed.

6" x 6" (150 x 150 mm) and 6" x 8" (150 x 200 mm) Wooden Sign Supports shall be installed in Class C Portland Cement Concrete Masonry. The diameter of the foundation shall remain the same, however, allowances shall be made to include a minimum of four (4) inches (100 mm) of concrete between the bottom of the post and the hole.

Before the support is placed in the foundation and prior to pouring concrete, the post shall be wrapped in 1/2 inch (12 mm) thick sheet styrofoam. The styrofoam shall cover all areas of the wooden support that will be exposed to the concrete.

Where signs serve both motorists and other road users, the minimum height, measured vertically from the bottom of the sign to the top of the curb, or in the absence of curb, measured vertically from the bottom of the sign to the elevation of the near edge of the traveled way shall be 7 feet (2.10 m). When a secondary sign is used below the main or regulatory sign, the height to the bottom of the secondary sign may be 6 feet (1.80 m) minimum.

Where used on a shared-use path, mounting height shall be a minimum of 4 feet (1.20 m), measured vertically from the bottom of the sign (from the bottom of the secondary sign, if a smaller secondary sign is used below the main sign) to the elevation of the near edge of the path surface.

Method of Measurement:

The quantity of wooden sign supports will be measured as the actual number of each wooden support placed and accepted.

Basis of Payment:

The quantity of wooden sign supports will be paid for at the Contract unit price each. Price and payment will constitute full compensation for the excavation and preparation of the foundation; for furnishing and installing all materials including Wooden Sign Supports; Borrow, Type C; Portland Cement Concrete Masonry, Class C; and styrofoam, if applicable; and for all labor, equipment, tools and incidentals necessary to complete the work.

8/19/11

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 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% TiO₂ (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 ± 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 ± 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 $73 \pm 5^\circ\text{F}$. ($23 \pm 3^\circ\text{C}$).

- a. Color. The white epoxy composition when applied at a minimum wet film thickness of 20 ± 1 mils ($500 \mu\text{m}$) 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 ± 1 mils ($500 \mu\text{m}$) 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 ± 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 μm) 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 [$0.125'' \pm 0.010''$ (3.18 ± 0.25 mm) thick]. Tests shall be conducted at an ambient temperature of $75 \pm 5^\circ\text{F}$ ($24 \pm 3^\circ\text{C}$). 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 polytetrafluorethylene (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 $75 \pm 5^{\circ}\text{F}$ ($24 \pm 3^{\circ}\text{C}$).

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 $1" \pm 0.002"$ ($25\text{ mm} \pm 0.05\text{ mm}$).

- 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 milkyiness 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>U.S. Standard Sieve</u>	<u>% Retained</u>	<u>% Passing</u>
#20 (850 μ m)	0	100
#30 (600 μ m)	5-25	75-95
#50 (300 μ m)	40-65	15-35
#100 (150 μ m)	15-35	0-5
Pan	0-5	

Type 4 Large Spheres

<u>U.S. Standard Sieve</u>	<u>% Retained</u>	<u>% Passing</u>
#10 (2000 μ m)	0	100
#12 (1680 μ m)	0-5	95-100
#14 (1410 μ m)	5-20	80-95
#16 (1190 μ m)	40-80	10-40
#18 (1000 μ m)	10-40	0-5
#20 (850 μ m)	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:	<u>Component</u>	<u>Percent By Weight</u>
	Carbon Black (ASTM D476 Type III)	7 \pm 2 percent, by weight
	Talc	14 \pm 2 percent, by weight
	Epoxy Resin	79 \pm 4 percent, by weight

D. Black Aggregate

The moisture resistant aggregate shall meet the gradation requirements (AASHTO T27) as follows:

<u>Sieve Size</u>	<u>Percent Retained</u>
#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.

<u>Hardness:</u>	The black aggregate hardness shall be 6.5-7 on Moh's Mineral Scale.
<u>Porosity:</u>	The black aggregate porosity shall be less than two (2) percent.
<u>Moisture Content:</u>	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 - All edge 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 or yellow 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 or yellow 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 Delta LTL 2000 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 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.

8/17/11

- 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 alkyl 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 50°F (10°C) 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 ft² (9.3 m²) and the AASHTO at 3 lb. (1.4 kg) per 100 ft² (9.3 m²). In combination, the total glass bead coverage shall be 7-8 lb. (3.2-3.6 kg) per 100 ft² (9.3 m²). 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-applied 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 ($73.4 \pm 3^\circ\text{F}$) (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°F ($-9.4 \pm 2^\circ\text{C}$) 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 $73.4 \pm 3^\circ\text{F}$ (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 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 DelDOT MUTCD or as directed by the Engineer. The Contractor shall be responsible for obtaining all necessary utility clearances before the signs may be installed. For sign removals, the sign posts shall have all nuts, bolts, and other connectors removed. The disturbed ground shall be graded and backfilled accordingly. All signing materials removed from the project shall be returned to the DelDOT Sign Shop without any damage to the sign materials.

Method of Measurement:

The number of single sign installations or removals will be measured as the actual number of sign posts 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 DelDOT MUTCD or signs installed in the incorrect location shall be moved at no additional cost to the Department.

2/2/11

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 DelDOT MUTCD or as directed by the Engineer. The Contractor shall be responsible for obtaining all necessary utility clearances before the signs may be installed. For sign removals, the sign posts shall have all nuts, bolts, and other connectors removed. The disturbed ground shall be graded and backfilled accordingly. All signing materials removed from the project shall be returned to the DelDOT Sign Shop without any damage to the sign materials.

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 DelDOT MUTCD or signs installed in the incorrect location shall be moved at no additional cost to the Department.

2/2/11

763500 - MAINTENANCE OF TRAFFIC

Description:

This item shall consist of all work performed by the Contractor to maintain vehicular, bicycle and pedestrian traffic through the project's work zones, including, but not limited to, the passage through the area of persons with disabilities in accordance with the Americans with Disabilities Act of 1990 (ADA) Title II, paragraph 35.130. All work associated with this item shall be completed as shown on the Plans or as directed by the Engineer.

All work shall be performed in a manner that will reasonably provide the least practicable obstruction to all road users, including vehicular traffic, bicycle traffic and pedestrian traffic. All temporary traffic control and temporary traffic control devices shall comply with the contract documents and with the latest edition of the manual titled "Delaware Department of Transportation Manual on Uniform Traffic Control Devices (MUTCD)," hereafter referred to as the "Delaware MUTCD", including all revisions as of the date of the advertisement of this Contract.

This item shall include installing, maintaining and/or relocating the temporary traffic control devices depicted in the approved Temporary Traffic Control (TTC) Plan, standard Delaware MUTCD TTC Cases and as required by project phasing.

The safety measures outlined within this Contract and the Delaware MUTCD are not necessarily sufficient in every instance to guarantee the protection of the traveling public or the persons working on the project. Therefore, the provisions of this Contract do not relieve the Contractor of the sole responsibility for the safety of all persons working within or traveling through the work zone throughout the duration of the project. The Contractor shall implement any additional safety measures that are not expressly required by the Contract and are necessary to ensure the safety of all persons. The Contractor shall submit to the Engineer justification for deviations from the TTC plan or additions to the TTC plan included in the contract documents. Final approval of the deviations or additions shall rest with the Engineer.

The Department reserves the right to stop the Contractor's operations, if in the opinion of the Engineer:

1. The Contractor's operations are not in compliance with the Delaware MUTCD, the specifications or the Plans.
2. The Contractor's operations are unsafe.

Construction Methods:

If the Contractor desires to deviate from the Temporary Traffic Control Plan (TTCP) provided in the Contract Documents or desires changes to the phasing or scope of the TTCP, the Contractor shall submit a new TTCP to the Engineer for approval prior to the start of work at each and every location. The TTCP shall be prepared, signed and sealed by a Professional Engineer registered in the State of Delaware and shall be prepared in accordance with all applicable DelDOT standards. The TTCP shall be submitted 14 calendar days in advance of starting work. Longitudinal dimensions for maintenance of traffic configurations may be adjusted slightly to fit field conditions as directed by the Engineer.

When specified by a note in the project plans, the Contractor shall be required to have an American Traffic Safety Services Association (ATSSA) certified Traffic Control Supervisor on the project. The ATSSA certified Traffic Control Supervisor's sole responsibility shall be the maintenance of traffic throughout the project. This responsibility shall include, but is not limited to, the installation, operations, maintenance and service of temporary traffic control devices. Also required is the daily maintenance of a log to record

maintenance of traffic activities, i.e. number and location of temporary traffic control devices; and times of installation, changes, and repairs to temporary traffic control devices. He/she shall also serve as the liaison with the Department concerning the Contractor's maintenance of traffic. The name and contact information for the ATSSA certified Traffic Control Supervisor shall be provided to the Engineer at the Preconstruction Meeting. A copy of the certifications for the ATSSA certified Traffic Control Supervisors proposed for the project shall be submitted to the Department prior to award. The cost of the ATSSA certified Traffic Control Supervisor shall be incidental to this item.

The Department will not make payment to the Contractor for any and all temporary traffic control devices where the Contractor sets up temporary traffic control to perform work, but fails to perform any work. This does not include long-term temporary traffic control set-ups that are installed as part of the maintenance of traffic plans outlined in the contract documents.

Temporary traffic control devices shall be maintained in good condition in accordance with the brochure entitled "Quality Guidelines for Temporary Traffic Control Devices", published by the American Traffic Safety Services Association (ATSSA). Any temporary traffic control devices that do not meet the quality guidelines shall be removed and replaced with acceptable devices. Failure to comply will result in work stoppage with time charges continuing to be assessed.

Any existing signs that conflict with any temporary or permanent construction signs shall be covered as needed or as directed by the Engineer. The Contractor shall stake out locations of permanent warning signs in the field and receive approval from the Engineer for the location and method of mounting prior to ordering the signs. The Contractor, with the Engineer, shall inventory all existing signs within the Contract limits. Signs that must remain in place during the project shall be maintained by the Contractor. Any other existing signs shall be removed and properly stored by the Contractor to prevent loss or damage. Immediately prior to the final inspection, the Contractor and the Engineer shall again inventory the traffic signs and account for any lost or damaged signs. The Contractor shall replace or reimburse the Department for any lost or damaged signs.

Access to all businesses and residences within the Project limits shall be maintained throughout the duration of this Contract. Any temporary closure of a driveway or entrance for tie-in purposes shall be coordinated with the Engineer and the property owner in advance of the closure.

Access to all transit stops located within the project limits shall be maintained unless otherwise directed by the Plans or the Engineer. Maintaining access to the transit stop shall include maintaining an area for the transit vehicle to stop to pick-up and drop-off passengers and also an accessible path for pedestrians to safely access the transit stop.

The Contractor shall provide all property owners and residents who live adjacent to the work zone with written notice, 48 hours in advance of the start of construction work. This notification shall include the scope of work, working hours, anticipated start and completion dates, a summary of construction activities which may interfere with access to the property including a schedule and access coordination plan, Contractor's name and address, and a DeIDOT contact phone number. Failure to give proper notice will result in a suspension of the work requiring notice, until proper notice is provided. The Contractor shall provide written verification to the Engineer that the property owners and residents were notified.

All roadway closures or lane closures beyond those specified and approved in the Contract Documents, shall be approved by the Chief Traffic Engineer or Designee a minimum of 48 hours in advance of the proposed restriction.

The Contractor shall notify the Engineer no less than fourteen (14) calendar days prior to the start of any detours and road closures and the Engineer will then notify the following entities:

- Local 911 Center
- Local schools

- Local post offices
- DelDOT's Transportation Management Center (TMC)
- Town Managers
- Local Police
- Local Fire Department and Emergency Medical Services
- DelDOT's Public Information Center
- Delaware Transit Corporation (DTC)

Immediately prior to the implementation of any lane or roadway closures, the Engineer shall notify the DelDOT TMC at (302) 659-4600. Notifications shall also be given to the TMC when the closure is lifted. The Engineer shall notify the TMC and the district Safety Officer if lane closures cannot be removed prior to the end of the allowable work hours.

The Contractor shall notify the local 911 center if access to a fire hydrant is temporarily restricted. The Contractor shall provide written confirmation to the Engineer that the local 911 center was notified.

The Contractor shall conduct construction operations in a manner that will minimize delays to traffic, and shall meet the following requirements:

1. If work is being conducted within 200 feet in advance or up to 200 feet beyond an intersection that is controlled by a traffic signal, the Flagger shall direct the flow of traffic in concert with the traffic signal to avoid queuing unless active work prohibits such action. The Flagger shall direct traffic to prevent traffic from queuing through an intersection (i.e., blocking an intersection).
2. If work is being conducted within a signalized intersection or series of signalized intersections, the Engineer shall notify the DelDOT TMC no less than 24 hours in advance of the operation. If work is being conducted within a signalized intersection, a Traffic Officer may direct traffic against the operation of the traffic signal only until the operation occurring within the intersection is completed. When the operation within the intersection is complete, the Engineer shall notify the DelDOT TMC that the intersection is no longer impeded by construction activities.
3. Work in the vicinity of traffic signals shall be scheduled to minimize the time during which the signal is operated without detectors. Prior approval of the Engineer shall be required for such work to be scheduled. The Contractor shall submit a schedule to the Engineer for approval seven (7) days in advance of the proposed start date of this work. The DelDOT Transportation Management Center (TMC) requires 48 hours advance notice of the cutting of a loop detector, and immediate notification once the loop detector has been reinstalled. The Contractor shall coordinate with the Engineer sufficiently in advance of loop detector work to ensure that these requirements are met.
4. When a lane adjacent to an open lane is closed to traffic, the temporary traffic control devices shall be set 2' (0.61 m) into the closed lane from the edge of the open lane, unless an uncured patch exists or actual work is being performed closer to the open lane with minimum restriction to traffic.
5. Except for "buffer lanes" on high volume and/or high speed roadways, lanes shall not be closed unless construction activity requiring lane closure is taking place or will take place within one hour. Lanes shall be reopened immediately upon completion of the work. For moving operations the lane closure shall be shortened as work progresses and as traffic conditions warrant to keep the length of the closure to a minimum. The Contractor shall conduct construction operations in a manner so as to minimize disruption to traffic during peak hours and periods of heavy flow. The Department reserves the right to stop the Contractor's

operations if, in the opinion of the Engineer, such operations are impeding traffic unnecessarily.

It is required that all temporary traffic control work and related items shall either be performed entirely by the Contractor's own organization, or totally subcontracted. Maintenance of equipment shall not be subject to this requirement.

Any deficiencies related to temporary traffic control that are reported to the Contractor in writing shall be corrected within 24 hours or as directed by the Engineer. Corrective actions on severe deficiencies shall be taken immediately unless otherwise directed by the Engineer. Failure to comply will result in non-payment for those devices that are found to be deficient for the duration of the deficiency. Serious deficiencies that are not corrected immediately could result in possible suspension of work until items identified are brought back into compliance and/or the holding of the pay estimate until the serious deficiencies are corrected.

At the end of each workday, the Contractor shall correct all pavement edge drop-offs in accordance with Table 6G-1 in the Delaware MUTCD. This corrective work shall be accomplished with Temporary Road Material (TRM) unless an alternate method is specified in the Plans. All ruts and potholes shall be filled with TRM as soon as possible, but no later than by the end of each workday. Placement of TRM shall be completed in accordance with the applicable sections of the Delaware Standard Specifications and shall be incidental to the appropriate item in the Contract. If temporary elimination of a drop-off hazard cannot be accomplished, then the area shall be properly marked and protected with additional temporary barriers, barricades, warning signs, flashing lights, etc. as required by Section 6G.20 of the Delaware MUTCD.

If an open trench accessible by vehicular traffic cannot be backfilled prior to the end of the working day, steel plates may be used to protect the trench area. Shop drawings for the steel plates shall be submitted to the Engineer for approval prior to starting construction. The Engineer shall forward the shop drawings to the Bridge Design Section for review and approval. The shop drawing shall show the intended method to brace, sheet, support or shore the excavation and to prevent a trench failure while the walls of the trench are under the load of traffic. The plan should include details of the plating design, the method of fastening plates, plate thickness, span, bearing and the method of preventing the movement of the plates. This design shall be prepared and signed by a Professional Engineer registered in the State of Delaware. Whenever steel plates are placed on a travel lane or shoulder, the associated temporary traffic control related to the use of steel plates shall follow the standards presented in Table 6G-1 of the Delaware MUTCD. The Contractor is required to provide a ramp (wedge) around the steel plate using bituminous temporary roadway material (TRM) placed at a slope of 20 to 1 or flatter. The cost for the wedge material shall be incidental to the item being constructed. If steel plates are used, the cost of furnishing and installing steel plates, bracing, sheeting, supporting or shoring the excavation and the preparation of shop drawings shall be incidental to the item being constructed. Steel plates are not permitted between November 1 and April 1, without the prior approval of the Engineer.

If pavement marking information is not provided in the Plans, the Contractor shall submit detailed drawings (including but not limited to, lane and shoulder widths, turn lane lengths, locations of stop bars, turn arrows, crosswalks and railroad crossings) that depict the existing pavement markings for each project location prior to beginning construction. These drawings will be reviewed by the Department's Traffic Section to determine if any changes to the final pavement markings are required.

Travel lane and ramp closings on multilane highways and Interstates shall not be permitted during the following holiday periods:

- December 24 through December 27 (Christmas Day)
- December 31 through January 3 (New Years Day)
- Friday prior to Easter through Easter Sunday
- Thursday prior to Memorial Day through the Tuesday following Memorial Day
- Dover International Speedway Race Weekends (Thursday prior to the race event through the day after the race event)

- July 3 through July 5 (Independence Day)
- Thursday prior to Labor Day through the Tuesday following Labor Day
- Wednesday prior to Thanksgiving Day through the Monday following Thanksgiving Day

Additional time restrictions may apply as noted in the project plans or as directed by the Engineer. Any requests to waive any restrictions must be made in writing to the Engineer for review and approval. A copy of the request shall be provided to the District Safety Officer for review.

Certification:

Temporary traffic control devices used on all highways open to the public in this State shall conform to the Delaware MUTCD. All devices shall be crashworthy in accordance with the National Cooperative Highway Research Program (NCHRP) Report 350, the memorandum issued August 28, 1998 by The USDOT Federal Highway Administration, and/or in accordance with the latest edition of the Manual for Assessing Safety Hardware (MASH), published by the American Association of State Highway and Transportation Officials (AASHTO).

The Contractor shall submit certification for temporary traffic control devices used specifically on this project at or prior to the pre-construction meeting.

Certification of compliance with NCHRP report 350 and/or MASH is required for the following categories of temporary traffic control devices:

Category I contains small and lightweight channelizing and delineating devices, which includes cones, tubular markers, flexible delineator posts and drums, all without any accessories or attachments.

Category II includes temporary traffic control devices that are not expected to produce significant vehicular velocity changes to impacting vehicles. These devices, which shall weigh 45 kg (100 lbs.) or less, include Type III barricades, portable sign supports with signs, and intrusion alarms. Also included are drums, cones, and vertical panels with accessories or attachments.

Category III includes temporary traffic control devices that are expected to cause significant vehicular velocity changes to impacting vehicles. These devices, which weigh more than 45 kg (100 lbs.), include temporary barrier, temporary impact attenuators, and truck-mounted attenuators.

Category IV includes portable or trailer-mounted devices such as arrow panels, variable message signs, temporary traffic signals and temporary area lighting. Note that certification compliance to NCHRP Report 350 or MASH criteria is not required for Category IV devices.

For Category I devices, the manufacturer or Contractor may self-certify that the devices meet the NCHRP-350 and/or MASH criteria. The Contractor shall supply the Federal Highway Administration's NCHRP-350 and/or MASH acceptance letter for each type of device that falls under Category II and III devices.

Basis of Payment:

Payment will be made at the lump sum bid price for "Maintenance of Traffic", for which price and payment constitutes full compensation for all maintenance of traffic activities accepted by the Engineer and for maintaining and/or relocating all temporary traffic control materials required, including submission of temporary traffic control plans, submitting certifications, ATSSA supervision (if required per the project plans), traffic cones, correction of edge drop-offs and for all labor, equipment, tools, and incidentals necessary to complete the item. Payment to furnish and maintain temporary traffic control devices (including, but not limited to plastic drums, temporary and permanent warning signs, portable P.C.C. safety barrier, truck mounted attenuators, variable message signs, arrow panels, temporary pavement markings and portable light

assemblies) will be made at the contract unit price for each item. The cost to move temporary traffic control devices in accordance with the temporary traffic control plan or as necessary to address safety issue is included in this item.

NOTE:

If the Contractor does not complete the contract work within the contract completion time (including approved time extensions), the Contractor shall be responsible for providing the necessary temporary traffic control devices that are required to complete any remaining work. The cost of such temporary traffic control shall be borne by the Contractor. No additional payment will be made to the Contractor to maintain traffic in accordance with the Delaware MUTCD, contract plans and specifications. Temporary traffic control items shall include, but not be limited to, warning lights, warning signs, barricades, plastic drums, P.C.C. safety barrier, flaggers, traffic officers, arrow panels, message boards, portable light assemblies and portable impact attenuators.

8/19/11

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 $[3\text{mm}+2\text{ppm}\times\text{D}]$ 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.

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.

8/29/07

763508 - PROJECT CONTROL SYSTEM DEVELOPMENT PLAN
763509 - CPM SCHEDULE UPDATES AND/OR REVISED UPDATES

Description:

The Project Control System will be set up and maintained by the Department of Transportation to monitor and record work in progress and to coordinate and synchronize construction management functions. The Department will use Critical Path Method (CPM) scheduling to approve the Contractor's work schedule, review work progress, evaluate time extensions, identify problem areas, and recommend solutions to maintain the established work schedule. The Department will designate a Critical Path Method Administrator (CPMA) to oversee the Project Control System.

The Contractor shall designate a Critical Path Method Coordinator (CPMC) having proven experience in construction scheduling and in CPM concepts and scheduling. The CPMC shall be familiar with and have direct contact with both the Contractor's front office and field staff. The CPMC shall be knowledgeable of the status of all parts of the work throughout the length of the Contract in order to properly coordinate the Contractor's work schedule information and shall be available for consultation and preparation of documents on a daily basis. If this condition is not complied with the Contractor shall submit qualifications for a replacement CPMC to the CPMA for approval by the Engineer.

The CPMC shall submit a working drawing schedule, materials schedule, crew schedule; and shall prepare and provide the "look ahead", original, update, revised update, and final (as-built) update CPM work schedules, written CPM schedule narratives, and other CPM schedule information as required by the Project Control System Development Plan. The CPMC shall prepare and provide the Contractor's work schedule information by email as a single compressed database file in CPM format fully compatible with the Windows® version of Primavera Project Planner® used by the Engineer for generation of the CPM schedules.

The CPM format shall be the Precedence Diagram Method with days as the Planning Unit and shall be based on Calendar Days. Schedules will be developed using every day as a workday; schedules with calendars based in any manner on Working Days will not be allowed. The CPMA will receive the Contractor's CPM schedule databases for input to generate the CPM schedules. The generated CPM schedules are the Contractor's own work schedule and will be reviewed for approval by the Engineer. CPM schedules approved by the Engineer will have the word "schedule" in the center title block (layout name) of their graphic outputs and title line of their report outputs.

The scheduling of the construction is the responsibility of the Contractor; the Contractor is responsible to determine, by adequate planning, the most feasible order of work commensurate with the Contractor's abilities and the Contract Documents.

The Contractor's compliance with the Project Control System Development Plan and CPM Schedule Updates and/or Revised Updates, and the Engineer's approval of the generated Original CPM schedule, its updates and/or revised updates will be required before processing monthly estimates for payment.

It is not the intent of this Contract that the Engineer by approving the CPM schedules agrees that it is reasonable in all respects or that the schedule, if followed, will result in timely completion of the Project. The Engineer's approval is based on a review of general conformity for compliance with the requirements of the Project Control System and on the items or time restrictions that the department and/or the Engineer have control. The Contractor is free to make assumptions regarding field conditions, estimated quantities, and/or subsurface conditions. However the Department's concurrence with the Contractor's schedule based on these assumptions does not relieve the Contractor from making necessary revisions to his schedule should his assumptions fail to hold true. No time extension to the Contract which is due to assumptions made by the Contractor and that do not hold true during construction will be considered by the Department. Discrepancies

and/or changes initiated by the Department in proposed quantities or plans that cause an extension to the critical path will be considered by the CPMA. The Department's controls or time restrictions are identified hereinafter and in the Standard Specifications, Special Provisions, and on the Contract Plans as plan notes.

Development of the Project Control System (PCS):

The PCS development plan is as follows:

- (a) Within seven (7) calendar days after the date of the fully executed Contract a workshop meeting will be held with the Engineer, CPMA, Contractor, and CPMC. The CPMA will profile the basics and procedures of the Project Control System and discuss schedule model design at this meeting. Attendance is mandatory,

The Department's partially predetermined Coding Structure (CS) format having a maximum of seventeen (17) code classification levels will be used and will be furnished at the Workshop Meeting. The CS is a specific listing that illustrates the hierarchy of work needed for the project. The hierarchy is categorized into levels or classifications. The CS classifications organize activities into manageable groups through each level of the project, for example; locations, phasing (staging), landmark dates, roadway sections and bridge structures; footings, columns, and caps; contractor and subcontractor.

The CPMC shall assist in determining the breakdown and code title descriptions from south to north and west to east of the location code classification. Activity code values shall be perspicuous for each classification grouping. Additional activity code classifications and values as required by the Engineer from time to time shall be provided and added to the schedule database by the CPMC. The CPMC shall not alter the CS and properly code all activities with the approved CS activity code values for all code classifications including all railroad, waterway, and outside agency activities with approved code values, including classifications as added by the Engineer. Coding enables generation of organized reports and graphics that can summarize any level of the project schedule.

When the Department provides a format database for the Contract, it shall be used by the Contractor as the basis from which to develop their schedule. The CPMC may add, but not insert, code classifications in the format database;

- (b) Within fourteen (14) calendar days after the workshop meeting, the CPMC:
 - (1) Shall submit a working drawing schedule, using the Department's application format or other format as agreed to by the Engineer. This schedule shall also include all other items having content that requires approval to allow any portion of the work to commence or continue. This schedule shall be submitted to the CPMA for approval by the Engineer and shall contain all required working drawings and also include but not be limited to reinforcing bar lists, formwork drawings and calculations, construction procedures, borrow pit security and traffic plans, precast structures, wetland work plans, construction sequencing, load tests, and wave equation analyses. Working drawing information shall include the identification number, description, type, anticipated submittal date, time frame for preparation and review, approval needed by date, and a resubmittal process (if expected) for each listed item. This information shall also give factory leadtime and expected delivery date, if applicable, for each listed item.

The Contractor should be aware that the Department's time frame for review of working drawings and other submittals properly submitted or resubmitted in accordance with Standard Specification Subsection 105.04 will be thirty (30)

calendar days duration unless mutually agreed to by the CPMC and CPMA; this 30 day duration supercedes the time frame of the Subsection. If a working drawing or other submittal involves review by railroads, environmental agencies, municipalities, other states, federal agencies, or the U. S. Coast Guard the time frame for review will be sixty (60) calendar days unless mutually agreed to by the CPMC and CPMA. The time frame will begin on the date of receipt of the drawings by the reviewer and will end on the date of transmittal returning the drawings to the Contractor by the Department. No drawings will be accepted for review until an initial working drawing schedule has been accepted unless agreed to by the Engineer.

The working drawing schedule shall be updated and correlated with the activities of the "look ahead" and all other CPM schedules;

- (2) Shall submit a materials schedule using the Department's application format or other format as agreed to by the Engineer. This schedule shall be submitted to the CPMA for approval by the Engineer and shall contain all required materials, samples, and sources of supply. The materials schedule information shall include the identification number, description, generic or brand name, sample requirement, and manufacturer's and supplier's name, address, and phone number for each listed item. The schedule shall also give the anticipated submittal date, time frame for preparation and review, approval needed by date, factory leadtime, and expected delivery date, if applicable, for each listed item.

The materials schedule shall be updated and for materials having long factory leadtimes shall be correlated with the activities of the "look ahead" and all other CPM schedules;

- (3) Shall submit a crew schedule. This schedule shall be submitted to the CPMA for approval by the Engineer and shall be accompanied by a written narrative and shall contain all crews and their work plan.

The crew schedule shall be updated and correlated with the activities of the "look ahead" and all other CPM schedules;

- (4) Shall prepare and provide a written narrative of the Contractor's work plan and an acceptable "look ahead" schedule database in CPM format. This schedule database shall reflect activities for the Contractor's overall work plan for the entire project detailing the "look ahead" period and shall be submitted to the CPMA for acceptance by the Engineer. The "look ahead" period shall be as determined by the Engineer. The "look ahead" schedule shall be maintained and updated until an Original CPM schedule is approved. The "look ahead" schedule shall also reflect the Sequence of Construction in the plans unless otherwise approved by the Engineer. This "look ahead" schedule, its updates and/or revised updates shall also be incorporated into the Original CPM schedule database. Issue of the Notice to Proceed is contingent upon receipt and acceptance of this schedule in accordance with Standard Specification Subsections 108.02 and 108.03; and
- (5) Shall begin meeting with the CPMA at their office every third business day to prepare and provide a written narrative of the Contractor's work plan and a CPM schedule database until a useable, logical draft of the full CPM schedule network, responsive to the project requirements and correlated with the required schedules has been developed as determined by the Engineer. The CPMA will generate an initial CPM schedule from the CPMC's logical draft CPM schedule database for review by the Engineer. This initial schedule shall reflect the Sequence of

Construction in the plans unless otherwise approved by the Engineer. This initial CPM schedule database, if acceptable, may be used to fulfill the Contractor's "look ahead" schedule requirements;

- (c) If the initial CPM schedule is not acceptable to the Engineer, the CPMC shall continue to meet with the CPMA on every third business day and prepare and provide the Contractor's written narrative and CPM schedule database as necessary until a generated CPM schedule is acceptable to the Engineer; and
- (d) Within twenty-eight (28) calendar days after the workshop meeting, an initial CPM schedule must be generated having the requirements for the Engineer's approval. This schedule shall reflect a clear understanding of the Contractor's work plan, be adequate to determine the Department's staffing requirements, have correct physical logic, incorporate construction and traffic phases, and display clarity of presentation for review and processing. Upon approval the CPMA will furnish the Contractor a graphic and report output of this CPM schedule. This CPM schedule, or Original CPM schedule, is the Contractor's own work schedule and the Contractor's responsibility to maintain.

The ending (cut-off) day for each monthly estimate period shall be proposed by the Contractor subject to Department approval. In the event of a conflict, the Engineer will have the authority to establish the ending day.

Processing of monthly estimates for payment will begin or continue only if the Contractor is in compliance as determined by the Engineer with the PCS Development Plan.

Any information required by the Engineer for analysis of the CPM schedules, their updates and/or revised updates; clarification of charts and other schedules; and evaluation of proposed changes or change orders shall be prepared and provided by the CPMC. A copy of the current approved CPM schedule, its updates and/or revised updates shall be on display at the field office of both the Department and the Contractor.

CPM schedule information and requirements:

The CPMC shall prepare and provide the Contractor's work schedule information in the form of work step and restraint activities:

- (a) Work step activities are single step construction elements,
- (b) Restraint activities are not construction elements but affect the start of other activities.

When setting forth work steps and restraints the breakdown on these activities shall address the following factors:

Work Step factors affecting the duration and/or sequence of activities;

1. Work at locations done at different times or requiring different crews,
2. Work requiring different materials,
3. Work requiring different crew or craft requirements,
4. Work requiring different equipment,
5. Work requiring different responsibility (subcontractors),
6. Structural work having distinct subdivisions,
7. Labor and equipment resource availability,
8. Work as reflected in the Contractor's estimating or accounting breakdown,
9. Work as reflected in the state's breakdown for bidding or payment,

10. Public, private, and/or Contractor utility work and limiting or outage schedules of public and/or private utility organizations, and
11. Maintenance of traffic.

Restraint factors affecting the start of other activities;

1. Preparation of working drawing and materials submittals,
2. Approval, return, and/or resubmittal of working drawings and materials,
3. Specialized material testing,
4. Long lead purchases - material and equipment availability,
5. Material and equipment fabrication time,
6. Testing of special equipment and in place testing,
7. Delivery of unusual shipment or scarce material,
8. Dependency on completion of utility work,
9. Dependency on the Department's approval of issues involving public, private, and/or other governmental agencies,
10. Dependency on completion of part or all of another Department contract or construction of other organizations, whether contiguous or not,
11. Protection and restoration of property, forest protection, special traffic controls, erosion control and water pollution, environmental controls and suspensions, safety, and foreseeable archeological and/or historical evidence delays,
12. Procurement of permits, and
13. Conditions as set forth in Standard Specification Subsection 107.01.

Activities must be identified by a name, symbol, and coding, and shall have duration, sequence, responsibility, and resources.

Activity names or titles shall be descriptive and be single identifiable work steps or restraints. A sample breakdown list of activity titles may be furnished to the Contractor by the Engineer on request. Activities shall be selected, as a minimum, on a structure by structure and/or section by section basis where relevant and have further breakdown into secondary components. Activities shall be inclusive and representative of the Contract work. Activity symbols, or ID's, shall be unique and systematic.

Activity codes shall have classifications and values. The approved CS will determine activity code classifications and values. The CPMC shall identify activities using these classifications and code values. Additional activity codes as required by the Engineer shall be provided by the CPMC.

Activity durations, or Original Durations, shall be reasonable and representative of the scope of the activity. If durations are considered excessive or insufficient, the industry standard will be used. Original Durations may not exceed thirty (30) calendar days unless approved by the Engineer. Durations of activities shall be determined by using productivity rates based on calendar days, not work days. Original Durations of activities may not be less than two (2) calendar days unless agreed to by the CPMA. The use of calendar day productivity rates in CPM scheduling allows for customary days during the work week that the Contractor does not work and for normal weather delays. Productivity rates used to establish durations shall reflect the time periods when work can be scheduled and exclude the non-work period of the activity's calendar. Activity calendars allow activities to be scheduled only when allowed by the nature of or restraints on the work. Calendars shall not exclude weekends, holidays, or other times the Contractor does not work.

All activities shall be identified by entry of their appropriate Calendar. A minimum of fourteen (14) shall be used and the first fourteen (14) shall be ordered and entitled as follows: 1) Full schedule, 2) Environmental, 3) Winter Condition, 4) Concrete Work, 5) Concrete Work Winter, 6) Concrete Deck, 7) Concrete Paving, 8) GABC, 9) Asphalt Base, and 10) Asphalt Surface, 11) SMA, 12) Night Paving Asphalt Base, 13) Night Paving Asphalt Surface, 14) Night Paving SMA. Calendar non-work periods shall reflect the average Delaware weather history of and the environmental regulations for the location of the Contract

work. The Contractor may perform work during its calendar non-work period when favorable weather allows the work to be performed without compromising its specification and at no cost to the Department. When the Department provides a format database from which to develop the CPM schedule, the Contractor shall not modify the Calendars in the format database unless approved by the Engineer. The non-work periods of the calendars follow:

CALENDAR	NON-WORK PERIOD
1) Full schedule,	N/A
2) Environmental:	Varies; project specific,
3) Winter Condition:	December 1 thru March 15,
4) Concrete Work:	December 1 thru March 15,
5) Concrete Work Winter:	N/A (Protection provided at no cost to the Department)
6) Concrete Deck:	November 15 thru March 31,
7) Concrete Paving:	December 1 thru March 15,
8) GABC:	November 15 thru March 15,
9) Asphalt Base:	November 15 thru March 15,
10) Asphalt Surface:	November 15 thru March 15,
11) SMA	November 15 thru March 31,
12) Night Paving Asphalt Base:	October 15 thru April 30,
13) Night Paving Asphalt Surface:	October 15 thru April 30, and
14) Night Paving SMA:	October 15 thru April 30.

Activity durations are based on Calendar Days and shall reflect all time necessary to complete an activities work and its requisites. The Contractor shall include in their original schedule narrative their work day to calendar day conversion factors with a discussion of how these factors were determined. When scheduling using multiple resources each resource unit shall have a corresponding activity. All time to complete the activity shall include as a minimum all Contractor unscheduled work days, all Contractor holidays, and allowance for normal weather delays, except for software generated calendars. Inclement weather and failure of a contractor and their subcontractors to provide sufficient resources are not means to recover costs or time due to delay.

Activity sequence shall be typical of proficient scheduling practice. The sequence must be logical and representative of the Contractor's order of the work. Successors and predecessors determine the job logic or activity sequence. Successors are activities that follow an activity. Predecessors are activities that precede an activity. A given activity cannot start until all predecessors have been completed. The Precedence Diagram Method (PDM) shall be used. The PDM places the activities on nodes and the dependencies between them are defined by arrows. Only finish to start dependency relationships (links) shall be used; lag times may not be used unless approved by the CPMA. The Department reserves the right to request a resequencing of activities to effect competent scheduling practice and realistic job logic.

Activities shall be sequenced to reflect resource apportionment. When one crew (resource) is being utilized to perform all of many similar activities, these activities must be linked together in some sequence to reflect that one crew is performing the work. Additionally, when several crews are performing similar activities, these activities must have separate linked sequences equal to the number of crews performing the work. Activities shall be logically connected and coded to reflect the crew (resource) performing the operation. A summary list of crews, their crew codes, and their operation(s) shall be included with each schedule submission unless unchanged. Resource loading will not be required unless otherwise directed by the Engineer. If resource loading is directed, payment will be incidental to the Item "763509 – CPM Schedule Updates and/or Revised Updates".

Activity responsibility shall be identified for each activity except those performed by the Contractor, if requested by the Engineer. Subcontractors, DBE's, utilities, performers of other contracts, and performers of adjoining work on other advertised contracts shall be identified by coding when responsibility for an

activity is requested.

Activity resource loading shall be required only if the Contractor demonstrates the inability to maintain the CPM schedule. In this event, the Engineer shall have the authority to require resource information for all activities affecting project completion. Resource information includes manpower, equipment, materials, and/or services and has cost and has a range and amount of availability. Lack of sufficient resources will not be considered cause to extend durations when preparing the CPM schedule. By bidding to contract the work, the Contractor has ensured that sufficient resources are available or will be available in a suitable time frame to perform the work within the Contract Time, even if a resequencing of activities requires an activity or activities to shorten their Remaining Duration. In the event the Contractor demonstrates the inability to maintain the CPM schedule, the Engineer may require the Contractor to increase the number of shifts, begin overtime operations, work extra days including weekends and holidays, supplement construction plant and equipment, or all or any of the foregoing as a step to improve the Contractor's work progress all without additional cost to the Department.

Work activities shall as a minimum be representative of all construction work for each operation, each phase (stage), and each location.

Working drawings shall be included as activities. Preparation and leadtime (order, manufacture, and delivery time), shall be included as activities for each applicable working drawing item. A separate activity shall be used to begin the submittals of working drawings. Time extension(s) will not be considered when submittal activity(s) affects the critical path except for owner caused delay as recognized by the Engineer. If working drawings require resubmittal(s), activities for their preparation and activities for their approval (having the Department's review time) shall be included in the next CPM schedule update database. Time extension will not be considered when resubmittal activity(s) affects the critical path except for owner caused delay as recognized by the Engineer. Working drawing activities and leadtime activities not requiring submittal shall not be on the critical path of the Original CPM schedule.

Materials having long leadtime and/or manufacture time or that are difficult to acquire and/or fabricate shall have materials approval and leadtime activities included in the schedule for each applicable material item. A separate activity shall be used to begin the submittal of these materials. These material approval and leadtime activities shall not be on the critical path of the Original CPM schedule.

Administrative milestones shall be included as activities. Each milestone of the bidding through first chargeable day process shall be an activity.

Utility work shall be included as activities and shall be identified accordingly. Each utility item on the plans or listed in the Contract's Utility Statement shall be an activity. The activity description shall indicate the utility company and include the number of each listed item or be numbered according to the item's order in the Utility Statement. A separate activity shall be used to begin utility work. Utility activities shall not be impactful on the Original CPM schedule unless authorized by the Engineer.

Agency agreements and/or arrangements and other submittals for approval shall be included as activities. A separate activity shall be used to begin the agency items and other submittals for approval.

The effect of other Department contracts or construction of other organizations on the completion of part or all of this Contract shall be included as activities. A separate activity shall be used to begin these items.

Phasing (staging) shall be included as activities. These activities shall be correlated with the sequence or suggested sequence of construction on the plans and/or in the specifications. A separate start and finish milestone activity shall be used to start and to complete each phase.

When multiple crews are performing an operation or a string of operations, each crew shall be logical

connected and coded to reflect the crew performing the operation.

Surcharge durations and special testing, if applicable, shall also be included as activities. Sufficient duration times for these activities will be allowed as per the plans and specifications or as agreed to by the Engineer.

Activity types must be either "task", "start milestone", or finish milestone. "Hammock" type activities may be allowed as agreed to by the Engineer. If the Department requires resource loading, "task" activities may be converted to "independent" type as agreed to by the Engineer.

Date constraints, float and duration constraints, and/or flags for activities will not be allowed. Milestones that do not constrain the schedule shall be allowed as agreed to by the Engineer when unique or unusual events cause a restraint to the Contractor's work schedule. The use of "Start No Earlier Than" (SNET) and "Zero Free Float" (ZFF) constraints for activities may be allowed for the purpose of schedule clarity or definitude if acceptable to the CPMA.

Total Float is defined as the difference between the current schedule finish date and the Contract Completion Date that is entered by constraint ("Project must finish by:" date) in the schedule.

Free float is defined as the amount of time between when an activity "can finish" (the early finish) and when an activity "must finish" (the late finish). Free float is float shared with all other activities and is defined as the amount of time an activity can be delayed without affecting the critical path of the schedule. It shall be understood by the Contractor and the Department that free float is a shared commodity, not for the exclusive use or financial benefit of either party. Either party has the full use of the free float until it is depleted.

The critical path is defined as the series of activities in a CPM schedule network that has the longest path in time. The submitted activity sequence and durations must generate a CPM schedule having only one (1) critical path; a schedule with multiple or near multiple critical paths will not be allowed. Work like project wide Maintenance of Traffic, Construction Engineering, or Temporary Erosion Control that by their nature are ongoing for long durations or the duration of the project and are basically complementary to other activities, shall be divided and condensed into "establish" and "conclude" activities to prevent this type of work from being the major portion of the critical path or its entirety.

The Project Start Date, or initial Data Date, of the Original CPM schedule shall be the first chargeable day of work. The first schedule activity related to productive work shall be entitled "First Chargeable Day" and shall be a start milestone. Nonproductive work and administrative activities may begin and/or end prior to the Project Start Date and shall be statused as such in the Original CPM Schedule. The submitted activity sequence and durations must generate an Original CPM schedule using all the Contract Time and a critical path having zero total float. An early completion schedule will not be allowed. The Contractor's original schedule shall reflect the use of the entire Contract Time. The schedule ending date that uses all the Contract Time in the Original CPM schedule will be the original Contract Completion Date. This Contract Completion Date shall be fixed (Project must finish by:) in the Original CPM schedule and shall remain unchanged unless a time extension is awarded.

The Contractor's Original CPM schedule shall allocate the work over the entire Contract Time. The Contractor shall not anticipate early completion in bid preparation and shall distribute all time-driven and/or time-dependent costs uniformly over every day of the Contract Time when preparing the bid. No early completion schedules will be accepted.

After the Original CPM schedule utilizing all the allocated Contract Time has been approved, job conditions or logic changes may occur which require revision to the schedule. Only an update may be revised. These revised updates must be reflective of the Contractor's actual intent in constructing the project. The revision may cause the project completion date to be earlier than the completion date of the current

approved schedule. This is acceptable to the Department; but no claims will be considered for time-driven and/or time-dependent costs (such as delay and/or extended overhead expense) which are a result of not meeting this new project "early finish" date. Consideration for these costs would occur only for approved extensions that force actual project completion past the originally advertised Contract Time including authorized time extension(s). However, no credits for non-expended overhead will be requested should a Contractor successfully achieve completion of the project prior to the use of all the Contract Time.

If the project is delayed, the contractor must demonstrate the inability to perform other critical or near critical work to receive consideration for an extension of Contract Time.

CPM schedule databases shall be calculated using the relevant Data Date prior to submittal to the CPMA. The Data Date of CPM schedule updates and revised updates shall be the next day after the end of the update period. Schedule calculations of CPM databases shall be based on retained logic, contiguous durations, and total float as finish float.

Activity Log (memo) information is allowed, but must be factual; shall be removed, if redundant; and shall not be masked, but indicated for printing to output reports. Punctuation is not required for activity and Activity Log information unless necessary for clarity.

Statusing or contract progress of activities for updates is the entering of Actual Start dates, Suspend Date(s), Resume Date(s), Actual Finish dates, and changes in Remaining Durations to the database. An activity's Original Duration may not be changed. An activity that begins (has an Actual Start Date) must have its Remaining Duration reduced by at least 1 day.

Activity Suspend and/or Resume Dates shall be added to the activity record and the factual reasons for the cause shall be added to the respective activity Log. If an activity is suspended again it shall be curtailed and assigned an Actual Finish Date equal to the latest suspension date, and a new activity (portion 2) comprising the balance of remaining duration shall be created and inserted in succession; both activities shall indicate by log comment the facts causing this condition.

Log statusing shall be used when an activity has out-of-sequence progress and no Actual Finish Date. Out-of-sequence progress occurs when any previous predecessor of an activity has no Actual Finish date. Log statusing is the entering of the Actual Start date to the Activity Log of the database in the Departments format. These entries are not to be masked, but indicated for printing to output reports. Changes in Remaining Durations shall be entered to the database but not the Activity Log. When progress is no longer out-of-sequence or all previous predecessors of the activity have Actual Finish dates, the activity's Actual Start shall be taken out of log status and entered to the database. Log statusing provides schedule output that prevents graphic distortion of schedule activities and preserves the design sequence of the CPM schedule plan. The Engineer shall have the authority to require a revision of the CPM schedule because of out-of-sequence progress. A suspended activity that requires log statusing shall be treated in the same manner as though it was suspended again.

Each original, update, and revised update schedule database and subsequent draft submitted for approval shall have a unique and manifest Project Name and shall be uniquely identified by entry (Number/Version) in the schedule database.

Corrections are defined as entries to the database that rectify coding and activity identification errors. Corrections shall be identified by written narrative and/or as agreed to by the CPMA. Exception(s) taken in PCS or other Department correspondence shall be complied with in the subsequent update and/or a revised update of the CPM schedule.

Written narratives shall be included with each submission of initial or revised update databases. The narratives must conceptualize work plans, modifications, and/or corrections but may be summary unless otherwise directed by the Engineer. These narratives shall describe where and the crews and order of what

is to be done; narratives that are a listing of the work will not be acceptable. The Department will only accept schedule databases that reflect the work plans, modifications, and/or corrections reflected by their respective written narratives.

Inaccurate and/or faulty databases of any CPM schedule update and/or revised update will be unacceptable and shall be summarily corrected and resubmitted. Resubmittals shall be labeled "2nd Draft", "3rd Draft", etc. as appropriate and identified by entry (Number/Version) in the schedule database.

Any activity(s) or activity information that is necessary to generate a CPM schedule acceptable to the Engineer and/or schedule information that is requested by the Engineer shall be prepared and provided by the CPMC.

The CPMA will generate the CPM schedule network reflecting the Contractor's scheduling information. Upon approval of the Original CPM schedule and subsequent CPM schedule updates and/or revised updates, the CPMA will furnish the Contractor graphic and report outputs of these schedules. These CPM schedules are the Contractor's own work schedule and the Contractor's responsibility to maintain.

Monthly CPM Schedule Updates:

The CPMC shall meet with the Contractor and Resident Engineer and prepare the required work schedule progress information (status reports) to update the CPM schedule. This information shall be submitted on status forms provided by the Department that are generated from the Original Schedule and thereafter from the previous CPM schedule update or revised update(s). This update information shall reflect the current state of completed project work. The update information shall include all activities on which work was performed and/or there was progress during the update period and shall include as a minimum their actual start dates, suspend dates, and resume dates; and the estimated remaining durations or actual finish dates. The update information shall be as agreed to and signed-off and dated by the Resident Engineer and the CPMC. The CPMC shall use the signed-off and dated information to status and/or log status the update database.

The Contractor shall submit the CPM schedule database update and a copy of the signed off update information within five (5) calendar days after the end of each monthly update period. The database and signed off information must match. The CPMA will generate a CPM schedule update reflecting the Contractor's update information. The five (5) calendar day submittal period will enable the Department to discuss current schedule information at the monthly progress meeting held the following week.

If the critical path of the generated CPM schedule update has less than minus ten (-10) calendar days of total float the CPM schedule update shall be revised.

Upon approval of the CPM schedule update, the CPMA will furnish the Contractor a graphic and report output of this update. This CPM schedule update is the Contractor's own updated work schedule and the Contractor's responsibility to maintain.

CPM Schedule Revised Updates:

The CPM schedule shall be revised if the critical path has less than minus ten (-10) calendar days of total float, conditions require the Contractor to modify the work schedule, the Contractor chooses to make a significant change in the sequence of work, or the Department requests the schedule to reflect the current state of the work and/or the Contractor's acknowledged work plans. The revised update shall reflect the Contractor's current order of work and include new and/or previous activities affected by the change and shall include a written narrative of these changes. Revision as required by this Specification or as requested by the Department does not constitute acceleration unless agreed to by the Engineer. Revisions shall be identified as the revised update of the current approved CPM schedule update. Revisions are to be singular in modification and not lumped together in the same revised update unless otherwise directed by the Engineer. Additional revision(s) of the same update is therefore acceptable. The Department reserves the right to

request a resequencing of activities to effect a completion date within the Project Time.

The CPMC shall meet as needed with the CPMA at the Engineer's office within five (5) calendar days after revision is required, formal request for a revision, or the Contractor announces intent to submit a revision. The purpose of the meetings shall be to prepare the Contractor's revised update CPM schedule database and its written narrative of changes. These meetings shall continue until a useable, logical draft of the revised update CPM schedule network, responsive to the modification requirements, has been developed that will generate a workable, CPM schedule revised update having a completion date using or within the Contract Time or that allowable by this specification. The submitted CPM schedule database revised update must reflect its written narrative. Revised updates inconsistent with their written narratives will not be acceptable. The CPMA will generate the CPM schedule revised update reflecting the Contractor's new information. The reports generated by the CPM schedule revised update shall be used to prepare the update information for the next CPM schedule update.

Reduction of activity durations will not be considered acceptable criteria for revision to bring the project back on schedule unless activity quantities have been reduced or the Contractor provides a narrative describing how their means and methods to construct the work shall change and/or their resource allocation to perform the work shall increase.

For activities using like resources, modification of activity relationships to be concurrent (run parallel) with each other will not be considered acceptable criteria for revision to bring the project back on schedule unless the Contractor provides a narrative describing how their crews and/or resource allocation to perform the work shall increase.

A CPM revised update having the requirements for the Engineer's approval must be completed before preparation of the next CPM schedule update. Processing of the next monthly estimate for payment will begin only after the Engineer's approval of the signed CPM schedule revised update.

Upon approval of the CPM schedule revised update, the CPMA will furnish the Contractor a graphic and report output of this revised update. This CPM schedule revision is the Contractor's own revised work schedule and the Contractor's responsibility to maintain.

In the event that the Contractor fails to maintain his CPM schedule in a satisfactory manner, the Engineer reserves the right to enforce the provisions as set forth in Standard Specification Subsection 108.10.

Change Orders and adjustment of completion time:

A Change Order will only be considered for extension of Contract Time when the modified critical path shows requirement of additional time because of the added activity or activities and/or there is justifiable delay as recognized and determined by the Engineer. For any change order that affects the schedule, the Department reserves the right to request a resequencing of activities to effect a completion date within the Project Time.

If the CPM schedule has been updated and/or revised and positive total float has been created, no additional time will be given for added activity(s) unless the modified critical path shows requirement of additional time and/or there is justifiable delay as recognized and determined by the Engineer. Compensation for additional overhead costs will not be considered until all of the original Contract Time has been utilized. The Engineer reserves the right to "bank" (postpone the award of) approved time extensions if the project is ahead of schedule.

If a change order represents issues for which the effect on contract time can be readily determined, then any time adjustment will be agreed upon by the CPMC and CPMA prior to final execution of the change order. Determination of time adjustment will be based on the effect of the issue on the CPM schedule, the

current approved CPM schedule update or approved CPM revised update, and the Department's Time Evaluation Worksheet (TEW) submitted by the Contractor.

However, if the issues represented by the change order require further analysis and review in order to accurately and fairly evaluate the effect on contract time, then the change order contract time assessment block may be marked "not considered at this time". This will be done in order to not delay payment to the contractor for completed work included on a particular change order while the time analysis is being performed. In these cases, final resolution of any time related issues would be made as soon as all required information is received and analyzed by the Department and the Contractor.

After signature by all parties, the change order is considered approved, and work activities and any time modifications as shown on the approved TEW that affect the CPM schedule shall be reflected in the next CPM schedule update or revised update and be documented by written narrative. Only activities on the approved TEW may be included as activity(s) in schedule databases. Updates reflecting change order(s) that are inconsistent with their change order narratives will not be acceptable. No change orders will be processed until their effect on the CPM schedule has been determined, unless otherwise approved by the Engineer. A change order may not be included in a monthly estimate for payment unless approved by the Department on or before the cutoff date of the estimate. All official time extensions will be granted by letters from the applicable District Construction Engineer or his/her designated representative.

Issues involving potential time extensions must be addressed in the CPM schedule update period in which they occur or they cannot be considered. If the Contractor proposes a change to the Contract work, any time the Contractor spends in discussion and preparation, and any time the Department requires for review in the approval or disapproval process for this proposed change to the Contract work will not be considered for granting of additional contract time. It is the obligation of the Contractor to complete the project on time according to the original contract documents including current approved changes notwithstanding any change submitted for approval that may or not be accepted. The Contractor is obligated to prosecute the work at any time according to the Contract Documents in covenant at that time.

If an allowance for weather days has been included in the Completion Date section at the beginning of the Contract Special Provisions, these days shall be identified as Contract Weather Days. The following definitions regarding weather days will be utilized:

Weather day – Any Calendar Day (including weekends and Holidays) on which a weather event prohibits contract work on critical path activities. Events include, but are not limited to rain, snow, or extreme temperatures.

Lost day – Any Calendar Day (including weekends and Holidays) on which residual effects from a weather event prohibit contract work on critical path activities. Examples include, but are not limited to, wet conditions from a previous rain event, snow cover, or frozen ground.

Extensions of Contract Time for weather will not be considered until the total of weather days and lost days as defined above exceed the number of Contract Weather Days as listed in the Completion Date section at the beginning of the Contract Special Provisions. The Contractor and the Department will record and agree on weather days and lost days. A day will be considered a weather or lost day if it prevents progress of the current or next work activity on the critical path of the schedule, unless it occurs during a calendar non-work period of the current or next work activity on the critical path of the schedule in which case the day will not be counted as a weather day. Weekends and holidays will also be excluded from consideration for weather and lost days during calendar non-work periods.

When the total of weather days and lost days recorded in the field exceed the advertised Contract Weather Days, the Contractor will be awarded a day for each day weather or conditions due to previous weather events prevent progress of the current or next work activity on the critical path of the schedule. When weather affects an activity not on the critical path and the activity becomes the critical path, the

allowable days of time extension will be only for the days the activity was on the critical path. The Contractor and the Department will record and agree on these weather days. Inability to prosecute work not shown as activities in progress on the most recent CPM schedule will not be considered when determining an extension of Contract Time. The Engineer will have the final decision as to the number of calendar days the Contractor's work was limited to because of weather.

Final (As Built) CPM Schedule Update:

The CPMC shall meet with the Contractor and Resident Engineer and prepare the required as-built work schedule information and corrective work schedule information to finalize the CPM schedule. The progress reports generated by the previous CPM schedule update or revised update will be used to prepare this update information. This final update information shall reflect the final state of the project work. The final update information shall include all activities on which work was performed and/or corrections since the last update period and shall include as a minimum the activity ID and title, the actual start and finish dates, and the actual completion date. The final update information shall also include any revisions and change orders not previously included in the CPM schedule. These correction, revision, and change order modifications shall be reflected by a final update written narrative. The final update information will be as agreed to and signed off by the Resident Engineer and the CPMC. The CPMC will use the signed off information to status the CPM schedule database to prepare the final update schedule.

The Contractor shall submit the final CPM schedule database and a copy of the signed off final update information within five (5) calendar days after formal request for this update. The database and signed off information must match. The CPMA will generate a final CPM schedule update reflecting the Contractor's new information. Upon approval of the final CPM schedule update, the CPMA will furnish the Contractor graphic and report outputs of this final update.

The CPMC shall submit two (2) signed copies of the final CPM schedule update to the CPMA. Processing of the final estimate for payment will begin only after these signed copies are received. This final (as built) CPM schedule is the Contractor's final work schedule.

Method of Measurement:

The Project Control System will be portioned into two (2) items. The item, "Project Control System Development Plan", will be bid price lump sum. The item, "CPM Schedule Updates and/or Revised Updates", will be unit bid price per each approved update.

Basis of Payment:

The item, "763508 - Project Control System Development Plan", will be paid for at the Contract lump sum bid price, on the next monthly estimate after completion of the requirements of the Project Control System Development Plan, which includes approval of the Original CPM schedule.

The item, "763509 - CPM Schedule Updates and/or Revised Updates", will be paid for at the Contract unit bid price per each approved CPM schedule update. Revised updates are incidental to this item, except that each revised update(s) requested by the Department for purposes of incorporating Plan Revisions will be paid as one (1) approved CPM schedule update.

10/28/2010

763510 - SITE FURNISHINGS

Description:

This work consists of providing and installing the site furnishings as indicated on the Plans and this specification.

Bench

Submittals - Manufacturer's shop drawings shall be submitted to the Landscape Architect/Engineer for approval prior to manufacture and/or ordering. The Landscape Architect/Engineer shall retain the right to reject benches not conforming to this specification and/or approved submittal drawings.

Size: Standard 6' long x 30 1/2" high x 23 1/8" wide with eight (8) 2" x 4" slats and no arm rests
Color: Black steel components
Material: Fabricated steel metal components and mahogany finished slats
Finish: TGIC Polyester Powder Coat on steel components
Mounting: In-ground mounting system utilizing 2 3/8" diameter tubular steel

Removable Bollard

Submittals - Manufacturer's shop drawings shall be submitted to the Landscape Architect/Engineer for approval prior to manufacture and/or ordering. The Landscape Architect/Engineer shall retain the right to reject removable bollards not conforming to this specification and/or approved submittal drawings.

Size: Bollard shall be 4 3/4" outside diameter x 4' – 6" in length
Pipe sleeve shall be 5" inside diameter x 2' – 0" in length
Color: Yellow
Material: Bollard shall be constructed of polyethylene thermoplastic
All steel components shall be hot dipped galvanized.

PCC Parking Bumper

Submittals - Manufacturer's shop drawings shall be submitted to the Landscape Architect/Engineer for approval prior to manufacture and/or ordering. The Landscape Architect/Engineer shall retain the right to reject PCC Parking Bumpers not conforming to this specification and/or approved submittal drawings.

This item shall be DelDOT Standard Item #701505, PCC Parking Bumper and as shown in DelDOT Standard Detail #M-8 (2007).

Equestrian Mounting Ramp and Assist Platform

Submittals - Manufacturer's shop drawings shall be submitted to the Landscape Architect/Engineer for approval prior to manufacture and/or ordering. The Landscape Architect/Engineer shall retain the right to reject equestrian mounting ramps and assist platforms not conforming to this specification and/or approved submittal drawings.

Size: Approximately 12' x 14' with two (2) stair connections, see details

Color: Color of steel handrail shall be approved by DelDOT as part of shop drawing review
Material: Fabricated steel metal components and pressure treated lumber
Finish: Powder Coat and hot dipped galvanized color on steel components

Picnic Table

Submittals - Manufacturer's shop drawings and color samples shall be submitted to the Landscape Architect/Engineer for approval prior to manufacture and/or ordering. The Landscape Architect/Engineer shall retain the right to reject picnic tables not conforming to this specification and/or approved submittal drawings.

Size: Standard 6' long x 30 ½" high x 5' wide with three (3) 2" x 10" planks for the table top and one (1) 2" x 10" plank for each of the two seats. Framing shall be 1 7/8" outside diameter aluminum pipe and 3" x 2" x 3/16" aluminum angle.
Color: Standard gray aluminum framing and tan colored planks
Material: Aluminum frame and recycled plastic planks with stainless steel fasteners
Finish: Mill finished aluminum

Pedestal Table

Submittals - Manufacturer's shop drawings and color samples shall be submitted to the Landscape Architect/Engineer for approval prior to manufacture and/or ordering. The Landscape Architect/Engineer shall retain the right to reject pedestal tables not conforming to this specification and/or approved submittal drawings.

Size: Approximately 5' square with four (4) seats measuring 3' long x 12" wide
Color: Tan
Material: Steel reinforced concrete complying with all aspects of ASTM C31, ASTM C33, and ASTM C150
Finish: Polished concrete and sealed with a clear acrylic sealer

ADA Pedestal Table

Submittals - Manufacturer's shop drawings and color samples shall be submitted to the Landscape Architect/Engineer for approval prior to manufacture and/or ordering. The Landscape Architect/Engineer shall retain the right to reject ADA pedestal tables not conforming to this specification and/or approved submittal drawings.

Size: Approximately 5' square with three (3) seats measuring 3' long x 12" wide and one side providing ADA compliant access
Color: Tan
Material: Steel reinforced concrete complying with all aspects of ASTM C31, ASTM C33, and ASTM C150
Finish: Polished concrete and sealed with a clear acrylic sealer

Vehicular Gate

Submittals - Manufacturer's shop drawings shall be submitted to the Landscape Architect/Engineer for approval prior to manufacture and/or ordering. The Landscape Architect/Engineer shall retain the right to

reject vehicular gates not conforming to this specification and/or approved submittal drawings.

Size: Length of gate varies and must be determined by each individual location and as per the details
Color: Color of steel components shall be approved by DelDOT as part of shop drawing review
Material: Fabricated steel metal components
Finish: Powder Coat and hot dipped galvanized color on steel components

Trailhead Information Center

The Trailhead Information Center consists of the following three (3) elements to be supplied by DNREC and installed by the Contractor, all inclusive:

- Trailhead Information Center
- Waste Removal Bag Station
- Pay Station

Submittals - Shop drawings shall be submitted to the Landscape Architect/Engineer for approval prior to installation.

Pedestrian/Bicycle Traffic Counter

The Pedestrian/Bicycle Traffic Counter consists of the installation of a counter for collecting and storing bicycle volume counts at locations as shown on the plans.

Submittals - Manufacturer's shop drawings and specifications shall be submitted to the Landscape Architect/Engineer for approval prior to manufacture and/or ordering. The Landscape Architect/Engineer shall retain the right to reject Pedestrian/Bicycle Traffic Counters not conforming to this specification and/or approved submittal drawings.

Materials: The counter shall be weatherproof and shall operate in a temperature range of minus 40°F to 140°F. It shall be operated with batteries that can operate continuously for five years. If such extended life batteries are not available, then batteries that have a life of no less than one year shall be used. The detection range of the counter shall be a minimum of 15 feet in length. The counter shall be capable of recording at varying speeds, including those exceeding 20 miles per hour.

The counter shall collect and store bicycle volume counts by direction for a minimum of one year to an accuracy of plus or minus 5 percent. Time for this data shall be reported in a minimum of 15 minute increments on a 24 hour clock and also be capable of storing hourly and daily volumes. The collection device shall be capable of displaying the volume count data and the location of the retrieval device.

The data shall be stored in a format such that is compatible with the Chaparral TRADAS data collecting and operating system and can be directly exported to Microsoft Excel. The field collection device shall provide a way to download data (such as a direct modem link between the counter and a networked personal computer) such that data can be accessed at any time from multiple computers without having to visit the site location.

The counter shall be installed in the ground in a weathertight handhole with minimum dimensions of 12" x 8" x 8".

Loop sealant shall conform to manufacturer's recommendations and curing temperatures.

Construction: A minimum of two weeks prior to the installation of the traffic counter, the Contractor shall contact the Engineer to coordinate the date that the counter will be installed. Unless the Engineer states, in writing, that the manufacturer is not needed on site, a representative of the manufacturer shall also be on site to ensure proper installation.

Loop sealant also shall not coagulate prior to installation and shall be spread out across the loop installation area with a sealant spreader tool such that the sealant is flush with the roadway or trail surface.

The contractor shall locate and test for all buried and overhead utilities, which may interfere with the planned location of the counter. The Contractor shall contact "Miss Utility" for location of member utilities at least three working days prior to any excavation, not including the day of actual notice.

The Contractor shall also locate non-member utilities, such as storm drains and swales. All utility conflicts encountered with the proposed installation shall be brought to the attention of the Engineer.

Loops shall be sealed with a two-part self-curing, self-bonding weatherproof epoxy approved for sealing loops. Loops shall be 6 feet by 6 feet.

Once the installation is complete, the contractor is required to test the loops to determine if the loop devices are detecting properly. This may require the contractor have a bicycle on-site for testing purposes.

The location of the counters shall be as close to the locations shown on the plans. However, actual locations may vary such that the counters are not located near bodies of water, near overhead power lines, or are pointing towards vehicular traffic. Exact locations shall be as approved by the Landscape Architect and Engineer. Once the placement is determined, the loop cutting lines will be drawn on the roadway or trail surface with chalk or a visible marker so that the contractor can then follow the saw cutting lines during installation. The saw cut for the loops shall be made 3/8 inch wide and 3-½ inches deep. The saw slot shall be as straight as possible and shall not vary more than ½ inch when checked with a straightedge. No more than one set of loop lead wires shall be placed in one saw slot. The number of turns of paired loop wire shall be in accordance with manufacturer's recommendations. Saw cuts shall be hydro-blasted with a mixture of water and air and then blown free of water and debris with compressed air, using a large capacity air compressor of at least 150 CFM. The cuts shall be dry prior to placement of loop wire.

The piezo lead wire shall be placed in the saw slot with a blunt non-metallic object. One half inch backer-rod shall be installed to insure the wire does not float to the surface during grouting. Backer-rod shall be installed in 4 to 6 inch pieces with 1 to 2 foot gaps in-between, to ensure the sealant will come in contact with the piezo lead wire. One continuous piece of backer-rod will not be allowed.

Loop lead wires from pavement edge to handhole shall be enclosed in ¾ inch PVC conduit or ¾ inch rubber hose to protect wire from abrasion. Loop lead-in pairs from pavement edge to handhole, shall be symmetrically twisted 5 turns per 1 foot (or whatever the counter manufacturer recommends). Handholes shall contain a minimum of 3 feet of loop lead wire for splicing. All loop and loop leads shall be clearly labeled in all handholes.

The Contractor shall follow all environmental regulations and best management practices during the saw cutting and installation of the loops. All damages or penalties associated with failing to meet environmental requirements shall be at the Contractor's expense.

Acceptance will be based on the Contractor performing a complete test of the counter to ensure that it is functioning correctly and is fully operational. Non-functioning systems will be repaired or replaced at the Contractor's expense.

Size: Approximately 6 ½" in diameter x 2 ½" tall and weighing approximately 2 pounds.

Materials and Construction Methods:

All materials, construction methods, and installation shall conform to the requirements of the Plans and manufacturers' recommendations.

Method of Measurement:

The quantity of site furnishings will not be measured.

Basis of Payment:

The quantity of site furnishings will be paid for at the Contract lump sum price. Price and payment will constitute full compensation for furnishing and installing all materials, labor, tools, equipment, and incidentals required to complete the work.

NOTE:

The breakout sheet attached to the Proposal shows all site furnishings proposed for this contract. The Contractor shall fill in a unit price for each item and the cost (unit price times the proposed quantity). The lump sum bid for Item 763510 - Site Furnishings shall be the sum of the cost for all items listed. The completed 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 removal of one or more site furnishings and the lump sum to be paid will be reduced in accordance with the contractors cost listed for that/those site furnishing(s). There will be no extra compensation if such additions and/or deletions are made.

1/26/12

763514 - RESTROOM FACILITY

Description:

This work consists of furnishing, placing, and installing all materials in order to complete restroom facility in accordance with the notes and details as shown on the Plans. Work includes but is not limited to:

Furnishing and installing factory fabricated Composting Restroom in accordance with manufacturer's instructions, including all components and incidentals, and as necessary to provide a complete functioning unit in compliance with all applicable codes and regulations. Completed unit shall include, but not necessarily be limited to, pre-manufactured building with all fixtures and hardware, structural concrete tank/foundation with maintenance access area, and electrical system.

All toilet stalls shall meet the accessibility requirements of the ADA (Americans with Disabilities Act).
Staking out work and obtaining Owner's approval.

Excavating and providing 6-inch layer Del. No. 57 stone below concrete tank/foundation under building, and backfilling.

Excavating and constructing drainage infiltration pit as shown on drawings.

Creating sump pit in maintenance access area per Owner's direction. Contractor shall coordinate and provide sump pit support as required by the building manufacturer.

The Contractor shall coordinate and cooperate with the Manufacturer in all phases of the work to ensure proper installation. Clean up.

References

Restroom and incidentals pertaining thereto shall conform to the applicable requirements of the following:

Manufacturer's technical specifications.

DELDOT: "Standard Specifications for Road and Bridge Construction Manual", 2001 edition, prepared by Delaware Department of Transportation.

ASTM: "Specifications of the American Society for Testing and Materials", most recent edition.

ACI: American Concrete Institute Standard 347, "Recommended Practice for Concrete Formwork".

ACI-318-93, "Building Code Requirements for Reinforced Concrete".

ANSI/ASCE-7-93 "Building Code Requirements for Minimum Design Loads in Buildings and Other Structures".

Concrete Reinforcing Institute, "Manual of Standard Practice".

1996 BOCA National Building Code; UL-752 test method level 4 for bullet resistance certified by an independent structural engineer.

Fabricator must be producer member of National Precast Concrete Association (NPCA) and participate in its Plant Certification Program.

Building fabricator must have a minimum of 5-years experience manufacturing and setting transportable precast concrete buildings.

Submittals

Submit the following:

Shop drawings/product literature: Submit shop drawings and/or product literature to show component parts, fabrication, installation, and dimensions for all items in this section.

Samples: Submit samples of applicable materials for Restroom Building.

Complete shop drawings (scaled drawings: plan view, cross-sectional view and elevation as a minimum) must be supplied to the Owner for all items in this Section. Where approved by the Owner, manufacturer's catalog cuts may be substituted for shop drawings. Drawings must indicate the products utilized are in complete compliance with the specifications and include attachment detailing.

Quality Assurance

Coordination: Coordinate locations with other work to avoid interference and to assure proper operation and servicing.

All work shall be performed in accordance with acceptable industry standards except where specific procedures are called for in these specifications or by the Manufacturer, in which case they shall be followed.

Provide a warranty for minimum of one year to include any and all parts and labor associated with any needed repairs or replacements.

Delivery, Storage, and Handling

Restroom Building and Concrete Tank/Foundation shall be secured as recommended by manufacturer to assure protection during transit. Pick up and deliver restroom and all other necessary materials to project site in original factory condition. Store materials in accordance with manufacturer's recommendation.

Install only components in "factory condition".

Composting Restroom

Compost Restroom shall be a two-toilet pre-cast concrete building meeting the following specifications and equipped with integrated concrete tank/foundation waste treatment system as follows.

Manufacturers include Biological Mediation Systems, Inc. or Bio-Sun Systems or approved equal by project engineer.

Biological Mediation Systems, Inc.
PO Box 650, Fort Collins, CO 80522
Phone 970-221-5949

Bio-Sun Systems
7088 Route 549
Millerton, PA 16936-9349 map
(570) 537-2200

Building construction to be of 5" pre-cast concrete. Roof, floor and wall panels must be each produced as single component monolithic panels. No roof, floor or vertical wall joints will be allowed, except at corners. Wall panels shall be set on top of floor panel.

Design Requirements:

Dimensions: see drawings

Design Loads:

1. Seismic load performance category 'C', Exposure Group III

2. Standard Live Roof Load - 60 PSF
3. Standard Floor Load -250 PSF
4. Standard Wind Loading -130 MPH

Materials:

Concrete: Steel reinforced, 5000-PSI minimum 28-day compressive strength, air-entrained (ASTM-C260) screened

Reinforcing Steel: ASTM A615, grade 60 unless otherwise indicated.

Post-tensioning Strand: 41K Polystrand CP50, .50, 270 KSI, 7-wire strand, greased plastic sheath, (ASTM A416), roof and floor to be each post-tensioned by a single, continuous tendon. Said tendon shall form a substantially rectangular configuration having gently curving corners and a corder where the tendon members are anchored. Tendons shall be greased and enclosed within a sheath.

Caulking: All joints between panels shall be caulked on the exterior and interior surface of the joints. Caulking shall be SIKAFLEX-1 A elastic sealant or equal.

Panel Connections: All panels shall be securely fastened together with 1/4" thick steel brackets. Steel is to be of structural quality, hot-rolled carbon complying with ASTM A283, Grade C and zinc rich powder coated after fabrication. All fasteners to be 1/2" diameter bolts complying with ASTM A307 for low-carbon steel bolts. Cast-in anchors used for panel connections to be Dayton-Superior #f-63, or equal. All inserts for corner connections must be fastened directly to form before casting panels. No floating-in of connection inserts shall be allowed.

Finish:

Interior finish shall be smooth steel form finish on all interior panel surfaces. Restroom floor, walls, and ceiling are painted with Tnemec Ceramlon 84 epoxy coating, or equal, to match the owner's color selection.

Exterior of building shall be washed brown riverstone aggregate finish on all exterior wall surfaces, see drawings for additional details. Aggregate must be seeded into top of panel while in form, chemically retarded, and high-pressure water-washed to expose the aggregate to a depth of 1/8".

Floor finish shall be raised disc, synthetic rubber, 5mm (0.20") min. thickness, installed with a two part epoxy inlay adhesive and 1500 pound per square foot mechanical roller compression.

Doors:

Entry doors shall be single 3'-0" x 6'-8" x 1-3/4", 18-gauge galvanized/insulated right hand reverse metal doors with 16-gauge galvanized frames. Doors and frames shall be bonderized and painted one coat of rust inhibitive primer and one finish coat of enamel paint, color to be specified by the owner. The Owner reserves the right to have the interior and exterior sides of the door painted two different colors. Doors shall be located on long side of building.

Entry doors shall include (3)- 3" x 1-1/2" semi-concealed hinges, ADA approved pneumatic door closer, ADA approved, "U" type door pull handle and key lockable cylinder.

Locksets shall be Extra Heavy Duty Cylindrical Lever Locksets. Contractor shall coordinate with Owner to match Owner's keying system.

Building Ventilation:

Ventilation shall be accomplished by room air drawn through screen ventilated soffits exhausting down through toilet chutes induced by the requirements of the waste treatment system's fan. Fan shall be roof-mounted type. Fan to be operational 24 hours per day and powered by the building's solar electric system.

Waste Treatment:

Treatment vessel shall be 4" thick, 5000 PSI reinforced concrete container. Vault to be sized for a capacity of 109,500 uses/year.

Provide internal waste treatment components including but not limited to the following in order to comprise a complete and functioning system.

Polyethylene air supply diffuser pipes with adapters/connectors.

PVC, air supply manifold with fittings, adapters and stainless steel mounting clamps .

Stainless steel central air exhaust cavity with stainless steel intake stub.

26 Ga. #304 Stainless steel vent pipe and elbows.

26 ga. galvanized vent flashing roof boot 26 ga. galvanized vent flashing storm collar. Regenerative, ring compressor/blower capable of 40 C.F.M. @ zero head pressure. The compressor/blower shall contain no contacting or wearing replaceable parts such as pistons, cylinders, valves, springs, seats, vanes, belts, pulleys, drive couplings, or diaphragms. The compressor and or motor shall require no periodic lubrication maintenance. Design compressed airflow shall be of the regenerative type providing a continuous and non-pulsating flow of air. Blower maintenance shall be limited to cleaning or replacement of the intake air filter as required, replacement of motor bearings and lube seal as required and cleaning of motor cooling fan and cooling air path as required. Motor shall be equipped with automatic, thermal, safety disconnect. Maximum power requirements for compressor motor shall be - 3.6- amperes @ -120 volts AC, 60 Hz. The compressor shall produce - 36 CFM @ -1" W.C. 1 - each Solid state, Compressor/ blower cycle timer assembly. The cycle timer shall be field settable. The benign power consumption of the cycle timer shall be 2 VA @ 120 volts AC, 60Hz maximum. Intake air filter silencer. The filter silencer shall allow a 99% efficient air flow @ 1.0 micron particle filtration and matched to the compressor.

Solar System:

System to include but shall not be limited to the following in order to provide a complete functioning system.

Roof mounted solar panels.

Battery storage and associated wiring.

Electronics and controls.

Solar powered exhaust fan.

The photovoltaic electric system shall be designed to operate the fan 24 hours per day and one the compressor 2 hours/day, 365 days per year - at a full sun location in - the state of Delaware.

Photo-electric module/s shall be manufactured of crystalline material mounted on a rigid aluminum substrate and weatherproofed by a tempered glass laminate. The array shall be capable of producing 2,000 watts per fan/ blower assembly @ 12 volts DC at full sun location. Battery plant shall be 220 Amp/hour @ 12 volts per fan/ blower assembly, 12 volt, deep cycle, deep discharge, lead acid and shall include all connectors, fuses, breakers/disconnects, regulators, MPPT unit, meters and monitoring equipment. Additional power design and equipment shall be required when optional lighting and/ or liquid pumps are specified.

Solar panel mounting hardware shall be 1/4" x 3" x3" extruded fiberglass structural angle, sized and drilled to secure the module/s to the south facing roof surface.

NOTE: it is a critical requirement that one of the long (sloped) roof surfaces of the building be oriented to face, unobstructed (fully exposed) to the due South.

The top of the caisson shall contain an access opening 4' wide x 8' long. The access and egress to and from the floor of the maintenance caisson shall be via a standard staircase described as follows: 8" max. stair rise

x 9" min. stair tread x 48" wide with a minimum headroom throughout the full traverse of staircase of 6' -8" (80"). There shall be a 48" wide x 31 " long x 6' -8" high free space landing area at the base of the stair: The landing area at the top of the stair shall be at adjusted grade level provided at final grading/ landscaping by others. The opening shall be covered and secured with a double leaf, 0.095" thick steel basement door type access assembly. The door unit shall have a five-year warranty against materials and workmanship.

An air to waste interface system shall be factory installed so as to maintain an air surface to waste mass volume ratio of a minimum of 1:1 from start-up through maximum capacity. Surface to volume ratio at half capacity shall be not less than 1.5:1. Usage capacity shall average 300 uses per day.

One stainless steel access door and frame equipped with stainless steel latches.

Roof:

Roof panel shall have a peak in center and slope 1" to each side. Roof shall extend 2 1/2" beyond the wall panel on each side and have a turndown design which extends 1/2" below the top edge of the wall panels to prevent water migration into the building.

Roofing shall be asphalt shingles.

Roofing to be applied over 15# felt or equal installed over 3/4" treated plywood sheathing good side facing in toward building. Underside of roof sheathing shall be painted with white enamel as the interior finish.

Ceiling shall be open with rafters/trusses painted white and exposed.

Hardware, including but not necessarily limited to the following:

Toilet compartment accessories shall include one aluminum minimum waste toilet tissue dispenser per compartment.

Handicap Accessible grab bars shall be 1-1/2" diameter stainless steel, mounted 33" above finished floor with semi-concealed fasteners.

Building shall be fitted with wooden "Unisex" signs and 'Accessible' signs.

All screws and other fasteners shall be stainless steel, or cadmium plated.

Plumbing fixtures:

Toilet and Urinal fixtures shall be located as shown on drawings. Fixtures shall conform to ADA accessibility standards. Fixture skeletal framework shall be fabricated stainless steel with white finish supported from the floor and or wall, the toilet shall include an integral seat. Fixtures shall be fabricated from 0.078-inch minimum thickness, ASTM A 666, Type 304 stainless steel. Include SSINA No. 4 polished finish on exposed surfaces, and corrosion-resistant metal for internal piping and bracing.

Inspections

Examine areas and conditions under which the Composting Restroom is to be installed, and remedy any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Owner and Building Manufacturer.

Preparation

Furnish setting drawings, diagrams, templates, instructions, and directions for the installation. Coordinate delivery and contractor's pick up of such items to the project site and per the project schedule for timely installation.

Installation

Composting Restroom shall be located where shown on the plans. Excavation and Backfill shall be as specified in Section 207. However pavement for Excavation and Backfill shall be included as part of this item.

Use actual furnishings or furnished templates to establish all dimensions for installation.

Erect and install Composting Restroom Building in accordance with manufacturer's instructions and recommendations. Install furnishings plumb, accurately and in the correct orientation and relationship with other site furnishings, elements and paving as shown on the drawings.

Install Integrated Precast Concrete Tank/Foundation in strict accordance with manufacturer's instructions and the Project Documents.

Construction Methods and Materials:

All materials and construction shall conform to the requirements of the specifications, notes, details and plans.

Mandatory Pre-Bid Meeting:

All bidders must be represented at the Mandatory Pre-Bid Meeting(s) for this contract. The meeting information is provided on the first page of this contract (page i). The bidder's representative must sign-in and identify the name of the bidder they represent.

Failure to sign-in with the bidder's company name at the Mandatory Pre-Bid Meeting will result in the bidder being found non-responsible and non-responsive, and their bid will be rejected.

Method of Measurement:

Payment for this item will be made on a lump sum basis wherein no measurement will be made.

Basis of Payment:

Payment will be made at the Lump Sum price bid for this item. Price and payment will constitute full compensation for delivering, furnishing, placing and constructing all materials including, demolition, plumbing, carpentry, and for all incidentals, labor, tools and equipment necessary to provide a complete, working, and usable facility acceptable to the Owner.

1/20/12

763597 - UTILITY CONSTRUCTION ENGINEERING

Description:

Utility Construction Engineering consists of providing construction and right-of-way/easement information to utility companies performing work (as defined in the Utility Statement) within the project limits. This may include but not necessarily be limited to staking right-of-way/easement lines, tops of cuts, bottoms of slopes, clear zones, drainage facilities, fill and cut grades, and other features that will enable utility companies to coordinate their work and correctly locate/relocate their facilities. Engineering/surveying required for utility work bid as part of the Contract is included in item 763501.

It is the intent of this item to cover engineering/surveying work that is done solely for utility companies and that is beyond the work performed under item 763501 - Construction Engineering. Work covered under Utility Construction Engineering will generally fall into two categories:

1. Engineering/surveying work that is not necessary for construction of the project, i.e. staking the clear zone line, providing cut/fill grades at proposed utility pole locations, staking back of drainage structures, and staking right-of-way lines where construction of the project (exclusive of utilities) is obviously well within the right-of-way.
2. Engineering/surveying work that is necessary for construction, but has to be provided for utility companies well in advance of the Contractor's need and will likely need to be redone later. This can essentially be any of the Construction Engineering work that when done early cannot be reasonably expected to remain undisturbed until needed for construction of the project (non-utility).

The Engineer must approve all requests for Utility Construction Engineering before the work begins. To this end, the Contractor should instruct utility companies to submit their requests to the Engineer. The Engineer will decide if the requested work meets the criteria for Utility Construction Engineering or is normal Construction Engineering and pass the requests along with his/her decisions to the Contractor. When the Engineer determines that the requested work qualifies as Utility Construction Engineering, the Department will reimburse the Contractor on a per hourly basis for each and every hour the Contractor's survey crew is in the field actively engaged in performing the Utility Construction Engineering work. The survey crew size shall be adequate to efficiently perform the work required and shall meet the approval of the Engineer. Office work associated with Utility Construction Engineering will be considered as incidental to the item.

The personnel engaged in and the equipment used for Utility Construction Engineering shall meet the requirements as described in item 763501 - Construction Engineering.

Method of Measurement:

The quantity of Utility Construction Engineering will be measured as the actual number of hours the Contractor's survey crew is in the field actively engaged in utility construction engineering work.

Basis of Payment:

The quantity of Utility Construction Engineering will be paid for at the Contract unit price per hour. Price and payment will constitute full compensation for furnishing all labor, equipment, instruments, stakes and other materials necessary to complete the work.

02/28/09



STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
800 BAY ROAD
P.O. Box 778
DOVER, DELAWARE 19903

SHAILEN P. BHATT
SECRETARY

UTILITY STATEMENT
August 18, 2011

STATE CONTRACT NO. T200669001
FAP# NRT-2011(25)
C&D CANAL RECREATIONAL TRAIL
NEW CASTLE COUNTY

The following is a breakdown of the utilities involved, adjustments and/or relocations, as required:

DELMARVA POWER (electric transmission)

Delmarva Power maintains at Biddle Point a large tower for above ground electrical transmission with no apparent conflicts. Any adjustments and/or relocations to the aforementioned utilities' existing facilities will be done by the respective companies' forces as construction warrants.

DELMARVA POWER (electric distribution)

Delmarva Power maintains underground electric facilities at Summit Marina including transformers within the project limits with no apparent conflicts. Any adjustments and/or relocations to the aforementioned utilities' existing facilities will be done by the respective companies' forces as construction warrants.

EASTERN SHORE NATURAL GAS (natural gas transmission)

Eastern Shore Natural Gas maintains underground transmission facilities at St. Georges within the project limits with no apparent conflicts. Any adjustments and/or relocations to the aforementioned utilities' existing facilities will be done by the respective companies' forces as construction warrants.

ARESIA WATER

Aresian maintains underground facility at Summit Marina in close proximity to the proposed trail/sidewalk within the project limits with no apparent conflicts. Any adjustments and/or relocations to the aforementioned utilities' existing facilities will be done by the respective companies' forces as construction warrants.

NEW CASTLE COUNTY (sanitary sewer)

The County maintains sanitary sewer facilities within the project limits with no apparent conflicts. Any adjustments and/or relocations to the City's existing facilities will be done



by the State's contractor in accordance with the Standard Specifications of the City of Newark.

VERIZON

Verizon maintains underground facility at Summit Marina within the project limits with no apparent conflicts. Any adjustments and/or relocations to the aforementioned utilities' existing facilities will be done by the respective companies' forces as construction warrants.

Note:

It is the responsibility of the contractor to verify all locations and depths of utilities prior to beginning construction. Before excavation is started in areas of underground utilities, the contractor shall call Miss Utility at (800)282-8555. All existing utilities shall be protected and temporarily supported or relocated as necessary to complete the work in accordance with the pertinent utility company. The Contractor, prior to laying a run of drainage pipe, installing guard rail, sign posts, or other involved construction, shall excavate within the alignment at points of possible utility conflict to determine if a conflict exists. Any conflicts shall be coordinated by the contractor with the Engineer and the utility company involved. The Engineer shall determine the solution. Excavating and backfilling of the test holes shall be incidental to Item 202001, Excavation and Embankment.

General Notes

1. 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 for excavation and/or demolition. 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.
2. It is understood and agreed that the Contractor has considered in his bid all permanent and temporary utility appurtenances in their present or relocated positions as shown on the plans or described in the Utility Statement or are readily discernible and that no additional compensation will be allowed for any delays, inconvenience, or damage due to any interference from the utility facilities and appurtenances or the operation of moving them, except that the Contractor may be granted an equitable extension of time.
3. Coordination and cooperation among the Utility Companies and the State's Contractor are of prime importance. Therefore, the Contractor is directed to contact the following Utility Company representatives with any questions regarding this work prior to submitting bids and work schedules. Proposed work schedules should reflect

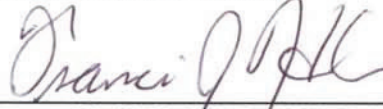
the Utility Companies' proposed relocations. The Utility Companies do not work on weekends or legal holidays.

Angel Collazo	Delmarva Power (Electric)	(302) 454-4370
Jason Woody	Eastern Shore Natural Gas	(302) 734-6710 x6169
George Zang	Verizon	(302) 422-1238
Carmen Hunter	Artesian	(302) 453-7153
Kevin Penozza	New Castle County	(302) 395-5723

DIVISION OF TRANSPORTATION SOLUTIONS

8-18-11

DATE



UTILITIES ENGINEER

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
PO BOX 778
DOVER, DELAWARE 19903**

CERTIFICATE OF RIGHT-OF-WAY STATUS

STATE PROJECT NO. T200669001.01

F.A.P. No. NRT-2011 (25)

CHESAPEAKE AND DELAWARE CANAL RECREATIONAL TRAIL

NEW CASTLE COUNTY

Certificate of Right-of-Way Status – Stipulated

As required by 23CFR Part 635, all necessary right-of-way has been acquired in accordance with current State/Federal rules and regulations covering the acquisition of real property.

This is to certify that all project rights of way are currently available ~~except~~ for the following parcels:

- Parcel No. 12-028.00-011 and 12-028.00-012
Lands of the United States Army Corps of Engineers

All right of way is anticipated to be clear within the next two weeks.

It is further certified that there were no individuals or families displaced by this project. Therefore the provisions of 49 CFR Part 24 is not applicable to the project.

There are no improvements to be removed or demolished as part of this project.

REAL ESTATE SECTION

Carol V. O'Donoghue
Assistant Chief, Real Estate

August 26, 2011



STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
800 BAY ROAD
P.O. Box 778
DOVER, DELAWARE 19903

SHAILEN P. BHATT
SECRETARY

August 3, 2011

ENVIRONMENTAL REQUIREMENTS

FOR

State Contract No. T200669001

Federal Aid No.: NRT-2011(25)

Contract Title: Chesapeake and Delaware Canal Recreational Trail

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.

Due to the nature of the proposed construction activities, permits are not required for this project. However, the following construction requirements and special provisions have been developed to minimize and mitigate impact to the surrounding environs. These requirements by DelDOT not specified within the contract, but listed below, are the responsibility of the contractor and is subject to risk of shut down at the contractor's expense if not followed.

GENERAL REQUIREMENTS:

1. 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 dumping ground.
2. That effort shall be made to keep construction debris from entering adjacent waterways or wetlands. Any debris that enters those areas shall be removed immediately.
3. The disposal of trees, brush, and other debris in any stream corridor, wetland, surface water, or drainage area is prohibited.



BID PROPOSAL FORMS

CONTRACT T200669001.01

FEDERAL AID PROJECT NRT-2011(25)

DELAWARE DEPARTMENT OF TRANSPORTATION
SCHEDULE OF ITEMS

PAGE: 1
DATE:

CONTRACT ID: T200669001.01 PROJECT(S): NRT-2011(25)

All figures must be typewritten.

CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
SECTION 0001 C & D CANAL RECREATIONAL TRAIL						
0010	201000 CLEARING AND GRUBBING	LUMP	LUMP			
0020	202000 EXCAVATION AND EMBANKMENT	CY	20837.000			
0030	208000 EXCAVATION AND BACKFILLING FOR PIPE TRENCHES	CY	6029.000			
0040	209003 BORROW, TYPE C	CY	129.000			
0050	209006 BORROW, TYPE F	CY	3082.000			
0060	212000 UNDERCUT EXCAVATION	CY	600.000			
0070	251000 SILT FENCE	LF	2530.000			
0080	252000 INLET SEDIMENT CONTROL, DRAINAGE INLET	EACH	67.000			
0090	263000 SUMP PIT, TYPE 1	EACH	19.000			
0100	266000 SANDBAG DIKES	CY	38.000			

DELAWARE DEPARTMENT OF TRANSPORTATION
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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0110	268000 STABILIZED CONSTRUCTION ENTRANCE	270.000 TON				
0120	272503 TRASH RACK	36.000 EACH				
0130	302006 GRADED AGGREGATE BASE COURSE, TYPE B, PATCHING	20.000 TON				
0140	302007 GRADED AGGREGATE BASE COURSE, TYPE B	7585.000 CY				
0150	302011 DELAWARE NO. 3 STONE	720.000 TON				
0160	302012 DELAWARE NO. 57 STONE	1744.000 TON				
0170	401574 PERVIOUS BITUMINOUS ASPHALT PAVEMENT	9557.000 SY				
0180	401800 WMA, SUPERPAVE, TYPE C, 115 GYRATIONS, PG 64-22 (CARBONATE STONE)	3989.000 TON				
0190	401809 WMA, SUPERPAVE, TYPE B, 115 GYRATIONS, PG 64-22	7882.000 TON				
0200	401821 WMA, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22, PATCHING	10.000 TON				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0210	406001 HOT-MIX PATCHING	180.000 SYIN				
0220	602615 MODULAR BLOCK RETAINING WALL	1409.000 SF				
0230	612502 PVC PIPE, 6"	670.000 LF				
0240	612526 CORRUGATED POLYETHYLENE PIPE, TYPE S, 36"	968.000 LF				
0250	612527 CORRUGATED POLYETHYLENE PIPE, TYPE C, 18"	624.000 LF				
0260	612529 PIPE VIDEO INSPECTION	1592.000 LF				
0270	612535 CLEANING DRAINAGE PIPE, 15"-24" DIA	200.000 LF				
0280	612536 CLEANING DRAINAGE PIPE, GREATER THAN 24" DIA	4800.000 LF				
0290	612537 HEAVY CLEANING OF DRAINAGE PIPE	1000.000 HOUR				
0300	617511 CORRUGATED POLYETHYLENE FLARED END SECTION, 18"	13.000 EACH				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0310	617514 CORRUGATED POLYETHYLENE FLARED END SECTION, 36"	36.000 EACH				
0320	701010 PORTLAND CEMENT CONCRETE CURB, TYPE 1-8	4460.000 LF				
0330	705001 P.C.C. SIDEWALK, 4"	890.000 SF				
0340	705007 SIDEWALK SURFACE DETECTABLE WARNING SYSTEM	156.000 SF				
0350	705008 CURB RAMP, TYPE 1	75.000 SF				
0360	705504 BRICK AND/OR BLOCK SIDEWALK	4429.000 SF				
0370	708060 REPLACE DRAINAGE INLET GRATE(S)	12.000 EACH				
0380	708061 REPLACE DRAINAGE INLET FRAME(S)	12.000 EACH				
0390	708512 DRAINAGE INLET, SPECIAL I	5.000 EACH				
0400	709518 SANITARY CLEANOUT	85.000 EACH				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0410	710001 ADJUSTING AND REPAIRING EXISTING DRAINAGE INLET	12.000 EACH				
0420	712005 RIPRAP, R-4	1020.000 SY				
0430	712540 GEOGRID, STABILIZATION	4050.000 SF				
0440	713002 GEOTEXTILES, SEPARATION	19926.000 SY				
0450	715517 PERFORATED PVC PIPE UNDERDRAINS, 6"	37567.000 LF				
0460	727014 CONSTRUCTION SAFETY FENCE	750.000 LF				
0470	727510 WOOD RAIL FENCE	567.000 LF				
0480	732004 TOPSOIL (TON)	4676.000 TON				
0490	733001 TOPSOILING, 4" DEPTH	11650.000 SY				
0500	734013 PERMANENT GRASS SEEDING, DRY GROUND	45701.000 SY				

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			DOLLARS	CTS	DOLLARS	CTS
0510	734017 TEMPORARY GRASS SEEDING, DRY GROUND	51739.000 SY				
0520	735535 SOIL RETENTION BLANKET MULCH, TYPE 5	35076.000 SY				
0530	737523 PLANTING	LUMP	LUMP			
0540	743006 PLASTIC DRUMS	940.000 EADY				
0550	743050 FLAGGER, NEW CASTLE COUNTY, STATE	100.000 HOUR	44.52000		4452.00	
0560	743504 WARNING SIGNS	45.000 EACH				
0570	743524 TEMPORARY BARRICADES, TYPE III	67.000 EACH				
0580	743525 TEMPORARY WARNING SIGNS	16.000 EADY				
0590	743538 WOODEN SIGN POSTS, 4" X 4"	18.000 EACH				
0600	743539 WOODEN SIGN POSTS, 4" X 6"	18.000 EACH				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0610	743540 WOODEN SIGN POSTS, 6" X 6"	9.000 EACH				
0620	748015 PERMANENT PAVEMENT STRIPING, SYMBOL/LEGEND ALKYD-THERMOPLAST IC	239.000 SF				
0630	748548 PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 5"	47298.000 LF				
0640	748555 PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS, HANDICAP SYMBOL	4.000 EACH				
0650	749687 INSTALLATION OR REMOVAL OF TRAFFIC SIGN(S) ON SINGLE SIGN POST	56.000 EACH				
0660	749690 INSTALLATION OR REMOVAL OF TRAFFIC SIGNS ON MULTIPLE SIGN POSTS	84.000 SF				
0670	758000 REMOVAL OF EXISTING PORTLAND CEMENTCONCRETE PAVEMENT, CURB, SIDEWALK, ETC.	99.000 SY				
0680	759005 FIELD OFFICE, TYPE II	9.000 EAMO				
0690	762001 SAW CUTTING, HOT MIX	792.000 LF				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0700	762002 SAW CUTTING, CONCRETE, FULL DEPTH	26.000 LF				
0710	763000 INITIAL EXPENSE	LUMP	LUMP			
0720	763500 MAINTENANCE OF TRAFFIC	LUMP	LUMP			
0730	763501 CONSTRUCTION ENGINEERING	LUMP	LUMP			
0740	763508 PROJECT CONTROL SYSTEM DEVELOPMENT PLAN	LUMP	LUMP			
0750	763509 CPM SCHEDULE UPDATES AND/OR REVISED UPDATES	9.000 EAMO				
0760	763510 SITE FURNISHINGS	LUMP	LUMP			
0770	763514 RESTROOM FACILITY	LUMP	LUMP			
0780	763597 UTILITY CONSTRUCTION ENGINEERING	160.000 HOUR				
	SECTION 0001 TOTAL					
	TOTAL BID					

CANNOT BE

BREAKOUT SHEETS

THE FOLLOWING SHEETS MUST BE COMPLETED AND RETURNED WITH THE PROPOSAL AT THE TIME OF BID. FAILURE TO COMPLETE THE BREAKOUT SHEETS AS REQUIRED WILL RESULT IN THE BID BEING DECLARED NON-RESPONSIVE AND WILL NOT BE CONSIDERED. BREAKOUT SHEETS MUST BE COMPLETED REGARDLESS OF WHETHER BIDDING BY ELECTRONIC MEANS OR TYPEWRITTEN HARD COPY.

BIDDING

SECTION 1			BREAKOUT SHEET - 1 ITEM 737523 - PLANTING	CONTRACT NO. T200669001	
ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
1	150	EA	Amelanchier canadensis 'Downy Serviceberry'; 6', B&B	\$	\$
2	161	EA	Acer rubrum 'Red Maple'; 2" cal., B&B	\$	\$
3	3	EA	Cornus florida 'Flowering Dogwood'; 2" cal., B&B	\$	\$
4	678	EA	Cornus sericea 'Redosier Dogwood'; 24", cont.	\$	\$
5	21	EA	Ilex verticillata 'Winterberry Holly'; 24", cont.	\$	\$
6	21	EA	Juniperus virginiana 'Eastern Red Cedar'; 5' HGT., B&B	\$	\$
7	6	EA	Liquidambar styraciflua 'American Sweetgum'; 2" cal., B&B	\$	\$
8	26	EA	Myrica pensylvanica 'Norther Bayberry'; 24", cont.	\$	\$
9	22	EA	Nyssa sylvatica 'Black Tupelo'; 2" cal., B&B	\$	\$
10	4	EA	Oxydendrum arboreum 'Sourwood'; 2" cal., B&B	\$	\$

SECTION 1			BREAKOUT SHEET - 2		CONTRACT NO. T200669001	
ITEM 763510 - SITE FURNISHINGS						
ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT	
1	45	EA	BENCHES	\$	\$	
2	58	EA	REMOVABLE BOLLARDS	\$	\$	
3	114	EA	PCC PARKING BUMPER	\$	\$	
4	1	EA	EQUESTRIAN MOUNTING RAMP &ASSIST PLATFORM	\$	\$	
5	4	EA	PICNIC TABLE	\$	\$	
6	2	EA	PEDESTAL TABLE	\$	\$	
7	3	EA	ADA PEDESTAL TABLE	\$	\$	
8	14	EA	VEHICULAR GATE	\$	\$	
9	2	EA	TRAILHEAD INFORMATION CENTER	\$	\$	
10	3	EA	PEDESTRIAN/BICYCLE COUNTER	\$	\$	
TOTAL ITEM 763510 - SITE FURNISHINGS				\$		
				(LUMP SUM BID PRICE FOR ITEM 763510)		

"ATTENTION"

TO BIDDERS

This Bid Proposal includes breakout sheets. The breakout sheets **MUST ACCOMPANY** the bid proposal at the time of bid. Failure to return completed breakout sheets **WILL RESULT** in the bid proposal being declared non-responsive and **REJECTED** as irregular.

CERTIFICATION

Contract No. T200669001.01
Federal Aid Project No. NRT-2011(25)

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)]:

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 prosecution 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.

=====

I/We acknowledge receipt and incorporation of addenda to this proposal as follows:

No.	Date	No.	Date	No.	Date	No.	Date	No.	Date
-----	------	-----	------	-----	------	-----	------	-----	------

=====

FAILURE TO ACKNOWLEDGE RECEIPT OF ALL ADDENDA AND FINAL QUESTIONS AND ANSWERS WILL RESULT IN THE BID BEING DECLARED NON-RESPONSIVE.

MUST INSERT DATE OF FINAL QUESTIONS AND ANSWERS ON WEBSITE: _____

=====



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. T200669001.01, 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
_____ (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