

STATE OF DELAWARE

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DEPARTMENT OF TRANSPORTATION

BID PROPOSAL

for

CONTRACT T200504110.01

FEDERAL AID PROJECT NO. ESTP-N54(04)

HSIP NCC, N54, HOWELL SCHOOL ROAD, SR 896 TO SR 71

NEW CASTLE COUNTY

ADVERTISEMENT DATE: September 28, 2015

COMPLETION TIME: 649 Calendar Days

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

Bids will be received in the Bidder's Room at the Delaware Department of Transportation's Administration Building, 800 Bay Road, Dover, Delaware until 2:00 P.M. local time **October 27, 2015**

Contract No. T200504110.01
Federal Aid Project No. ESTP-N54(04)

HSIP NCC, N54, HOWELL SCHOOL ROAD, SR 896 TO SR 71
NEW CASTLE COUNTY

GENERAL DESCRIPTION

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 labor and materials for this contract. This Project will realign the SR 896, Summit Bridge Road Intersections of N396, Denny Road and N54, Howell School Road. In addition, Howell School Road will be widened to provide two 11-foot lanes and two 5-foot shoulders (Shared Bicycle Lanes) from SR 896 to Robert Peoples Boulevard. A roundabout will be constructed at the intersection of Robert Peoples Boulevard and Howell School Road. A multi-use path will also be constructed to connect access to Lums Pond from Denny Road, and other incidental construction in accordance with the location, notes and details shown on the plans and as directed by the Engineer.

COMPLETION TIME

All work on this contract must be complete within 649 Calendar Days. The Contract Time includes an allowance for 105 Weather Days. It is the Department's intent to issue a Notice to Proceed such that work starts on or about January 6, 2016.

PROSPECTIVE BIDDERS NOTES:

1. BIDDERS MUST BE REGISTERED with DelDOT and request a cd of the official plans and specifications in order to submit a bid. Contact DelDOT at dot-ask@state.de.us, or (302) 760-2031.
2. QUESTIONS regarding this project are to be e-mailed to dot-ask@state.de.us no less than six business days prior to the proposal opening date in order to receive a response. Please include T200504110.01 in the subject line. Responses to inquiries are posted on-line at <http://www.bids.delaware.gov>.
3. This project incorporates the electronic bidding system **Expedite, version 5.9a**. Bidders wishing to use the electronic bidding option will find the installation file on the plan holders bid file disk. The installation file and instructions are also available on DelDOT's Website at: http://www.deldot.gov/information/business/bids/const_proj_bid_info.shtml.
4. Each proposal must be accompanied by a deposit of either surety bond or security for a sum equal to at least 10% of the bid.
5. No retainage will be withheld on this contract.
6. The Department's External Complaint Procedure can be viewed on DelDOT's Website at: <http://www.deldot.gov/information/business/>, or you may request a copy by calling (302) 760-2555.
7. **SPECIFICATIONS:** New Supplemental Specifications to the August 2001 Standard Specifications were issued November 24, 2014 and apply to this project. They can be [viewed here](#). The Department is currently updating the August 2001 Specifications for Road and Bridge Construction. Through this update, some Divisions were renumbered and some new ones were created and added. The *Specifications Note* document is for the use by the bidders to reference the new numbers to the past numbers used for bidding purposes on previous Department contracts.
8. **PLEASE NOTE** the requirements of special provision 'Changes to Project Documents During Advertisement' have moved to Supplemental Specifications, the special provision is no longer needed.
9. **PLEASE NOTE** federal requirements for the DBE program under [49CFR §26.53\(b\)\(3\)\(i\)\(B\)](#) have changed effective November 3, 2014. Submission of DBE participation information is now required from the lowest apparent bidder no later than seven (7) days after bid opening (*formerly 10 days*).
10. **BREAKOUT SHEETS MUST** be submitted either with your bid documents; or within seven (7) calendar days following the bid due date by the lowest apparent bidder. Refer to instructions adjacent to the Breakout Sheets in this document.

11. **PROPOSED TRAINEE PLANS** as required. Number of required programs is listed in the Training Special Provisions within Contract General Notices. The program(s) must be submitted within 10 Calendar Days of notification of apparent low bidder status. Contract Award will not take place until acceptable On-the-Job (OJT) program plans are received by the Civil Rights Group of the Department.
Failure of the apparent low bidder to present copies of an acceptable OJT Trainee Programs within ten (10) calendar days of notification of apparent low bidder status, shall create a rebuttable presumption that the bid is not responsive.
12. Contractor must add Joseph P. Murphy & Sarah E. Murphy as an “Additional Insured” to the Certificate of Liability Insurance, and provide a copy to:

Delaware Department of Transportation
Contract Administration
P.O. Box 778
Dover, DE 19903

Contract No.T200504110.01
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.

TABLE OF CONTENTS

GENERAL DESCRIPTION..... i
 LOCATION..... i
 DESCRIPTION..... i
 COMPLETION TIME..... i
 PROSPECTIVE BIDDERS NOTES..... i
 CONSTRUCTION ITEMS UNITS OF MEASURE..... iii

GENERAL NOTICES..... 1
 SPECIFICATIONS..... 1
 CLARIFICATIONS..... 1
 ATTESTING TO NON-COLLUSION..... 1
 QUANTITIES..... 1
 PREFERENCE FOR DELAWARE LABOR..... 1
 EQUALITY OF EMPLOYMENT OPPORTUNITY ON PUBLIC WORKS..... 1
 TAX CLEARANCE..... 2
 LICENSE..... 2
 DIFFERING SITE CONDITIONS..... 2
 CONFLICT WITH FEDERAL STATUTES OR REGULATIONS..... 3
 FEDERAL LABOR AND EMPLOYMENT REQUIREMENTS..... 3
 CONVICT PRODUCED MATERIALS:..... 3
 TO REPORT BID RIGGING ACTIVITIES..... 4
 NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION..... 5
 STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY..... 6
 TRAINING SPECIAL PROVISIONS..... 9
 INTERMODAL SURFACE TRANSPORTATION EFFICIENCY ACT..... 10
 DISADVANTAGED BUSINESS ENTERPRISE (DBE) PROGRAM SPECIFICATION..... 10
 CRITICAL DBE REQUIREMENTS..... 12
 GUIDANCE FOR GOOD FAITH EFFORT..... 13

REQUIRED CONTRACT PROVISIONS - FEDERAL-AID CONSTRUCTION CONTRACTS.... 15
 I. GENERAL..... 15
 II. NONDISCRIMINATION..... 15
 III. NONSEGREGATED FACILITIES..... 19
 IV. DAVIS-BACON AND RELATED ACT PROVISIONS..... 19
 V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT..... 24
 VI. SUBLETTING OR ASSIGNING THE CONTRACT..... 24
 VII. SAFETY: ACCIDENT PREVENTION..... 25
 VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS..... 26
 IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION
 CONTROL ACT..... 26
 X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY..... 26
 XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING..... 29
 APPENDICES TO THE TITLE VI ASSURANCE..... 30

PREVAILING WAGES..... 32
 PREVAILING WAGE REQUIREMENTS..... 32
 APPLICABILITY OF DAVIS-BACON LABOR STANDARD PROVISIONS TO FLAGGERS..... 36
 ALL AGENCY MEMORANDUM NO. 130..... 36

SUPPLEMENTAL SPECIFICATIONS..... 38

SPECIAL PROVISIONS..... 39
 CONSTRUCTION ITEM NUMBERS..... 40
 401502 - ASPHALT CEMENT COST ADJUSTMENT..... 41
 302514 - MILLED HOT-MIX BASE COURSE..... 42
 401699 - QUALITY CONTROL/QUALITY ASSURANCE OF BITUMINOUS CONCRETE.... 45
 401752 – SAFETY EDGE FOR ROADWAY PAVEMENT..... 58
 401801 - BITUMINOUS CONCRETE, TYPE C, 160 GYRATIONS, PG 64-22
 (CARBONATE STONE)..... 59

401810 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG 64-22.	<u>59</u>
401819 - BITUMINOUS CONCRETE, SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 160 GYRATIONS, PG 64-22.	<u>59</u>
601520 - TEMPORARY TIMBER MAT.	<u>71</u>
602547 - WATERPROOFING BRIDGE DECK.	<u>72</u>
602736 - PRECAST CONCRETE CULVERT.	<u>74</u>
602738 - PRECAST CONCRETE RETAINING WALL.	<u>78</u>
614508 - WATER SERVICE AND METER ASSEMBLIES.	<u>82</u>
617515 - HEADWALL.	<u>87</u>
705530 – TRIANGULAR CHANNELIZING ISLANDS.	<u>88</u>
710506 - ADJUST AND REPAIR EXISTING SANITARY MANHOLE.	<u>90</u>
712531 - CHANNEL BED FILL.	<u>91</u>
715500 - UNDERDRAIN OUTLET PIPE, 6	<u>92</u>
720509 - GALVANIZED AND FUSION-BONDED POLYESTER COATED GUARDRAIL.	<u>93</u>
720586 - GUARDRAIL END TREATMENT ATTENUATOR, TYPE 2 - 31.	<u>97</u>
727510 - WOOD RAIL FENCE.	<u>99</u>
727535 - WOOD FENCE, 6' HIGH.	<u>100</u>
727555 - RIGHT-OF-WAY MARKER, CAPPED REBAR.	<u>101</u>
744506 - CONDUIT JUNCTION WELL, TYPE 7, PRECAST POLYMER CONCRETE.	<u>102</u>
744523 - CONDUIT JUNCTION WELL, TYPE 4, PRECAST CONCRETE.	<u>102</u>
744530 - CONDUIT JUNCTION WELL, TYPE 11, PRECAST CONCRETE/POLYMER LID- FRAME.	<u>102</u>
744531 - CONDUIT JUNCTION WELL, TYPE 14, PRECAST CONCRETE/POLYMER LID- FRAME.	<u>102</u>
745602 - FURNISH & INSTALL UP TO 4” SCHEDULE 80 HDPE CONDUIT (BORE).	<u>104</u>
745603 - FURNISH & INSTALL UP TO 4” SCHEDULE 80 PVC CONDUIT (OPEN CUT).	<u>104</u>
745604 - FURNISH & INSTALL UP TO 4” SCHEDULE 80 PVC CONDUIT (TRENCH).	<u>104</u>
746847 - POLE BASE, TYPE 3	<u>108</u>
746850 - POLE BASE, TYPE 4	<u>108</u>
746924 - FURNISH & INSTALL LOOP WIRE 1-CONDUCTOR #14 AWG ENCASED IN ¼” FLEXIBLE TUBING IN A LOOP SAWCUT.	<u>110</u>
747516 - CABINET BASE TYPE P.	<u>113</u>
748548 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 5”	<u>114</u>
748549 -PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 10”	<u>114</u>
748530 - REMOVAL OF PAVEMENT STRIPING.	<u>124</u>
748553 - PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS, BIKE SYMBOL.	<u>125</u>
749687 - INSTALLATION OR REMOVAL OF TRAFFIC SIGN ON SINGLE SIGN POST.	<u>129</u>
749690 - INSTALLATION OR REMOVAL OF TRAFFIC SIGN ON MULTIPLE SIGN POSTS	<u>130</u>
753516 - SANITARY SEWER SYSTEM.	<u>131</u>
760507 - PROFILE MILLING, BITUMINOUS CONCRETE.	<u>145</u>
763501 - CONSTRUCTION ENGINEERING.	<u>147</u>
763508 - PROJECT CONTROL SYSTEM DEVELOPMENT PLAN.	<u>151</u>
763509 - CPM SCHEDULE UPDATES AND/OR REVISED UPDATES.	<u>151</u>
763533 - SUMP PUMP CONNECTIONS.	<u>156</u>
763537 - SUBDIVISION ENTRANCE SIGN.	<u>158</u>
900500 - ENVIRONMENTAL PERFORMANCE INCENTIVE (DISINCENTIVE).	<u>160</u>
905500 - SUPER SILT FENCE.	<u>162</u>
907506 - EARTH DIKE, TYPE A-1.	<u>164</u>
UTILITY STATEMENT.	<u>166</u>
RIGHT OF WAY CERTIFICATE.	<u>173</u>
ENVIRONMENTAL STATEMENT.	<u>174</u>
RAILROAD STATEMENT.	<u>178</u>

BID PROPOSAL FORMS.	<u>179</u>
BREAKOUT SHEET.	<u>196</u>
CERTIFICATION.	<u>200</u>
BID BOND.	<u>202</u>

GENERAL NOTICES

SPECIFICATIONS:

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

CLARIFICATIONS:

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

ATTESTING TO NON-COLLUSION:

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

QUANTITIES:

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

PREFERENCE FOR DELAWARE LABOR:

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

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

EQUALITY OF EMPLOYMENT OPPORTUNITY ON PUBLIC WORKS:

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

"a. As a condition of the awarding of any contract for public works financed in whole or in part by State appropriation, such contracts shall include the following provisions:

During the performance of this contract, the contractor agrees as follows:

1. The contractor will not discriminate against any employee or applicant for employment because of race, creed, color, sex, sexual orientation or natural origin. The contractor will take positive steps to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, creed, color, sex, sexual orientation or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places available to employees and applicants for employment notices to be provided by the contracting agency setting forth this nondiscrimination clause.

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

TAX CLEARANCE:

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

LICENSE:

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

SUBCONTRACTOR LICENSE: 29 DEL. C. §6967:

(c) Any contractor that enters a public works contract must provide to the agency to which it is contracting, within 30 days of entering such public works contract, copies of all occupational and business licenses of subcontractors and/or independent contractors that will perform work for such public works contract. However, if a subcontractor or independent contractor is hired or contracted more than 20 days after the contractor entered the public works contract the occupational or business license of such subcontractor or independent contractor shall be provided to the agency within 10 days of being contracted or hired.

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.

CONFLICT WITH FEDERAL STATUTES OR REGULATIONS:

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

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

FEDERAL LABOR AND EMPLOYMENT REQUIREMENTS

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

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

CONVICT PRODUCED MATERIALS:

- (a) Materials produced after July 1, 1991, by convict labor may only be incorporated in a Federal-aid highway construction project if such materials have been:
 - (1) Produced by convicts who are on parole, supervised release, or probation from a prison or
 - (2) Produced in a qualified prison facility and the cumulative annual production amount of such materials for use in Federal-aid highway construction does not exceed the amount of such materials produced in such facility for use in Federal-aid highway construction during the 12-month period ending July 1, 1987.
- (b) Qualified prison facility means any prison facility in which convicts, during the 12-month period ending July 1, 1987, produced materials for use in Federal-aid highway construction projects.

TO REPORT BID RIGGING ACTIVITIES:

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

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

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

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

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

Goals for Minority Participation In
Each Trade

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

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INTERMODAL SURFACE TRANSPORTATION EFFICIENCY ACT & TRANSPORTATION EQUITY ACT

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

DISADVANTAGED BUSINESS ENTERPRISE (DBE) PROGRAM SPECIFICATION

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

The following definitions apply to this subpart:

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

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

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

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

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

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

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

Socially and economically disadvantaged individuals means any individual who is a citizen (or lawfully admitted permanent resident) of the United States and who is - (1) any individual who a recipient finds to be a socially and economically disadvantaged individual on a case-by-case basis; (2) any individual in the following groups, members of which are rebuttably presumed to be socially and economically disadvantaged:

- (i) Black Americans which includes persons having origins in any of the Black racial groups of Africa;
- (ii) Hispanic Americans which includes persons of Mexican, Puerto Rican, Cuban, Dominican, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race;
- (iii) Native Americans which includes persons who are American Indians, Eskimos, Aluets, or Native Hawaiians;
- (iv) Asian-Pacific Americans which includes persons whose origins are from Japan, China, Taiwan, Korea, Burma (Myanmar), Vietnam, Laos, Cambodia (Kampuchea), Thailand, Malaysia, Indonesia, the Philippines, Brunei, Samoa, Guam, the U.S. Trust Territories of the Pacific Islands (Republic of Palau), the Commonwealth of the Northern Marianas Islands, Macao, Fiji, Tonga, 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.

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

Disadvantaged Business Enterprise 6 % Percent

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

Bidders are required to submit with their bids the completed DBE Program Assurance portion of the Certification document which will state the bidders intent of meeting the goals established for this contract; or in the instance where a contractor cannot meet the assigned DBE Goals for this contract, he/she shall at the time of bid submit documentation required to verify that he/she has made a Good Faith Effort to meet the DBE Goals. Guidance for submitting a Good Faith Effort is identified in the next section and in the DBE Program Plan. Further, the apparent low bidder must submit to DelDOT within seven (7) 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. 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 seven (7) calendar days after the bid opening shall create a rebuttable presumption that the bid is not responsive.
4. Bidders are advised that failure to meet DBE Goals during the term of the contract may subject them to Department sanctions as identified in the DBE Program Plan.
5. In the execution of this contract, the successful bidder agrees to comply with the following contract clauses:

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

Retainage: The prime contractor agrees to return retainage to each subcontractor within 15 calendar days after the subcontractor's work is satisfactorily completed. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of DelDOT. This clause covers both DBE and non-DBE subcontractors. As guidance, once a subcontractor has satisfactorily completed the physical work, and has given to the prime contractor a certified statement that all laborers, lower tier contractors, and materialmen who have furnished labor and materials to the subcontractor have been paid all monies due them, the prime contractor shall return retainage to the subcontractor within 15 calendar days.

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

"The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex

in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such remedy as the recipient deems appropriate." 49 CFR Section 26.13

7. In addition to this specification, bidders must comply with all provisions of the rules and regulations adopted by the U.S. Department of Transportation for DBE participation in U.S. DOT and DeIDOT 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.
8. In accordance with 49 CFR 26.53(f)(1), DeIDOT requires that a prime contractor not terminate a DBE subcontractor without prior written consent from the DeIDOT Civil Rights Office. This includes, but is not limited to, instances in which a prime contractor seeks to perform work originally designated for a DBE subcontractor with its own forces or those of an affiliate, a non-DBE firm, or with another DBE firm.

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GUIDANCE FOR GOOD FAITH EFFORT

When the DBE Goals established for a contract by DeIDOT 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 DeIDOT 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 DeIDOT will consider other factors and types of efforts that may be relevant:

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

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

1. Failure to contract with a DBE solely because the DBE was unable to provide performance and/or payment bonds.
2. Rejection of a DBE bid or quotation based on price alone.
3. Rejection of a DBE because of its union or non-union status.

4. Failure to contract with a DBE because the contractor normally would perform all or most of the work in the contract.

Administrative reconsideration:

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

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

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

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

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

I. GENERAL

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

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

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

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

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.
3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.
4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

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

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as

amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

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

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

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

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:
 - a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.
 - b. The contractor will accept as its operating policy the following statement:
"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."
2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.
3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:
 - a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.
 - b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.
 - c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

- d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.
 - e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.
4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.
- a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.
 - b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.
 - c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.
5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:
- a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.
 - b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.
 - c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.
 - d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.
6. Training and Promotion:
- a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.
 - b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

- c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.
 - d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.
7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:
- a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.
 - b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.
 - c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.
 - d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.
8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.
9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.
- a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.
 - b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.
10. Assurance Required by 49 CFR 26.13(b):
- a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.
 - b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.
 - a. The records kept by the contractor shall document the following:
 - (1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;
 - (2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and
 - (3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;
 - b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

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

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

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

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

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

1. Minimum wages

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

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

- b. (1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:
 - (i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
 - (ii) The classification is utilized in the area by the construction industry; and
 - (iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.
 - (2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.
 - (3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.
 - (4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.
- c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.
 - d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding

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

3. Payrolls and basic records

- a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.
- b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g. , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..
- (2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:
 - (i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;
 - (ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without

rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

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

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

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

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

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

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

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

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

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

b. Trainees (programs of the USDOL).

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

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

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

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

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

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

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

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

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

10. Certification of eligibility.

- a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
- b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
- c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

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

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.
2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.
3. Withholding for unpaid wages and liquidated damages. The FHWA or the contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.
4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

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

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).
 - a. The term "perform work with its own organization" refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents

of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

- (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
 - (2) the prime contractor remains responsible for the quality of the work of the leased employees;
 - (3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
 - (4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.
- b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.
2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.
 3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.
 4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.
 5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

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

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.
2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

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

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

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

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

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

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

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

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

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

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

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

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

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

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

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

1. Instructions for Certification – First Tier Participants:

- a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.
- b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.
- c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.
- d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
- e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).
- f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.
- g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.
- h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.
- i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
- j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

* * * * *

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

- a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:
 - (1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;
 - (2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
 - (3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and
 - (4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
- b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. Instructions for Certification - Lower Tier Participants:

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

- a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.
- b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.
- c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.
- d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).
- e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

- f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.
- g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.
- h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
- i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

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

- 1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.
- 2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

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

- 1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:
 - a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
 - b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- 2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

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

* * * * *

APPENDICES TO THE TITLE VI ASSURANCE

APPENDIX A

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

1. **Compliance with Regulations:** The contractor (hereinafter includes consultants) will comply with the Acts and the Regulations relative to Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, (Federal Highway Administration (FHWA), or Federal Transit Authority (FTA), as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.
2. **Non-discrimination:** The contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor will not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.
3. **Solicitations for Subcontracts, Including Procurements of Materials and Equipment:** In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the contractor of the contractor's obligations under this contract and the Acts and the Regulations relative to Non-discrimination on the grounds of race, color, or national origin.
4. **Information and Reports:** The contractor will provide all information and reports required by the Acts and the Regulations, and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the Federal Highway Administration (FHWA), or Federal Transit Authority (FTA) to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor will so certify to the Recipient or the Federal Highway Administration (FHWA), or Federal Transit Authority (FTA), as appropriate, and will set forth what efforts it has made to obtain the information.
5. **Sanctions for Noncompliance:** In the event of a contractor's noncompliance with the Non-discrimination provisions of this contract, the Recipient will impose such contract sanctions as it or the Federal Highway Administration (FHWA), or Federal Transit Authority (FTA) may determine to be appropriate, including, but not limited to:
 - withholding payments to the contractor under the contract until the contractor complies;
 - and/or cancelling, terminating, or suspending a contract, in whole or in part.
6. **Incorporation of Provisions:** The contractor will include the provisions of paragraphs one through five in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts and the Regulations . The contractor will take action with respect to any subcontract or procurement as the Recipient or the Federal Highway Administration (FHWA), or Federal Transit Authority (FTA) may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request the Recipient to enter into any litigation to protect the interests of the Recipient. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

APPENDIX E

During the performance of this contract, the contractor or consultant, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees to comply with the following nondiscrimination statutes and authorities; including but not limited to:

Pertinent Non-Discrimination Authorities:

Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21.

The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970,(42 U.S.C. § 460 I), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);

Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 et seq.), (prohibits discrimination on the basis of sex);

Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 et seq.), as amended, (prohibits discrimination on the basis of disability); and 49 CFR Part27;

The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 et seq.), (prohibits discrimination on the basis of age);

Airport and Airway Improvement Act of 1982,(49 USC §471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);

The Civil Rights Restoration Act of 1987,(PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964,The AgeDiscrimination Act of 1975and Section 504 of the Rehabilitation Act of 1973,by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);

Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131 - 12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;

The Federal Aviation Administration's Non-discrimination statute (49 U.S.C. S 41123) (prohibits discrimination on the basis of race, color, national origin, and sex);

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures nondiscrimination against minority populations by discouraging programs; policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;

Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);

Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).

PREVAILING WAGES

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

REQUIREMENT BY DEPARTMENT OF LABOR FOR SWORN PAYROLL INFORMATION

Title 29 Del.C. §6960 stipulates;

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

(c) Every contract based upon these specifications shall contain a stipulation that sworn payroll information, as required by the Department of Labor, be furnished weekly. The Department of Labor shall keep and maintain the sworn payroll information for a period of 6 months from the last day of the work week covered by the payroll.

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

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

PREVAILING WAGE REQUIREMENTS

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

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

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

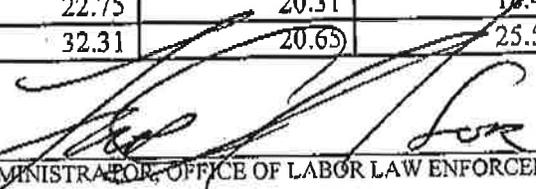
Mailing Address:
225 CORPORATE BOULEVARD
SUITE 104
NEWARK, DE 19702

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

PREVAILING WAGES FOR **HIGHWAY CONSTRUCTION**
EFFECTIVE MARCH 13, 2015 - AMENDED JULY 15, 2015

CLASSIFICATION	NEW CASTLE	KENT	SUSSEX
BRICKLAYERS	49.39	49.39	14.51
CARPENTERS	42.55	51.86	41.22
CEMENT FINISHERS	31.06	30.92	19.65
ELECTRICAL LINE WORKERS	22.50	22.50	21.25
ELECTRICIANS	63.60	63.60	63.60
IRON WORKERS	42.20	23.87	25.35
LABORERS	31.10	34.12	37.75
MILLWRIGHTS	16.11	15.63	13.49
PAINTERS	63.14	63.14	63.14
PILEDRIVERS	66.42	23.75	26.95
POWER EQUIPMENT OPERATORS	39.15	32.92	29.04
SHEET METAL WORKERS	22.75	20.31	18.40
TRUCK DRIVERS	32.31	20.65	25.55

CERTIFIED: 8/7/15

BY: 

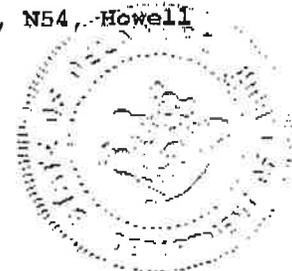
ADMINISTRATOR, OFFICE OF LABOR LAW ENFORCEMENT

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 MECHANICS RATE.

PROJECT: T200504110.01 Federal Aid Project No. - ESTP-N54(04), HSIP NCC, N54, Howell School Rd SR896 to SR71, New Castle County



GENERAL DECISION: DE150011 08/14/2015 DE11

State: DELAWARE

Construction Type: HIGHWAY

COUNTY: New Castle County in Delaware

HIGHWAY CONSTRUCTION PROJECTS

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

Modification Number	Publication Date
0	06/26/2015
1	08/14/2015

SUDE2015-002	04/23/2015	Rates	Fringes
Bricklayer		49.39	
Carpenter		42.55	
Cement Mason/Concrete Finisher		31.06	
ELECTRICIAN			
Electrician		63.60	
Line Worker		22.50	
Ironworker		42.20	
Laborer		31.10	
Millwright		16.11	
Painter		63.14	
Power Equipment Operator:			
Piledriver		66.42	
Power Equipment Operator		39.15	
Sheet Metal Worker		22.75	
Truck Driver		32.31	

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)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of “identifiers” that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

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

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

Survey Rate Identifiers

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

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

Union Average Rate Identifiers

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

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

WAGE DETERMINATION APPEALS PROCESS

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

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

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

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

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

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

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

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

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

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

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

END OF GENERAL DECISION

APPLICABILITY OF DAVIS-BACON LABOR STANDARD PROVISIONS TO FLAGGERS

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

* * * * *

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

GUIDELINES

HIGHWAY CONSTRUCTION

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

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

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

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

**SUPPLEMENTAL SPECIFICATIONS
TO THE
AUGUST 2001
STANDARD SPECIFICATIONS**

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

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

To access the Website;

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

The full Website Link is;

http://www.deldot.gov/information/pubs_forms/manuals/standard_specifications/index.shtml

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

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

SPECIAL PROVISIONS

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

NOTE:

PLEASE NOTE revised Supplemental Specifications to the August 2001 Standard Specifications were issued November 24, 2014 and apply to this project. They can be [viewed here](#) and at www.deldot.gov.

SPECIFICATIONS: The Department is currently updating the August 2001 Specifications for Road and Bridge Construction. Through this update, some Divisions were renumbered and some new ones were created and added. The *Specifications Note* document is for the use by the bidders to reference the new numbers to the past numbers used for bidding purposes on previous Department contracts.

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 link for the posting is http://www.deldot.gov/information/business/bids/asphalt_cement_english.shtml.

The Project Asphalt Cement Base Price will be the Delaware Posted Asphalt Cement Price in effect on the date of advertisement.

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 using the weight of eligible asphalt that is shown on the QA/QC pay sheets as a percentage for the delivered material.

If the mix was not inspected and no QA/QC pay sheet was generated, then the asphalt percentage will be obtained from the job mix formula for that mix ID.

The asphalt percentage eligible for cost adjustment shall only be the virgin asphalt cement added to the mix.

There shall be no separate payment per ton cost of asphalt cement. That cost shall be included in the various unit prices bid per 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 per ton for the project will be the Delaware Posted Asphalt Cement Price in effect on the date of project advertisement.

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 or more of hot-mix bid quantity in case of Sections 401, 402 and 403; and 15,000 gallons or more in case of Sections 304, 404 and 405.

5/05/15

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:

Materials:

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).

Subgrade Preparation:

The subgrade shall be properly constructed in accordance with Subsection 202.06. No base course material shall be placed until the subgrade has been approved by the Engineer.

Placement:

- a. *Equipment.* The milled material shall be spread uniformly by an approved spreading machine or box in such a manner that no segregation occurs. A conventional motor grader will not be approved for placement of milled material on mainline roadway sections.

Where it is not possible to use a spreading machine or box in patching or other tight areas, other approved methods can be used only in such manner that no segregation occurs. Compaction shall be uniformly attained by approved rollers or compactors. No milled materials shall be placed until approved equipment is on the Project site and is operational.

- b. *Spreading and Compacting.* Milled material shall be placed in successive layers. Each layer shall be placed in a level, uniform cross-section not to exceed 12 (300 mm) 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 (300 m) 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.

Compaction or rolling shall be performed parallel to the roadway centerline starting at the edges and progressing toward the center. It shall continue until each layer is thoroughly and uniformly compacted to the full width as shown on the Plans.

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.

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.

In no case shall vehicles be allowed to travel in a single track or to form ruts in the base course. If any sharp irregularities are formed in the subgrade or base course material, the affected area shall be scarified to a depth of 6 (150 mm) and compacted to conform to the requirements of Section 202 or this Section.

- c. *Performance.* 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.

The finished surface of the graded aggregate base course shall not vary from that required on the Plans by more than 1/2 (13 mm) when tested with a 10 (3.048 m) straightedge applied to the surface parallel to the centerline of the pavement and when tested with a template cut to the cross-section of the pavement. The actual thickness of the graded aggregate base course shall not be more than 1/2 (13 mm) less than the thickness shown on Plans. Those portions of completed base course not meeting these performance requirements shall be completely removed and replaced with proper material placed in accordance with this Section.

A straightedge meeting the approval of the Engineer shall be supplied by the Contractor at each placement operation. The straightedge shall be constructed of rigid materials that resist warping and bending.

Method of Measurement:

The quantity of milled hot-mix base course will be measured by the cubic yard (cubic meter) and will be paid for under Item 302007 - Graded Aggregate Base Course. The volume of cubic yards (cubic meters) 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.

If the limits of measurement for pay quantities for milled hot-mix base course are designated on the Plans, the quantity of milled hot-mix base course measured for payment will be the number of square yards (square meters) of surface area multiplied by the depth placed within the payment lines and grades shown on the Plans. If the limits are not designated on the Plans, or have been changed by the Engineer, in-place dimensions of the accepted milled hot-mix base course will be established. The computation of quantity will be made from cross-sections taken after the completion of work under this Section.

Materials placed beyond the designated lines and grades as shown on the Plans or beyond the limits established by the Engineer will not be measured for payment.

There will be no separate payment made for filling voids with millings as required under Placement subsection (b) *Spreading and Compaction*.

Basis of Payment:

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

Price and payment will constitute full compensation for hauling, stockpiling (includes any double handling of material), preparing the subgrade, placing and compacting the materials, and for all labor, equipment, tools and incidental required to complete the work.

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.

No payment will be made for materials placed beyond the designated lines and grades as shown on the Plans or beyond the limits established by the Engineer.

10/31/05

401699 - QUALITY CONTROL/QUALITY ASSURANCE OF BITUMINOUS CONCRETE

.01 Description

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

.02 Bituminous Concrete Production – Quality Acceptance

(a) Material Production - Tests and Evaluations.

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

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

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

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

The Engineer will evaluate and accept the material on a lot basis. All the material within a lot shall have the same JMF (mixture ID). The lot size shall be targeted for 2000 tons or a maximum period of three days, whichever is reached first. If the 2000th ton target lot size is achieved during a production day, the lot size shall extend to the end of that production day. The Contractor may interrupt the production of one JMF in order to produce different material; this type of interruption will not alter the determination of the size or limits of material represented by a lot. The Engineer will evaluate each lot on a 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 and Determining the Density of Hot Mix Asphalt (HMA) Specimens by Means of the Superpave Gyratory Compactor
- AASHTO T166, Method C (Rapid Method) - Bulk Specific Gravity of Compacted Hot Mix Asphalt (HMA) Using Saturated Surface Dry Specimens
- AASHTO T308 - Determining the Asphalt Binder Content of Hot Mix Asphalt (HMA) by the Ignition Method
- AASHTO T30 - Mechanical Analysis of Extracted Aggregate
- AASHTO T209 - Theoretical Maximum Specific Gravity and Density of Hot Mix Asphalt (HMA)
- ASTM D7227 - Standard Practice for Rapid Drying of Compacted Asphalt Specimens using Vacuum Drying Apparatus

(b) Pavement Construction - Tests and Evaluations.

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

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

The exempt areas around manholes will be a maximum of 4 feet transversely on either side from the center of the manhole, and 20 feet longitudinally on either side from the center of the manhole. The exempt areas around driveway entrances shall be the entire width of the driveway, and 3 feet from the edge of the longitudinal joint next to the driveway. Areas of exemption that will be cored for informational purposes only include: areas where the mat thickness is less than three times the nominal maximum aggregate size as directed by the Engineer, violations of Section 401.08 in the Standard Specifications as directed by the Engineer, and areas shown to contain questionable subgrade properties as proven by substantial yielding under a fully legally loaded truck. Failure to obtain core samples in these areas will result in zero payment for compaction regardless of the exempt status. The Engineer will evaluate and accept the compaction work on a daily basis. Payment for the compaction will be calculated by using the material production lots as referenced in **.02 Acceptance Plan (a) Material Production - B Tests and Evaluation** and analyzing the compaction results over the individual days covered in the material production lot. The compaction results will be combined with the material results to obtain a payment for this item.

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

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

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

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

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

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

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

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

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

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

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

.03 Payment and Pay Adjustment Factors.

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

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

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

(a) Material Production - Pay Adjustment.

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

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

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

1. For each parameter, calculate the mean value and the standard deviation of the test values for the lot to the nearest 0.1 unit.
2. For each parameter, calculate the Upper Quality Index (QU):

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

$$QL = ((\text{mean value}) - (JMF \text{ target}) + (\text{single test tolerance})) / (\text{standard deviation}).$$
4. For each parameter, locate the values for the Upper Payment Limit (PU) and the Lower Payment Limit (PL) from Table 3 - Quality Level Analysis by the Standard Deviation Method. (Use the column for “n” representing the number of sublots in the lot. Use the closest value on the table when the exact value is not listed).
5. Calculate the PWL for each parameter from the values located in the previous step:

$$PWL = PU + PL - 100.$$
6. Calculate each parameter’s contribution to the payment adjustment by multiplying its PWL by the weight factor shown in Table 2 for that parameter.
7. Add the calculated adjustments of all the parameters together to determine the Composite PWL for the lot.
8. From Table 4, locate the value of the Pay Adjustment Factor corresponding to the calculated PWL. When all properties of a single test are within the single test tolerance of Table 2, Pay Adjustment factors shall be determined by Column B. When any property of a single test is outside of the Single Test Tolerance parameters defined in Table 2, the Material Pay Adjustment factor shall be determined by Column C.

9. For each lot, determine the final material price adjustment:

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

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

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

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

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

Table 3 - Quality Level Analysis by the Standard Deviation Method							
PU or PL	QU and QL for "n" Samples						
	n = 3	n = 4	n = 5	n = 6	n = 7	n = 8	n = 9
100	1.16	1.50	1.79	2.03	2.23	2.39	2.53
99	-	1.47	1.67	1.80	1.89	1.95	2.00
98	1.15	1.44	1.60	1.70	1.76	1.81	1.84
97	-	1.41	1.54	1.62	1.67	1.70	1.72
96	1.14	1.38	1.49	1.55	1.59	1.61	1.63
95	-	1.35	1.44	1.49	1.52	1.54	1.55

Table 3 - Quality Level Analysis by the Standard Deviation Method							
PU or PL	QU and QL for "n" Samples						
	n = 3	n = 4	n = 5	n = 6	n = 7	n = 8	n = 9
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
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

Table 3 – Quality Level Analysis by the Standard Deviation Method							
PU or PL	QU and QL for “n” Samples						
	n = 3	n = 4	n = 5	n = 6	n = 7	n = 8	n = 9
61	0.39	0.33	0.31	0.30	0.30	0.29	0.29
60	0.36	0.30	0.28	0.27	0.27	0.27	0.26
59	0.32	0.27	0.25	0.25	0.24	0.24	0.24

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

95	0	-5
94	-1	-6
93	-2	-7
92	-3	-8
91	-4	-9
PWL<91	PWL - 100	PWL - 100

(b) Pavement Construction - Pay Adjustments.

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

- Degree of compaction of the in-place material

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

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

Degree of Compaction (%)	Range	Pay Adjustment Factor (%)
97.0	96.75	-100*
96.5	96.26 – 96.74	-5
96.0	95.75 – 96.25	-3
95.5	95.26 – 95.74	-2
95.0	94.75 – 95.25	0
94.5	94.26 – 94.74	0
94.0	93.75 – 94.25	1
93.5	93.26 – 93.74	3

93.0	92.75 – 93.25	5
92.5	92.26 – 92.74	3
92.0	91.75 – 92.25	0
91.5	91.26 – 91.74	0
91.0	90.75 – 91.25	-5
90.5	90.26 – 90.74	-15
90.0	89.75 – 90.25	-20
89.5	89.26 – 89.74	-25
89.0	88.75 – 89.25	-30
88.5	88.26 – 88.74	-50
88.0	88.25	-100*

* or remove and replace it at Engineer's discretion

Table 5A: Compaction Price Adjustment Other¹ Locations		
Degree of Compaction	Range	Pay Adjustment Factor (%)
97.0	96.75	-100*
96.5	96.26 – 96.74	-5
96.0	95.75 – 96.25	-3
95.5	95.26 – 95.74	-2
95.0	94.75 – 95.25	0
94.5	94.26 – 94.74	0
94.0	93.75 – 94.25	0
93.5	93.26 – 93.74	1
93.0	92.75 – 93.25	3
92.5	92.26 – 92.74	1
92.0	91.75 – 92.25	0
91.5	91.26 – 91.74	0
91.0	90.75 – 91.25	0
90.5	90.26 – 90.74	0
90.0	89.75 – 90.25	0
89.5	89.26 – 89.74	0
89.0	88.75 – 89.25	-1
88.5	88.26 – 88.74	-3
88.0	87.75 – 88.25	-5

87.5	87.26 – 87.74	-10
87.0	86.75 – 87.25	-15
86.5	86.26 – 86.74	-20
86.0	85.75 – 86.25	-25
85.5	85.26 – 85.74	-30
85.0	84.75 – 85.25	-40
84.5	84.26 – 84.74	-50
84.0	84.25	-100*

* or remove and replace at Engineer's discretion

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

.04 Dispute Resolution.

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

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

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

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

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

If there is a discrepancy between the Engineer’s acceptance test result and the Contractor’s test result, the Contractor may ask for the Dispute Resolution sample to be tested. The Contractor may request up to two dispute resolution samples be tested per calendar year without charge. Any additional Dispute Resolution samples run at the Contractors request where the results substantiate the acceptance test result will be assessed a fee of \$125. Any additional Dispute Resolution samples that substantiate the Contractors test result will not be assessed the fee. When disputes over compaction core test results occur, the Engineer’s acceptance core will be used for the dispute resolution sample. The Contractor will be advised on when the testing will occur as referenced above to witness the testing. The results of the dispute resolution testing shall replace all of the applicable disputed test results for payment purposes.

Appendix A - Repairing Core Holes in Bituminous Asphalt Pavement

Description.

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

Materials and Equipment.

The following material shall be available to complete this work:

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

The following equipment shall be available to complete this work:

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

Construction Method.

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

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

Performance Requirements.

The Engineer will judge the patch on the following basis:

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

Basis of Payment.

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

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 Bituminous Asphalt Pavements.
4. Cores are to be taken throughout the entire project for the area in question. Cores will be spaced, from the start of the project in increments determined based on field and project specifics. Cores will be evenly distributed throughout the project location. The cores will be taken in the center of the lane in question.
5. Additional cores may be taken at other locations, if surface conditions indicate that there may be a substantial difference in the underlying section. The location of these cores should be documented and submitted to M&R.
6. Cores shall be full depth and include underlying materials. If there is a stone base included in the pavement section, at a minimum 1 core must have information concerning the thickness of the base. This is determined by augering to the subgrade surface.
7. The calculations used to determine the structural capacity of the roadway is as follows. If the contractor finds, upon starting the coring process, that the areas are of greater thickness than applicable to Table 5a, they may terminate the coring process on their own and retract the request.

Structural Number Calculations

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

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

Existing Material	Structural Coefficient
HMA	0.32
Asphalt Treated Base	0.26
Soil Cement	0.16
Surface Treatment (Tar & Chip)	0.10
GABC	0.14
Concrete	0 - 0.7*

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

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

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

Example:

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

Calculation:

For the Type B lift the calculation would be:

Existing HMA	$2 * 0.32 = 0.64$
GABC	$7 * 0.14 = \underline{0.98}$
	1.62

For the Type C lift the calculation would be:

Newly Placed B	$2.25 * 0.4 = 0.90$
Existing HMA	$2 * 0.32 = 0.64$
GABC	$7 * 0.14 = \underline{0.98}$
	2.52

11/3/14

401752 – SAFETY EDGE FOR ROADWAY PAVEMENT

Description:

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

Construction Methods:

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

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

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

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

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

or

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

or an approved equal.

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

Method of Measurement:

Safety Edge will not be measured for payment.

Basis of Payment:

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

10/15/2013

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

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

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

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

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

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

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

- 401821 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22,
PATCHING
- 401822 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG 64-22,
PATCHING
- 401823 - BITUMINOUS CONCRETE, SUPERPAVE, BITUMINOUS CONCRETE BASE
COURSE, 160 GYRATIONS, PG 64-22, PATCHING
- 401824 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG-64-22,
WEDGE
- 401825 - BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG-64-22,
WEDGE

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

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

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

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

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

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

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

401835 - THIN BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 115 GYRATIONS, PG 64-22

401836 - THIN BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22

401837 - THIN BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 115 GYRATIONS, PG 70-22

401838 - THIN BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 70-22

401839 - THIN BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 115 GYRATIONS, PG 76-22

401840 - THIN BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 76-22

.01 Description:

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

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

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

.02 Materials:

Use materials conforming to standard specifications 823.

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

a) **Asphalt Binder:**

Meet the requirements of Superpave performance-grade asphalt binder, as referenced in the Plans, according to M 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 (δ)	T 315	1.00 - 2.20 kPa ¹
RTFO DSR, G*/sin (δ)	T 315	>= 2.20 kPa
PAV DSR, G*/ sin (δ)	T 315	</=5000 kPa
BBR Creep Stiffness, S	T 313	</= 300.0 kPa
BBR m-value	T 313	>/=0.300

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

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

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

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

b) Recycled Materials:

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

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

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

c) Shingles:

RAS (Recycled Asphalt Shingles): Materials reclaimed from the shingle manufacturing process such as tabs, punch-outs, and damaged new shingles mechanically broken down with 100% passing the 1/2 in (12.5 mm) sieve. Shipping, handling, and shredding costs are incidental to the price of Superpave item.

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

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

d) Mineral Aggregate:

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

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

¹Coarse Aggregate Angularity is tested according to ASTM D5821.

²Fine Aggregate Angularity is tested according to AASHTO TP-33.

³Clay Content is tested according to AASHTO T176.

⁴Flat and Elongated is tested according to ASTM 4791 with a 5:1 aspect ratio.

⁵85/80 denotes that 85% of the coarse aggregate has one fractured face and 80% has two or more fractured faces.

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

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

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

e) **Mineral Filler:**

Conform to AASHTO M17.

f) **Warm Mix Additives:**

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

1. WMA technology and/or additive information.
2. WMA technology manufacturer's recommendation for usage.
3. WMA technology target dosage rate and tolerance envelope. Support tolerance envelope with test data demonstrating acceptable mix production properties conforming to all sections of this specification.
4. WMA technology manufacturer's material safety data sheets (MSDS).
5. Documentation of past WMA technology field application including points of contact.
6. Temperature ranges for mixing and compacting.
7. Laboratory test data, samples, and sources of all mix components, and asphalt binder viscosity-temperature relationships.

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

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

g) **Anti-stripping additives**

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

.03 Bituminous Concrete Production – Quality Control

(a) Process Control - Material Production Quality Control.

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

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

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

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

- where new material is not being added; one gradation and asphalt cement content test per week for stockpiles where material is continually being added to the stockpile.
- Gradation analysis of non-payment sieves
 - Dust to effective asphalt calculation
 - Moisture content analysis of aggregates - daily.
 - Gradation analysis of the combined aggregate cold feed - one per year per mixture.
 - Bulk specific gravity and absorption of blended material - one per year per mixture.
 - Ignition Oven calibration - one per year per mixture.
 - Hot-Bins: one per year per mixture.
 - Others, as appropriate.
 - Procedures for reporting the results of inspection and tests (include schedule).
 - Procedures for dealing with non-compliant material or work.
 - Presentation of control charts. The contractor shall plot the results of testing on individual control charts for each characteristic. The control charts shall be updated within 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 401644 Section .04(a)(1)).
 - Change in the source of the component materials.
 - Calibration of material production equipment (asphalt pump, belt feeders, etc.).
 - Rejection of material.

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

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

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

The following steps will be taken for violations listed above:

1. First offence: Written notice of violation to the Contractor.
2. Second offence: Written notice of violation and forfeiture of any bonus (material production or pavement construction) payment eligibility under 401699 section .03 for that production shift.
3. Third offence: Written notice of violation, forfeiture of bonus payment eligibility, and a 5% deduction of payment based upon contract unit price in addition to any calculated pay adjustment factors per 401699 Section 03.

4. Fourth offence: Written notice of violation, forfeiture of bonus payment eligibility, 50% deduction of payment based upon contract unit price in addition to any calculated payment adjustment factor per 401699 Section 03, and immediate suspension of the Contractor until corrective actions are taken. Corrective actions shall be submitted in writing to the Engineer for approval. The Engineer may request a meeting with the Contractor to discuss proposed changes prior to lifting suspension.

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

(b) Material Production Test Equipment.

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

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

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

Maintain minimum calibration records for the referenced equipment:

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

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

(c) Material Production Test Methods

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

.04 Job Mix Formula (JMF)

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

- a) Development of JMF

Gradation: Use the FHWA Superpave 0.45 Power Chart to define permissible gradations for the specified mixture. Type C shall be either a No.4 (4.75 mm), 3/8" (9.5 mm), or 1/2" (12.5 mm) Nominal Maximum Aggregate Size bituminous concrete. Unless otherwise noted in the Plans, the Type C shall meet the 3/8" (9.5

mm) Nominal Maximum Aggregate Size. Type B bituminous concrete shall be the 3/4" (19.0 mm) Nominal Maximum Aggregate Size and the Bituminous Concrete Base Course (BCBC) shall be the 1" (25.0 mm) Nominal Maximum Aggregate Size. Target values for percent passing each standard sieve for the design aggregate structure shall comply with the Superpave control points and should avoid the restricted zone. Percentages shall be based on the washed gradation of the aggregate according to AASHTO T11.

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

Superpave Gyratory Compactive (SGC) Effort:

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

Superpave Gyratory Compactive (SGC) Effort:

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

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

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

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

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

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

Gradation Control Points:

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

TABLE 1

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

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

Gradation Classification

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

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

Plant Production Tolerances:

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

The proposed JMF shall include the following:

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

1. Job mix formula (JMF) design of the component materials and target characteristic values for each mixture proposed for use. The component materials design shall include designating the source and the expected proportion (within 1 percent for the aggregate components and within 0.1 percent for the other components) of each component to be used in order to produce workable bituminous concrete meeting the specified properties. Recycled Asphalt Pavement (RAP) is one individual aggregate component regardless of fractionation size. Recycled Asphalt Shingles (RAS) is a separate component from RAP.
2. The JMF target characteristic values include the mixing temperature range, core temperature range for gyration, the percentage of the asphalt cement component (both total and virgin), and the percentages of the aggregate amounts retained on the sieves to be addressed by the JMF as shown in Table 1.
3. Plot of the design aggregate structure on the FHWA Superpave 0.45 power chart showing the maximum density line and Superpave control points.
4. Plot of the three trial asphalt binder contents at +/- 0.5% gyratory compaction curves where the percent of maximum specific gravity (% of G_{mm}) is plotted against the log base ten of the number of gyrations ($\log(N)$) showing the applicable criteria for N_i , N_d , and N_m .
5. Plot of the percent asphalt binder by total weight of the mix (P_b) versus the following:
% of G_{mm} at N_d , VMA at N_d , VFA at N_d , Fines to effective asphalt binder (P_{be}) ratio, and unit weight (kg/m^2) at both N_d and N_m .
6. Summary of the consensus property standards test results for the design aggregate structure, summary of the source property standards test results for the individual aggregates in the design aggregate structure, target value of the asphalt binder content, and a table of G_{mm} of the asphalt mixture for the four trial asphalt binder contents determined according to AASHTO T209.
7. Test data with each JMF and tests performed by a Qualified Laboratory on representative materials, verifying the adequacy of the design. Refer to the specifications for each mix type in order to determine the design requirements. The JMF sieve percentage values shall conform to the ranges shown in Table 1.

For any mixture that has a 20% or greater failure rate on any combined volumetric criteria, the JMF will not be approved for use on Department contracts.
8. Provide raw material of each JMF so NCAT Ignition Oven calibration correction numbers can be established for the Engineers and Contractors ovens. The Engineer shall provide an ignition oven correction number for each JMF.

.05 Approval of JMF

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

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

a) **Design Evaluation:**

The Engineer may elect to evaluate the proposed JMF and suitability of all materials through laboratory trial batches. All materials requested by the Engineer shall be provided at the contractor's expense

to the Central Laboratory in Dover in a timely manner upon request. To verify the complete mixture design and evaluate the suitability of all materials, the following approximate quantities are required:

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

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

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

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

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

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

.06 Construction.

(a) Pavement Construction Test Equipment.

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

Weather Limitations.

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

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

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

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

Compaction:

(b) Pavement Construction - Process Control.

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

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

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

Repair all core holes in accordance with 401699 Appendix A.

Method of Measurement:

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

Basis of Payment:

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

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

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

10/29/2014

601520 - TEMPORARY TIMBER MAT

Description:

The item shall consist of furnishing all materials and constructing a temporary timber mat for access across the wetland area as shown on the Plans and as directed by the Engineer. All equipment shall utilize this temporary timber mat when trying to access the stockpile/staging area and the underside of the bridge.

Materials:

In accordance with Section 601 of the Standard Specifications and the following:

Timber shall have a strength and grade adequate to support the Contractor's anticipated vehicular or equipment loads. Any preservative treatment applied to the matting shall be environmentally safe for wet conditions and be preapproved by the Department.

Hardware shall be in accordance with Section 601.07 of the Standard Specifications.

Construction Methods:

The Contractor shall submit to the Department for approval shop drawings and design calculations indicating the layout, size of members, arrangement of members and the construction methods at least two weeks prior to initiating construction. This information shall be signed and sealed by a Professional Engineer registered in the State of Delaware. A timber mat system is shown on the plans and shall be used for conceptual purposes only. The actual timber mat system utilized for the construction shall be designed for the anticipated construction loads and shall be compatible with the environment. Placement of stone within the wetland area is not permitted.

The temporary timber matting should be periodically inspected by the Contractor and any damaged or deteriorated components should be replaced. The Contractor assumes full responsibility for the load carrying capability of the system and for its anchorage, as required, to resist high water flows. No additional compensation will be granted for repairing any portion of the system damaged during naturally occurring weather events or contractor usage. The Contractor is responsible for retrieving lost mats and repairing any damage caused by naturally occurring weather events.

Basis of Payment:

The payment for the item shall be made for at the contract unit price bid per Lump Sum for "601520 - Temporary Timber Mat", which price and payment shall constitute full compensation for furnishing and placing all materials, for design, submission of signed and sealed drawings and computations, installation and removal of timber mat materials, and for all labor, equipment, tools and incidentals required to complete the work.

6/24/15

602547 - WATERPROOFING BRIDGE DECK

Description:

The item shall consist of furnishing and installing asphaltic waterproofing membrane to the new concrete bridge deck prior to overlaying hot-mix bituminous concrete in accordance with these Special Provisions, notes and details on the Plans, and as directed by the Engineer.

Materials:

The waterproofing asphaltic membrane shall consist of a woven or non-woven, needle punched composite membrane of a minimum of 60 mils thickness. Woven fiberglass reinforcement or non-woven, needle punched polypropylene shall be sandwiched between rubberized asphalt compound or adhesive membrane. The materials shall have sufficient adhesive property or shall be applied with primer tack coat. The primer/ tack adhesive materials shall be compatible with asphaltic membrane and used as per recommendation of the manufacturers.

The materials shall have following physical properties:

<u>Property</u>	<u>Test Method</u>	<u>Standard</u>
Strip Tensile	ASTM D 882	50 lb/in min
Puncture Resistance	ASTM E 154	200 lbs min
Permeance	ASTM E 96 Method B	0.10 perms (max)
Pliability	ASTM D 146	No crack or split
Elongation	ASTM D 882	50% minimum

Construction Methods:

The deck surface preparation and installation of the membrane shall be done as described herein, as per the notes on the plans, and as recommended by the manufacturer of the membrane. In case of any conflict between these Special Provisions and the manufacturer's recommendations, the latter will prevail.

All holes or voids in the concrete deck shall be patched with an approved non-shrinkable grout, and all sharp protrusions shall be removed. The deck surface shall be thoroughly broomed and cleaned of dirt, loose concrete and other contaminates. The cleanliness may require pressure wash or lightly shot blast.

Prior to installing the membrane, primer shall be applied to the cleaned deck and up to the curb face to the height required for membrane. Puddles shall be brushed out and the primer allowed to dry to touch which normally takes a half hour.

The membrane shall be installed to the deck at an ambient temperature of 50 degrees F. or higher as per manufacturers requirement. The membrane shall be applied by hand-rolling the laminates onto the primed surface or by using approved mechanical aids. Primer can be applied by brush, squeegee or roller as thin as possible, avoid excess build up of adhesive and allow to dry completely prior to the application of membrane or by using approved mechanical aids. In either case, the release paper shall be removed as the installation of the membrane proceeds. The membrane shall cover the deck with the sticky side down.

The membrane shall be rolled into close contact with the deck surface with a segmented rubber-tired roller or a lawn roller. The sealing of overlaps at the end of each roll and the bonding of the member to the curb shall be achieved by heating with a propane torch. All entrapped air bubbles shall be eliminated by puncturing the membrane and patching.

The membrane sheet should be overlapped at least 3” or as specified by manufacturer.

The temperature of the hot-mix bituminous overlay at the time of placing shall be in between 290°F and 340°F or as per manufacturer recommendation.

Method of Measurement:

The quantity of waterproofing membrane will be measured as the actual number of square yards completed and accepted.

Basis of Payment:

The quantity of waterproofing membrane will be paid for at the Contract unit price per square yard. Price and payment will constitute full compensation for surface preparation, furnishing and placing all materials including primer and membrane, equipment, tools, for all labor, and incidentals necessary to complete the work.

11/13/14

602736 - PRECAST CONCRETE CULVERT

Description:

This work consists of furnishing, fabricating, and constructing complete in place the precast reinforced concrete culvert(s) and other associated precast structures (toewalls, headwalls, baffles etc.) as specified on the Plans, as described herein and as directed by the Engineer.

Materials:

1. Concrete

Concrete shall conform to Section 812 of the Standard Specifications except as amended herein. Minimum 28 days strength for precast concrete shall be 5000 psi (35 MPa). The Contractor shall develop his own concrete mix design, according to ACI 211.1-81, Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete, which shall be submitted to the Engineer for approval. The cement content shall not be less than 700 lb. per cubic yard (415 kg per cubic meter). Portland Cement shall be Type I or Type II (ASTM C 150). In a salt water environment, Type II Cement shall be used.

2. Reinforcing Steel

Reinforcing steel in all associated structures shall meet the requirements of AASHTO M 31/M 31M, Grade 60 (Grade 400) (AASHTO M 31); and shall be protected with fusion bonded epoxy meeting the requirements of Section 604 of the Standard Specifications

3. Hardware

All connection hardware shall be hot-dipped galvanized.

4. Closed-Cell Neoprene Sponge

Use elastomer conforming to ASTM D1056, Type 2, Class C.

5. Post-Tensioning Strands

Use ½" (12.7 mm) diameter, 7 wire, uncoated, low-relaxation strands for unbonded post-tensioning, conforming to AASHTO M203, Grade 270 (Grade 1860). Encase strands in polymer sheathing. Use corrosion inhibitor recommended by the manufacture between the strand and sheathing. Provide anchorages, bearing devices, fittings and couplings as shown on the plans and specified by the tendon manufacturer.

6. Joint Wrap

The external wrap shall be as per ASTM C-877.

Fabrication Plant:

The fabrication plant for precast concrete culvert shall be a National Precast Concrete Association (NPCA) certified plant and pre-approved from the Department.

Fabrication:

1. General

All materials, equipment, processes of manufacture, and the finished sections, including handling, storage, and transportation, shall be subject to inspection and approval. Any defective construction, which may adversely affect the strength or performance of a section, shall be cause for rejection. Rejected sections shall be replaced at no expense to the Department.

2. Forms

The forms used shall be sufficiently rigid and accurate to maintain the culvert dimensions within the tolerances hereinafter specified. The culverts forms shall be matched so that the internal dimensions from one precast section to the next adjacent section shall not vary by more than 1/2" (13 mm). They shall be well constructed, carefully aligned, substantial and firm, securely braced and fastened together, sufficiently tight to prevent leakage of mortar, and strong enough to withstand the action of mechanical vibrators. All the casting surfaces shall be of a smooth material.

Form ties shall be either the threaded type or the snap-off type, so that no form wires or metal pieces will be left at the surface of the finished concrete. Corners and angles shall be mitered or rounded.

Joints between panel forms shall be made smooth and tight.

3. Curing

The culvert shall be cured for a sufficient length of time so that the concrete will develop the specified compressive strength in 28 days or less. Any one of the following methods of curing or combinations thereof shall be used for culvert sections:

Steam Curing - The culvert sections may be low pressure, steam-cured by a system that will maintain a moist atmosphere.

Water Curing - The culvert sections may be water cured by any method that will keep the sections moist.

Forms Left in Place - An accelerated overnight cure accomplished through the use of an external heat source may be used, provided moisture loss from exposed surfaces is minimized.

The maximum temperature increase or decrease shall be 40 C F (22 C C) per hour. The initial application of the heat shall be two hours after the final placement of concrete to allow the initial set to take place.

4. Testing Requirements

Test Specimen - Concrete compressive strength shall be determined from compression tests made on cylinders. Acceptance of the concrete culvert sections with respect to compressive strength will be determined on a basis of production lots. A production lot is defined as a group of culvert sections representing 10 culvert sections or a single day's production, whichever is less.

During the production of the culvert sections, the manufacturer shall randomly sample the concrete in accordance with AASHTO T 141. A single compressive strength sample shall consist of a minimum of 4 cylinders randomly selected for every production lot. Cylinders for compressive strength tests shall be 4" x 8" or as specified by the Engineer prepared and tested in accordance with AASHTO T 23 and T 22, respectively. For every compressive strength sample, a minimum of 2 cylinders shall be cured in the same manner as the culvert sections and tested at approximately 7 days. The average compressive strength of these cylinders will determine the initial strength of the concrete. In addition, 2 cylinders shall be cured in accordance with AASHTO T 23 and tested at 28 days. The average compressive strength of these two cylinders will determine the compressive strength of the production lot.

Acceptability by Cylinder Tests - The compressive strength of the concrete for each production lot as previously defined is acceptable when the compressive strength is equal to or greater than the design concrete strength.

When the compressive strength of any production lot is less than the design concrete strength, the production lot shall be rejected. The rejection shall prevail unless the manufacturer, at his/her own expense, obtains and submits evidence of a type acceptable to the Engineer that the strength and quality of the concrete placed within the culvert sections of the production lot are acceptable. If the evidence consists of tests made on cores taken from the culvert sections within the production lot, the cores shall be obtained and tested in accordance with the requirements of AASHTO T 24. The

core holes shall be plugged and sealed by the manufacturer in a manner such that the culvert section will meet all of the test requirements of this Special Provision. Culvert sections so sealed shall be considered satisfactory for use.

5. Tolerances

Internal Dimensions - The internal dimension shall vary not more than $-0''/+1/4''$ ($-0\text{ mm}/+25\text{ mm}$) from the design dimensions.

Top Slab and Wall Thickness - The top slab and wall thickness shall not be less than the design dimensions by more than 5 percent. A thickness more than that required shall not be cause for rejection.

Length of Opposite Surfaces - Variations in laying lengths of two opposite surfaces of the culvert sections shall not be more than $1/8''/\text{foot}$ ($10\text{ mm}/\text{m}$) of internal span, with a maximum of $5/8''$ (16 mm) for all sizes through $7'$ (2100 mm) internal span, and a maximum of $3/4''$ (19 mm) for internal spans greater than $7'$ (2100 mm).

Length of Section - The under run in length shall not be more than $1/8''/\text{foot}$ ($10\text{ mm}/\text{m}$) of length with a maximum of $1/2''$ (13 mm) in any box section.

Position of Reinforcement - Clear cover shall be as detailed on the plans. The maximum variation in the position of the reinforcement shall be $\pm 3/8''$ ($\pm 10\text{ mm}$).

Construction Methods:

The foundation on which the culvert sections are to be placed shall be a layer of the type of coarse aggregate as specified on the Plans. The bedding areas on which the coarse aggregate will be placed shall be approved by the Engineer. Coarse aggregate shall be carefully placed and tamped to form a solid, unyielding mass with the exposed surface conforming to the form and dimensions shown on the Plans.

Precast sections shall be assembled in accordance with the recommendations of the manufacturer and as approved by the Engineer in the field. The culvert sections shall be so formed that when they are laid together they will make a continuous line of culverts with a smooth interior free of appreciable irregularities, and compatible with the permissible tolerances of this Special Provision.

Care shall be exercised to insure proper matching and aligning of joints of adjacent sections. The joints shall tongue and groove. The keyway surfaces shall be given a medium abrasive grit blast, 2000 psi (14 MPa) waterblast or a thorough wire brushing at the plant within four days prior to leaving the plant. Mortar for the keyway shall be a non-shrinking, non-metallic mortar having a minimum compressive strength at 28 days of 5000 psi (35 MPa). Before applying the mortar, the surfaces shall be clean of all dirt, dust, and other foreign matter. The surfaces shall be wetted, but no free water shall be allowed to remain in the keyway. The mortar shall be prepared, placed, and cured in accordance with the manufacturers recommendations.

The joint exterior shall be covered with a minimum of a $9''$ (225 mm) wide wrap centered on the joint. Care shall be exercised to keep the joint wrap in its proper location during backfilling.

The section length shall not exceed that which permits lifting, moving, and placing of the section without any bending, distortion, or stress being induced therein. Devices or holes shall be permitted in each culvert section for the purpose of handling. However, not more than four holes may be cast or drilled in each section. The holes shall be tapered unless drilled, and before backfilling, the tapered holes shall be filled with portland cement mortar, or with precast concrete plugs which shall be secured with portland cement mortar or other approved adhesive. Drilled holes shall be filled with portland cement mortar. Holes shall be covered on the exterior with the joint wrap material previously specified. This wrap shall have a minimum length and width of $9''$ (225 mm) or $2''$ beyond any edge, whichever is greater.

No construction equipment except for compaction shall be permitted to pass over the culvert until the fill height has reached the bottom of the pavement subbase. Hauling of materials over the culvert shall be limited as directed, and in no case shall legal load limits specified in Section 105.12 of the Standard Specifications be exceeded unless permitted in writing.

Method of Measurement:

The quantity of item 602736 - Precast Concrete Culvert will be measured as the number of cubic yards (cubic meters) of concrete placed and accepted. The volume will be computed using the dimensions shown on the plans with no allowance for form deflection. No deduction in the computed volume of precast concrete will be made for conduits, anchors, bolts, handling devices, post-tensioning ducts, etc.

The quantity of reinforcing bar will not be measured.

Basis of Payment:

The quantity of Precast Concrete Culvert will be paid for at the Contract unit price per cubic yard (cubic meter) for item 602736. Price and payment will constitute full compensation for furnishing all materials, including reinforcing bar, related to the precast culvert units; designing, fabricating and installing the units on site; for all labor, tools, and equipment and necessary incidentals to complete the work. Price and payment will also constitute full compensation for all materials including reinforcing bar, labor, tools, equipment and incidentals necessary to construct structures associated with the culvert (toewalls, headwalls, baffles, etc.) as specified on the Plans. Excavation, backfill, backfilling, and coarse aggregate will be paid separately under their respective bid items for this contract.

11/13/14

602738 - PRECAST CONCRETE RETAINING WALL

Description:

This work consists of furnishing, fabricating, and constructing complete in place the precast reinforced concrete retaining wall(s) and other associated precast structures as specified on the Plans, as described herein and as directed by the Engineer.

Materials:

1. Concrete

Concrete shall conform to Section 812 of the Standard Specifications except as amended herein. Minimum 28 days strength for precast concrete shall be 5076 psi (35 MPa). The Contractor shall develop his own concrete mix design, according to ACI 211.1-81, Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete, which shall be submitted to the Engineer for approval. The cement content shall not be less than 26 lb per cubic foot (415 kg per cubic meter). Portland Cement shall be Type I or Type II (ASTM C 150). In a salt water environmental Type II Cement shall be used.

2. Reinforcing Steel

Reinforcing steel shall meet the requirements of ASTM A 615, Grade 400 (AASHTO M 31); and shall be protected with fusion bonded epoxy meeting the requirements of Section 604 of the Standard Specifications.

3. Hardware

All connection hardware shall be hot-dipped galvanized.

4. Closed-Cell Neoprene Sponge

Use elastomer conforming to ASTM D1056, Type 2, Class C.

5. Post-Tensioning Strands

Use ½" (12.7 mm) diameter, 7 wire, uncoated, low-relaxation strands for unbonded post-tensioning, conforming to AASHTO M203, Grade 270 (Grade 1860). Encase strands in polymer sheathing. Use corrosion inhibitor recommended by the manufacture between the strand and sheathing. Provide anchorages, bearing devices, fittings and couplings as shown on the plans and specified by the tendon manufacturer.

6. Joint Wrap

The external wrap shall be as per ASTM C-877.

Design:

The precast concrete retaining wall shall be constructed in accordance with the notes and details in the plans. The allowable soil bearing pressure shall be as shown on the Plans. If structural dimensions or reinforcement differ from the Plans, the Contractor shall submit design calculations and load ratings for the changed design; and shop drawings showing all pertinent dimensions or reinforcement, reinforcement size and location to the Engineer for approval. The Precast Concrete Retaining Wall design shall be in accordance with the Delaware Department of Transportation "Bridge Design Manual", latest edition, and the AASHTO LRFD Bridge Design Specifications, latest edition. All calculations shall be certified by a registered Professional Engineer in the State of Delaware.

Fabrication Plant:

The fabrication plant for precast concrete retaining wall shall be a National Precast Concrete Association (NPCA) certified plant and pre-approved from the Department.

Fabrication:

1. General

All materials, equipment, processes of manufacture, and the finished sections, including handling, storage, and transportation, shall be subject to inspection and approval. Any defective construction, which may adversely affect the strength or performance of a section, shall be cause for rejection. Rejected sections shall be replaced at no expense to the Department.

2. Forms

The forms used shall be sufficiently rigid and accurate to maintain the retaining wall dimensions within the tolerances hereinafter specified. The retaining wall forms shall be matched so that the internal dimensions from one precast section to the next adjacent section shall not vary by more than ½" (13 mm). They shall be well constructed, carefully aligned, substantial and firm, securely braced and fastened together, sufficiently tight to prevent leakage of mortar, and strong enough to withstand the action of mechanical vibrators. All the casting surfaces shall be of a smooth material unless Plans require textured surfaces.

Form ties shall be either the threaded type or the snap-off type, so that no form wires or metal pieces will be left at the surface of the finished concrete. Corners and angles shall be mitered or rounded.

Joints between panel forms shall be made smooth and tight.

3. Curing

The retaining wall shall be cured for a sufficient length of time so that the concrete will develop the specified compressive strength in 28 days or less. Any one of the following methods of curing or combinations thereof shall be used for retaining wall sections:

Steam Curing - The wall sections may be low pressure, steam-cured by a system that will maintain a moist atmosphere.

Water Curing - The wall sections may be water cured by any method that will keep the sections moist.

Forms Left in Place - An accelerated overnight cure accomplished through the use of an external heat source may be used, provided moisture loss from exposed surfaces is minimized.

The maximum temperature increase or decrease shall be 40° F (22° C) per hour. The initial application of the heat shall be two hours after the final placement of concrete to allow the initial set to take place.

4. Testing Requirements

Test Specimen - Concrete compressive strength shall be determined from compression tests made on cylinders. Acceptance of the concrete wall sections with respect to compressive strength will be determined on a basis of production lots. A production lot is defined as a group of wall sections representing 10 wall sections or a single day's production, whichever is less.

During the production of the wall sections, the manufacturer shall randomly sample the concrete in accordance with AASHTO T 141. A single compressive strength sample shall consist of a minimum of 4 cylinders randomly selected for every production lot. Cylinders for compressive strength tests shall be 4" x 8" or as specified by the Engineer prepared and tested in accordance with AASHTO T 23 and T 22, respectively. For every compressive strength sample, a minimum of 2 cylinders shall be cured in the same manner as the wall sections and tested at approximately 7 days. The average

compressive strength of these cylinders will determine the initial strength of the concrete. In addition, 2 cylinders shall be cured in accordance with AASHTO T 23 and tested at 28 days. The average compressive strength of these two cylinders will determine the compressive strength of the production lot.

Acceptability by Cylinder Tests - The compressive strength of the concrete for each production lot as previously defined is acceptable when the compressive strength is equal to or greater than the design concrete strength.

When the compressive strength of any production lot is less than the design concrete strength, the production lot shall be rejected. The rejection shall prevail unless the manufacturer, at his/her own expense, obtains and submits evidence of a type acceptable to the Engineer that the strength and quality of the concrete placed within the wall sections of the production lot are acceptable. If the evidence consists of tests made on cores taken from the wall sections within the production lot, the cores shall be obtained and tested in accordance with the requirements of AASHTO T 24. The core holes shall be plugged and sealed by the manufacturer in a manner such that the wall section will meet all of the test requirements of this Special Provision. Wall sections so sealed shall be considered satisfactory for use.

5. Tolerances

Wall Thickness - Wall thickness shall not be less than the design dimensions by more than 5 percent. A thickness more than that required shall not be cause for rejection.

Length of Section - The under run in length shall not be more than 12_ /ft (10 mm/m) of length with a maximum of 1/2_ (13 mm) in any box section.

Position of Reinforcement - Clear cover shall be 2" minimum except as noted or detailed on the plans. The maximum variation in the position of the reinforcement shall be +/-3/8" (+/-10 mm), except the cover over the reinforcement for the external surface of the wall shall not be less than 2" (50 mm).

Area of Reinforcement - The areas of steel reinforcement shall be the design steel areas per linear meter. Steel areas greater than those required shall not be cause for rejection. The permissible variation in diameter of any reinforcement shall conform to the tolerances prescribed in the ASTM specification for that type of reinforcement.

Construction Methods:

The foundation on which the retaining wall sections are to be placed shall be a layer of the type of coarse aggregate as specified on the Plans. The bedding areas on which the coarse aggregate will be placed shall be approved by the Engineer. Coarse aggregate shall be carefully placed and tamped to form a solid, unyielding mass with the exposed surface conforming to the form and dimensions shown on the Plans.

Precast sections shall be assembled in accordance with the Plans and approved shop drawings. The wall sections shall be so formed that when they are laid together they will make a continuous line with a smooth face free of appreciable irregularities, and compatible with the permissible tolerances of this Special Provision.

Care shall be exercised to insure proper matching and aligning of joints of adjacent sections. The joints shall consist of mortar filled shear keyways. The keyway surfaces shall be given a medium abrasive grit blast, 2000 psi (14 MPa) waterblast or a thorough wire brushing at the plant within four days prior to leaving the plant. Mortar for the keyway shall be a non-shrinking, non-metallic mortar having a minimum compressive strength at 28 days of 5000 psi (35 MPa). Before applying the mortar, the surfaces shall be clean of all dirt, dust, and other foreign matter. The surfaces shall be wetted, but no free water shall be allowed to remain in the keyway. The mortar shall be prepared, placed, and cured in accordance with the manufacturer's recommendations.

The fill side of the joint shall be covered with a minimum of a 9" (225 mm) wide wrap centered on the joint unless noted otherwise on the Plans. Care shall be exercised to keep the joint wrap in its proper location during backfilling.

The wall section length shall not exceed that which permits lifting, moving, and placing of the section without any bending, distortion, or stress being induced therein. Devices or holes shall be permitted in each wall section for the purpose of handling. However, not more than four holes may be cast or drilled in each section. The holes shall be tapered unless drilled, and before backfilling, the tapered holes shall be filled with portland cement mortar, or with precast concrete plugs which shall be secured with portland cement mortar or other approved adhesive. Drilled holes shall be filled with portland cement mortar. Holes shall be covered on the fill side with the joint wrap material previously specified. This wrap shall have a minimum length and width of 9" (225 mm) or 2" beyond any edge, whichever is greater.

Method of Measurement:

The quantity of item 602738 - Precast Concrete Retaining Wall will be measured as the number of cubic yards (cubic meters) of concrete placed and accepted. The volume will be computed using the dimensions shown on the plans with no allowance for form deflection. No deduction in the computed volume of precast concrete will be made for conduits, anchors, bolts, handling devices, post-tensioning ducts, etc.

The quantity of reinforcing bar will not be measured.

Basis of Payment:

The quantity of Precast Concrete Retaining Wall will be paid for at the Contract unit price per cubic yard (cubic meter) for item 602738. Price and payment will constitute full compensation for furnishing all materials, including reinforcing bar, related to the precast retaining wall units; designing, fabricating and installing the units on site; for all labor, tools, equipment and necessary incidentals to complete the work. Price and payment will also constitute full compensation for all materials, labor, tools, equipment and incidentals necessary to construct structures associated with the retaining wall as specified on the Plans. Excavation, backfill, backfilling, and coarse aggregate will be paid separately under their respective bid items of this Contract.

11/13/14

614508 - WATER SERVICE AND METER ASSEMBLIES

Description:

This work consists of furnishing and installing the water service and accessories in accordance with the locations, details and notes on the Plans, and as directed by the Engineer. The work shall be performed in accordance with these Special Provisions, DeIDOT Standard Specifications, Artesian Water Company Standards and Specifications, and the requirements of the Owner (Department of Natural Resources and Environmental Control, Division of Parks and Recreation) of the water service. In case of conflict between these Special Provisions, DeIDOT Standard Specifications, and Artesian Water Company Standards and Specifications, Artesian Water Company shall prevail. The existing water service and appurtenances shall be abandoned in place unless required for construction activities and as otherwise specified on the Plans. The existing water service meter pit and meter assembly shall be removed in entirety.

Materials:

Materials including pipe, fittings, and all other accessories as listed under this Special Provisions, shall conform to the material and quality requirements of Artesian Water Company Standards and Specifications. Any materials provided by the contractor that are not provided by the Artesian Water Company but are required to properly install or complete the project shall conform to the same Standards and Provisions. The Artesian Water Company and the Owner shall have the right to inspect and reject the materials.

The Contractor shall furnish all materials including pipe, fittings, structures and appurtenances as listed in the Breakout Sheet for Item 614508 and as necessary to install and put in complete working order the water service and structures pertaining thereto. Artesian Water Company will furnish and install the service meter(s) to be installed in a new prefabricated meter pit. The Contractor is required to coordinate with Artesian Water Company and the Owner and shall provide the Owner with five (5) days' notice prior to start of work and provide a safe, accessible location to accept the deliveries. The Contractor shall provide supplemental materials and accessories deemed necessary by the Contractor, Owner and Engineer to complete the project. If the Contractor believes that the material list provided is not adequate to complete the project, a written explanation shall be provided to the Owner detailing the additional items needed.

A. Pipe and Fittings:

1. All ductile iron pipe shall be Class 50 Tyton joint with a design pressure of 350 psi and a maximum working test pressure of 150 psi. Pipe joints shall be mechanical or rubber gasketed push-on type. Rubber gasketed joints shall conform to ANSI/AWWA C111/A21.11-95. A double thickness cement mortar lining shall be provided in accordance with ANSI/AWWA-C104/A21.4.
2. M.J. Ductile Iron Retainer Glands: AWWA C111 and ANSI A21.11.
3. Joints on all ductile iron pipe shall be mechanical or rubber gasket push-on type. Mechanical joints shall be used on all fittings. In locations on the construction drawings where restrained mechanical joint pipe and fittings are required, wedge action retainer glands shall be used for joint restraint. Wedge action retainer glands shall be EBAA Iron "Megalug" Series 1100 or Ford Meter Box "Uniflange" Series 1400, or approved equal.

B. Valve Box:

1. Valve boxes shall be screw type with cast iron tops and base sections that are adjustable to accommodate valve body depth of bury. Valve cover shall read "WATER". The entire assembly shall be casted for heavy traffic conditions and meet the applicable requirements of the owner. Valve boxes shall be Mueller H100350 or equal.

C. Valves:

1. Gate valve: epoxy coated ductile iron, to Artesian standards and of the resilient wedge type in accordance with AWWA C509 or C515 with mechanical joint ends. Valves shall open left and be furnished with Standard AWWA operating nut. Valves shall be manufactured by the Mueller Company, model A-2350 or approved equal. All valves shall be supplied with a 2-inch square operating nut and an extension stem compatible with the valve box supplied such that the maximum distance from the actuator nut to finished grade is not greater than 4 feet. Gate valves shall be used for all valves up to and including 8 inches.

D. Water Service Meter Pit and Assemblies:

1. Precast Meter Pit: prefabricated 6'Wx16'Lx7'D concrete meter pit with knockout panels, as manufactured by A.C. Miller or another precast vender determined to be equal by Engineer. Meter pit shall be furnished with traffic rated 42"x42" Just Set Aluminum door with pentahead lock or determined equal by the Artesian Water Company. Exterior shall have one coat of Coopers Bitumastic C4-SP applied.
2. Water Service Meter Assembly: Meter assembly shall be 8" model FSAA-01 as manufactured by Badger Meter, Inc., or approved equal. Meters will be provided by Artesian Water Company and are subject to change without notice. Piping must be restrained with reaction angles on the exterior walls of the meter pit with rodding through the wall to the first flange on each end.

E. Steel Casing Pipes:

1. Shall be smooth walled and have a minimum yield strength of 36,000 psi (ASTM A-570, Grade 36). Minimum wall thickness shall be .375 inches. Pipe shall conform to AWWA C-200.
2. The pipe shall be fabricated and field connected in accordance with the Approved Plan. Joints shall be fully welded around the circumference of the pipe.
3. The exterior of the pipe including field connection shall be bituminous coated before installation.
4. Casing spacers/insulators shall be fabricated item capable of providing position, support, and separation of carrier pipes inside casing pipes.

F. Cap: ANSI/AWWA C110/A21.10.

G. Joint Sealant: ASTM C 920 Type S, Grade P, Class 25, Use T, A.

H. Portland Cement Concrete required for the job shall be Class B, and shall conform to Section 812 of the DelDOT Standard Specifications.

Special Requirements:

The Contractor's attention is directed to the following special requirements.

The Contractor shall coordinate all water service construction activities with the Artesian Water Company and the Owner including but not limited to requests for system shut downs and inspections. Contractor must request authorization for a water service shut down from the Owner a minimum of two weeks in advance of any outage. Shut downs will not be permitted during the summer months or weekends and the duration of the shutdown shall not exceed more than four hours unless otherwise authorized by the Owner. The Contractor shall coordinate any shut downs with Lums Pond State Park Superintendent Michael Moyer by phone at (office): 302-368-6989 or (mobile): 302-229-8610.

The Contractor shall provide the Owner with reasonable time to respond to requests for information and for coordination. The Contractor shall analyze the design drawings and develop a plan and logical sequence for water service shut-downs and tie-ins and SUBMIT for review by the Owner prior to construction (3 weeks prior to beginning work on the water service). It is imperative that the plan consider means and methods for minimizing loss of water service to Lums Pond.

The Contractor shall assist Artesian in disinfecting all water mains in accordance with AWWA C601, latest edition. Artesian shall be responsible for obtaining bacteriological tests to show that the disinfection has been satisfactory and the main can be placed in service.

The Artesian Water Company and the Owner shall determine at what times and in what order the Contractor shall undertake work, of making connections, scheduling shutdowns, and modifications to the existing water system. Prior notice, a minimum of forty- eight (48) hours shall be given to the Owner for inspection and supervision by the Contractor of his intention to begin work involving the water service installation. No work shall be started by the Contractor until he has received permission from both the Engineer and the Owner to proceed. The Contractor shall immediately notify both the Engineer and the Owner of all delays.

All materials and work, or parts thereof provided by the Contractor, which are unsatisfactory as to any or all requirements of the Owner or the Engineer, and/or as specified herein, shall be removed and replaced or repaired in an acceptable manner by the Contractor at his own expense.

The Contractor shall guarantee that all workmanship, materials provided by him, and work performed under the contract, shall be in strict accordance with the Drawings, Specifications, and other Contract Documents. This guarantee shall be for a period of two years from and after the date of completion and acceptance of the work. The Contractor shall repair, correct or replace as required, promptly and without charge, all work, equipment and material, or parts thereof, which fail to meet the above guarantee, or which in any way fail to comply with or fail to be in strict accordance with the terms and provisions and requirements of the contract during such two- year period.

Construction Methods:

All work in connection with construction of water service connections shall conform to the applicable requirements of the latest Artesian Water Company Standard Specifications, except as modified by the Plans and these Special Provisions.

Excavation and Trenching - Excavation shall be performed in accordance with Section 208 - Excavation and Backfill for Pipe Trenches, except as amended herein. The bottom of the trench shall be cut true and even, so that the barrel of the pipe will have a bearing for the full length. The trenches for water mains and services shall be excavated to the minimum standard depth or to such depth as required to connect to existing mains. A minimum of 42" of cover shall be maintained along the entire length of all water mains and water services. Payment for excavation and backfill shall be in accordance with Section 208 of the Standard Specifications. The Engineer and the Owner shall have the right to limit the amount of trench opened in advance of pipe laid, and the amount of pipe laid in advance of backfilling. They shall be empowered at any time to require the refilling of open trenches over completed pipelines, if in their judgment, such action is necessary and the Contractor shall therefore have no claims for extra compensation, even though to accomplish such refilling, he is compelled to temporarily stop excavation or other work at any place.

If work is stopped on any trench or excavation for any reason and the excavation is left open for an unreasonable length of time (in the opinion of the Engineer) in advance of construction, the Contractor shall, if so directed, refill such trench or excavation at his own expense and shall not again open said trench until he is ready to complete the work therein.

Where rock is encountered and blasting is required for trenching, all rock excavation work shall be performed in accordance with Subsection 107.11 of the Standard Specifications and as modified; and the trench shall be excavated an additional six inches (6") below grade. After the excavation is completed, a bed six inches (6") in depth of Borrow Type C shall be placed in the bottom of the trench, leveled off and thoroughly tamped.

In absence of item for Rock Excavation under this contract, a fixed price of \$135.00 per cubic yard shall be paid for rock excavation.

Installation of Pipe and Fittings - The laying and jointing of water pipe shall be in accordance with the requirements of Artesian Water Company latest Standards and Specification. All pipe and fittings shall be thoroughly cleaned before laying, and shall be kept clean until acceptance of the work.

At the close of the work each day, the end of the pipe shall be tightly closed to prevent dirt, foreign substances, or small animals from entering the line until laying is again resumed.

Pipe and fittings shall be carefully handled and lowered into the trench. Special care shall be taken to make sure all pipes are well bedded on a solid foundation. Any defects due to settlement shall be made good by the Contractor at his expense.

Where the manufacturer's recommended pipe joint deflection is exceeded, mechanical joint bends shall be required and installed to the satisfaction of the Owner and the Engineer.

Concrete buttresses, thrust blocks and reaction backing shall be provided at all bends, tees, plugs, tapping sleeves, etc. Contractor is to provide concrete, straps, anchor bolts, drive pipes, etc. No separate payment shall be made for thrust blocks, mechanical and bell joint restraints, couplings, service saddles and other required incidentals; and payments for these shall be included in water main pipes.

No pipe shall be laid upon a foundation into which frost has penetrated, nor at any time when the Owner or the Engineer shall deem that there is danger of frost penetration at the bottom of the excavation, unless all requirements as to the minimum length of open trench and promptness of refilling are observed.

The Contractor shall keep all excavation free from water or other liquids during the progress of the work; and backfilling of trenches shall meet the applicable requirements of the latest Standard Specifications.

Hydrostatic Testing - The Contractor shall test completed sections of the underground ductile iron water piping for leakage in accordance with the requirements of AWWA C600, 2-hour duration at 150 psi. Artesian shall be notified in advance of all tests and the tests shall be conducted to its entire satisfaction

Upon completion of the new water main or service and before connecting into the existing water main, the ends of the relocated line shall be adequately plugged and the system shall be tested at a hydrostatic pressure equal to 150 psi. Under this pressure, maximum allowable leakage shall be in accordance with AWWA C-605. The Contractor shall install any taps required at all high points on the line to expel trapped air prior to the actual tests. Following the tests, all such taps shall be tightly plugged with suitable threaded brass plugs. All costs of tapping and plugging the line for this purpose shall be borne by the Contractor.

Water for testing purposes shall be furnished by the Contractor. The Contractor shall furnish and install adequate pumping and gauging equipment to develop the required hydrostatic pressure and to measure the pressure and amount of water lost by leakage. Duration of the pressure test shall not be less than two (2) hours. All visible leaks shall be repaired regardless of total leakage as shown by test.

If inspection or test shows defects, including visible leaks, such defective work or material shall be replaced at the expense of the Contractor, and inspection and tests shall be repeated. All repairs shall be made with new material; failure to meet the tests specified above will be sufficient cause to reject the work until the defects are satisfactorily repaired. All expenses and costs incurred in carrying out the specified tests shall be borne by the Contractor at no extra cost to the Owner or to the State and shall be included in the contract unit price per linear foot bid for the various sizes of installing water main.

Sterilization of Main - Prior to the final connection of the newly installed pipe into the existing water main, and with the plugs used in the pressure test still in place on the installed pipe, the entire installed system shall be sterilized, using one of the procedures as specified in AWWA Standard C601 and as required by the Owner of the utility.

The Contractor shall provide an adequate blowoff for use in flushing of the main. Before the water is turned on for use by the consumer from the relocated mains, the Contractor will assist Artesian to conduct bacteriological tests on water samples taken from the blowoff. All expenses incurred in the making of these tests by Artesian will be borne by the Contractor. No water shall be turned on for use by the consumer from the newly installed water service until Artesian receives final sanitary approval.

Before the final connection is made, all surfaces of the relocated line, and the existing water service that are to become part of the closing joint, including all gaskets and glands, shall be thoroughly cleaned, and shall be treated with a 5% solution of Sodium Hypochlorite. Extreme care is to be exercised in order to prevent the entrance of any contaminants into the main.

All expenses and cost incurred in carrying out the specified sterilization work shall be borne by the Contractor at no extra cost to the Owner or the State and shall be included in the contract unit price per linear foot bid for the item Installing Water Main for the various sizes.

Abandoning and/or Removing Existing Water Service - Artesian Water Company reserves the right to inspect and retain existing water service meter(s) removed from the existing meter pit.

Final Location Drawings - Within thirty (30) days after completion of required work, the Contractor shall submit an accurate print or prints showing the horizontal and vertical location of mains, bends and other appurtenances to the Engineer and the Owner.

Method of Measurement:

The measurement of payment shall be for the installation of the materials listed in the breakout sheet in accordance with the units indicated as Each and the number of Linear Feet of pipe(s) of specified diameter(s) excluding the portion of pipe inserted inside the accessories installed in place, complete and accepted.

Basis of Payment:

The quantity of mains or services and accessories will be paid for at the Contract Lump Sum. Price and payment shall constitute full compensation for installing the materials, concrete buttresses, pressure testing, sterilizing the water mains/services and connecting to the existing water service, maintaining service as required and for all labor, equipment, tools and necessary incidentals to achieve and accept operational water main or service. Material Costs for the Water service, fittings, and accessories listed in Breakout Sheet for Item 614508 will not be paid as part of the Lump Sum. The Contractor shall include unit cost to install each item listed in the Breakout Sheet for Item 614508. No separate payment shall be made for salvaging or abandoning or removing and disposing of existing water mains and cost for such required work shall be incidental to the respective sizes for installing water main.

A breakout sheet attached to the Proposal lists the different elements of work or materials involved in completing this item. The Contractor shall fill in a unit price to install each item and the cost (unit price times the proposed quantity). The Lump Sum cost for Item 614508, shall be derived from the total sum of the cost of all items listed.

The Owner reserves the right to delete from the Contract one or more items listed and the right to add or subtract from the quantity of each item. The total price to be paid will be adjusted in accordance with the Contractor's unit prices as required above. There will be no extra compensation or increase in unit prices in the breakout sheet if such additions and/or deletions are made to the quantities.

8/3/15

617515 - HEADWALL

Description:

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

Materials:

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

Construction Methods:

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

Method of Measurement and Basis of Payment:

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

705530 – TRIANGULAR CHANNELIZING ISLANDS

Description:

Furnish all materials to construct Triangular Channelizing Island(s) on a prepared foundation as shown on the details in Plans, at the location(s) shown on the Plans, and/or as directed by the Engineer.

Materials:

Provide materials as specified in:

Graded Aggregate Base Course	Section 302
Bituminous Pavement	Section 401
Bituminous Patching	Section 406
Portland Cement Concrete	Section 812, Class B
Expansion Joint Material	Subsection 808.06
Curing Compound	Subsection 812.02 (i)
Delineator	As Submitted and approved by Engineer

General: Submit all proposed sources of materials to Materials and Research Section in accordance with Subsection 106.01.

Construction Methods:

- A. Construction of Triangular Channelizing Island(s)
1. Sawcut existing bituminous concrete pavement or PCC pavement, if applicable;
 - a. For bituminous concrete pavements, sawcut 2' minimum from the proposed face of curb of the island to allow enough room to achieve compaction for hot-mix patching;
 - b. For PCC pavement, sawcut at the proposed face of curb.
 2. Remove bituminous concrete pavement or PCC pavement and dispose of in accordance with Subsection 106.09 and/or permits, if applicable;
 3. Prepare the foundation for the curb in accordance with Subsections 701.05;
 4. Place Graded Aggregate Base Course (GABC) for curb installation at the location and depths shown on the plans in accordance with Section 302;
 5. Layout and pour PCC Curb Type II in accordance with Section 701 unless otherwise specified on the plans or directed by the Engineer;
 - a. Finish curb in accordance with Subsection 701.11;
 - b. Cure curb in accordance with Subsection 701.13;
 - c. Backfill curb in accordance with Subsection 701.14 after removal of forms, or upon completion of slip-form operation;
 6. Prepare the foundation for the sidewalk in accordance with Subsection 705.05;
 7. Place concrete for sidewalk at depth(s) shown on plans in accordance with Section 705;
 - a. Install 4" PVC sleeve for signs at locations shown on plans;
 8. Construct Curb Ramps, if applicable, in accordance with the requirements of the Standard Construction Details, any modifications on the plans and to all the applicable requirements of Section(s) 302 and 705 of the Standard Specifications.
 9. Furnish and install Sidewalk Surface Detectable Warning System, if applicable, in accordance with the requirements of the Standard Construction Details and to all the applicable requirements of Section 705.

10. Perform bituminous concrete patching in accordance with Section 406 and/or PCC patching in accordance with Section 503, if applicable, as shown on plans or otherwise match existing pavement structure;
11. Furnish and install Delineator(s) on the leading ends/corners of the island(s).

Method of Measurement:

The quantity of Triangular Channelizing Island(s) will be measured as the number of square foot (square meter), from face of curb to face of curb, of Triangular Channelizing Island(s) installed and accepted.

Sidewalk Surface Detectable Warning System will be measured and paid for under Item No. 705007.

Basis of Payment:

The quantity of Triangular Channelizing Island(s) will be paid for at the Contract unit price per square foot (square meter). Price and payment constitutes full compensation for sawcutting hot-mix, sawcutting concrete full depth, removal and disposal of existing materials, foundation preparation, furnishing and placing all materials including but not limited to; GABC, concrete for curb and sidewalk, expansion joint material, the construction of curb ramps within the limits of the island, bituminous pavement and/or PCC pavement patching, for furnishing and installing delineator(s) and for all labor, tools, and incidentals necessary to complete the work.

No additional payment will be made under other contract items for work necessary to construct the island except Item No. 705007 - Sidewalk Surface Detectable Warning System.

Note: The curb and sidewalk components are not to be placed monolithically unless otherwise directed by the Plans or the Engineer.

10/25/2013

710506 - ADJUST AND REPAIR EXISTING SANITARY MANHOLE

Description:

This work consists of adjusting and repairing existing sanitary manholes in accordance with notes and details on the Plans and as directed by the Engineer.

Materials and Construction Methods:

Materials and construction methods shall conform to the applicable requirements of Section 710 of the Standard Specifications, and the Standard Specifications of the owner of the sewer system. If there is a conflict between the Department's Specifications and the Specifications of the owner, the latter will prevail.

Method of Measurement and Basis of Payment:

The method of measurement and basis of payment for the item shall be made in accordance with Subsections 710.09 and 710.10 of the Standard Specifications.

8/28/01

712531 - CHANNEL BED FILL

Description:

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

Materials:

Provide aggregate material meeting the following requirements:

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

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

Table 1

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

Notes:

¹ Salvaged materials may contain material exceeding this size and be acceptable.

² Salvaged materials may contain up to 20% passing the 3/8-inch sieve but not to exceed 10% passing the #200 sieve when tested in accordance with T-11.

³ Unless noted otherwise on plan sheets, Light gradation shall be used in locations in Sussex County

⁴ Unless noted otherwise on plan sheets, Medium gradation shall be used in locations in Kent and New Castle Counties.

Method of Measurement:

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

Basis of Payment:

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

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

4/10/12

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

Description:

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

Materials and Construction Methods:

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

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

Method of Measurement:

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

Basis of Payment:

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

10/29/01

720509 - GALVANIZED AND FUSION-BONDED POLYESTER COATED GUARDRAIL

Description:

This work consists of surface preparation, application, and applying fusion-bonded polyester coating over galvanized metal railing elements, posts, guardrail end terminals, guardrail transitions and any associated hardware in shop facilities as specified in the Contract Documents, the Standard Construction Details, this specification, and as directed by the Engineer.

Materials:

Prior to coating any guardrail end terminals, Contractor shall submit written approval to Engineer from the end terminal manufacturer allowing the fusion-bonded polyester coating to be installed on the end terminal.

Approved rust-proof spray paint, color to match fusion-bonded polyester coating.

Galvanizing Coating:

Prior to galvanizing operations, the galvanizing facility shall inspect and remove all sharp edges on rails, posts, or other hardware used in assemblies. The easing of all sharp edges is essential to the durability of the fusion-bonded polyester coating process and failure on the part of the galvanizing facility to perform this step will be cause for rejection of the material.

All surfaces of beams, components and assemblies receiving fusion-bonded polyester coating shall not be water-quenched, nor receive a chromate conversion coating after the galvanizing process.

Galvanized surfaces receiving fusion-bonded polyester coating shall be cleaned and prepared for coating in accordance with SSPC SP 16, including all information noted in Appendix A and ASTM D 6386, Sections 5.1 through 5.3, Section 5.4.1 and Section 5.4.3 respectively. Prior to sweep blasting, all surfaces shall be inspected to ensure the galvanized layer is smooth. Should any locations be found to have excessive liquid zinc run-off, dross or zinc oxide particles they shall be smoothed until the location is level with the surrounding area using hand or power tools as described in SSPC SP 2 and 3. The resultant profile of galvanized layer produced after sweep blasting shall be 1.0 to 1.5 mils as determined by ASTM D 4417, Method C.

Thickness of the galvanized layer shall be measured before and after sweep blasting in accordance with SSPC PA-2 to ensure all components conform to ASTM A 123 or ASTM A 153 as applicable. Any locations found having insufficient thickness shall be repaired in accordance with ASTM A 780.

All shapes, except beams, shall be hot-dipped galvanized in accordance with AASHTO M 111. The Contractor may elect to use either hot-dipped galvanized rolled H sections or fabricated sections, that conform to the requirements of ASTM A 769, Grade 36 (Grade 250) (b) Beams. All beams shall conform to the requirements of AASHTO M 180, Class A, Type I or Type II. 397.

After galvanizing, all components shall be thoroughly inspected and protected from rain or moisture during storage and shipment by a secured cover to the fusion-bonded polyester coating facility.

Fusion-Bonded Polyester Coating:

The fusion-bonded polyester coating applicator shall identify to the galvanizer all guardrail beam, components, and assemblies surfaces receiving fusion-bonded polyester coating to ensure the galvanizing method used on assemblies is compatible with subsequent application of powder coating.

Coating and cleaning systems shall be applied in an environmentally controlled plant that is fully enclosed and preapproved by the Department's Materials & Research Section. A low pressure power washing to ensure removal of any organic contaminants prior to fusion-bonded polyester coating is required. Also, to ensure water and air molecules do not get trapped in the zinc coating and turn into pinholes and blisters due to outgassing, a "pre-heat" treatment of the piece prior to fusion-bonded polyester coating is required.

Cleaned surfaces shall be protected from conditions of high humidity, rainfall, or surface moisture and shall not be allowed to flash rust. Sweep or brush blast to SSPC SP16. Blast profile shall be approximately 1 to 1.5 mils, but not greater than 2 mils, as checked with a Test-O-Tex or Keane-Tator surface profile gauge or as approved by the Engineer.

The fusion-bonded polyester coating shall be applied as an electrostatically charged dry powder sprayed onto grounded components using an electrostatic spray system. The coated components shall be given a thermal time/temperature cure to provide a fully cured finish. The coating thickness, after cure, shall be 7 mils plus or minus 2 mils in accordance with the manufacturer's recommendation when measured in accordance with ASTM D7091 and SSPC PA2.

After coating, each component shall be checked for continuity using a 67-1/2 volt wet sponge detector to check for holidays, pinholes, and discontinuities. Coating thickness shall be checked with a properly calibrated magnetic gauge.

All components shall be padded and shall be handled with nylon slings during loading, unloading and installation.

Control and acceptance of the Fusion-Bonded Polyester Coating will be based on the following tests as used on projects for the National Park Service:

Quality	Test	Limits
Abrasion	Tabor Abraser CS-10	100 Mg. Max.
	1000 Gram Load	Weight Loss
	1000 Cycles	Weight Loss
Adhesion	ASTM D1044	
	ASTM D-3359	5A
	Initial	5A
Gloss	1000 Hrs. (Item H)	
	ASTM D-523	82%-60 degrees
	Initial 500 Hrs.	90%-60 degrees
Hardness Impact	1000 Hrs. (Item H)	
	ASTM D-3363	2H - No Gouge
	ASTM D-2794	Pass 80 Inc. Lb.
Salt Spray Resistance	Direct	
	ASTM B-117	
	ASTM D-1654	
Thickness	1000 Hrs. Unscribed	Table 2 - 10
	400 Hrs. Scribed	Table 2 - 10
	ASTM G-12	6 mils \pm 2 mils
Weather Resistance	ASTM G-23, 1000 Hrs., 18 min.	Water Spray
	1000 Hrs. Unscribed	No Film Failure
	400 Hrs. Scribed	
Color		Brown Polyester No. 20040, Mid-Gloss Chocolate Brown
Identify	Infrared Finger Print	Match Original
Flexibility	180 degrees Bend-120 Min.	No Breaks, Flaking or Cracks.
	Light within 10 seconds	Tested w/a Q-Panel w/2 mils (50 mm) or less of Cracking
Humidity	ASTM D-2247/1000 Hrs.	No. Blister or Film Failure

Construction Methods:

Installation of guardrail, guardrail end terminals and guardrail transitions is specified in Sections 720 and 721 of the Standard Specifications and paid for under the respective guardrail pay items of the Contract.

After curing and acceptance, the fusion-bonded polyester coating applicator shall protect the coated assemblies with multiple layers of wrapping, or other protective materials specified in the project specific fusion-bonded polyester coating plan.

During storage and subsequent shipping, each assembly shall be separated from other assemblies by expanded polystyrene spacers and other spacing materials specified in the project specific fusion-bonded polyester coating plan.

All guardrail and components shall be off-loaded and installed using extreme care to ensure coatings are not damaged. Upon delivery to the project site, coated assemblies and hardware shall be thoroughly inspected by the Engineer for any coating defects or damage. If damage is found, the Engineer will determine if the extent of the damage will constitute a cause for rejection.

It is required a representative from the fusion-bonded polyester coating applicator's firm be present to witness proper handling and erection processes are being employed by the Contractor to minimize or eliminate coating damage. Wood or other suitable material shall be used to protect tops of posts when pile driving.

All coating damage due to shipping, storage, handling, and installation operations shall be repaired by the Contractor at no additional expense to the Department. The Contractor shall provide the Engineer access to all locations of all powder coated members for verification of coating conditions prior to and following all coating repairs.

Repair damaged surfaces as follows:

1. Prepare surfaces in accordance with SSPC-SP 1 followed by SSPC-SP 2 or SSPC-SP 3. Solvents or degreasers used in SP 1 preparation shall be acceptable to the powder manufacturer and the manufacturer of the coating used for repair. Proof of acceptability shall be furnished to the Engineer. Extend the prepared area at least 2 inches into adjacent, tightly adhering, intact coating.
2. Feather the existing coating system surrounding each repair location. Feather the repair area for a distance of 1 inch to 2 inches to provide a smooth, tapered transition into the existing intact coating.
3. When the steel substrate is exposed in the repair area, the surface shall be prepared in accordance with SSPC SP11. Apply a coat of Organic Zinc primer conforming to ASTM A 780 in accordance with manufacturer's instructions and feather back existing coatings as stated above before re-application of topcoat.
4. The coating thickness of the touch-up material shall be the same thickness as the polyester and can be applied in multiple coats.

After installation, coat all exposed hardware (bolts, nuts and washers) with an approved spray paint that matches the color of the fusion-bonded polyester coating.

Warranty

Fusion-bonded polyester coated guardrail shall be warranted as specified herein for a period of three years from the date of acceptance. Should the coating system fail within three years after the project has been accepted, the coating shall be repaired by the Contractor in conjunction with the fusion-bonded polyester coating applicator at no cost to the Department. The extent and method of repair must be acceptable and agreed upon by the Department. System failure does not include damage from external agents, such as scraping from snow removal equipment, vandalism, debris impacts, collisions, etc., or normal loss of gloss and color. Once the duplex system (galvanizing and fusion-bonded polyester coating) has been accepted, a failure shall mean any visible corrosion, blistering, checking, cracking, or delamination (peeling) of the coating.

Method of Measurement:

Measure the quantity of fusion-bonded polyester coated guardrail as the number of linear feet of guardrail, including end terminals, transitions and associated hardware coated with fusion-bonded polyester coating.

Basis of Payment:

The quantity of guardrail coated with fusion-bonded polyester coating will be paid for at the Contract unit price per linear foot. Price and payment constitute surface preparation of all guardrail materials, including end terminals and guardrail transitions, fusion-bonded polyester coating materials, application of the fusion-bonded polyester coating on all guardrail components, delivery of coated materials to the project location, warranty, labor, equipment, tools, and necessary incidentals to complete the work as specified and as directed by the Engineer.

8/3/15

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

Description:

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

Materials:

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

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

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

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

Construction Methods:

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

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

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

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

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

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

Method of Measurement:

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

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

Basis of Payment:

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

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

8/12/2013

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.

6/24/15

727535 - WOOD FENCE, 6' HIGH

Description:

This work consists of furnishing all materials, and erecting a pressure treated wood fence in accordance with the notes and details on the Plans, these specifications and as directed by the Engineer.

Materials:

The timber, including posts, backers and vertical boards, shall be Southern Yellow Pine, Number 2 grade or better and shall be pressure treated with chromated copper arsenate, with 0.4 pounds retained per cubic foot (6.5 kg retained per cubic meter), in conformance with Section 601.

The hardware, including nails, bolts and fasteners, shall be hot dipped galvanized and shall conform to Section 601. Concrete for footings shall meet the requirements of Section 812, Class B.

Construction Methods:

Installation methods shall conform to applicable portions of Section 727 of the Standard Specifications and as noted on the Plans. Prior to fence installation, all required clearing and grubbing, and tree trimming shall be completed. Clearing and grubbing, tree and stump removal and tree trimming will all be paid for under Item 201000, Clearing and Grubbing.

The fence shall be installed true to line, as indicated, and grade and the top elevation shall be uniform. The vertical boards shall be placed on the roadway side of posts and backers and shall be a nominal 3" (75 mm) above the ground line unless shown otherwise in the Plans. If any grading is required to meet the 3" (75 mm) above the ground criteria as stated above or details shown in the Plans, the cost for such work shall be considered as part of these items. The vertical boards of the fence shall be installed prior to cutting or shaping the top as shown in the Plans.

Method of Measurement:

The quantity of wood fence will be measured as the actual number of linear feet (linear meters) along the fence, excluding gates, constructed and accepted.

Basis of Payment:

The quantity of wood fence will be paid for at the Contract unit price per linear foot (linear meter) for each size of fence. Price and payment will constitute full compensation for the furnishing of all materials, labor, tools, equipment, hauling, concrete footings, fasteners, excavation and backfilling for footings, grading if required and incidentals necessary to complete the work.

6/24/15

727555 - RIGHT-OF-WAY MARKER, CAPPED REBAR

Description:

Furnish necessary materials and labor to set at the locations shown on the Plans, and as directed by the Engineer.

Materials:

Provide Right-of-Way Marker, Capped Rebar constructed in accordance with the details shown in the Standard Construction Details using materials specified in:

Bar Reinforcement	Section 603
Aluminum 2" Flat Survey Marker for Rebar	As Submitted and approved by Engineer

Construction Methods:

- A. Exact location to be set by a Delaware Professional Land Surveyor in accordance with the plans or as directed by the Engineer;
- B. Place Rebar in a vertical position at depth shown on the plans;
- C. Place Aluminum 2" flat survey marker on rebar taking care not to move the location of the rebar.

Method of Measurement:

Right-of-Way Marker, Capped Rebar will be measured as the actual number of Right-of-Way Marker, Capped Rebar set and accepted.

Basis of Payment:

The quantity of Right-of-Way Marker, Capped Rebar will be paid for at the Contract unit price per Each. Price and payment will constitute full compensation for furnishing all materials required and setting the Right-of-Way Marker, Capped Rebar by a Delaware Professional Land Surveyor and any incidentals necessary to complete the item. Existing Right-of-Way Marker, Capped Rebar damaged will be replaced as required by Subsection 107.09 of the Standard Specifications and will be repaired, replaced, and set at the Contractor's expense.

9/15/11

- 744500 - CONDUIT JUNCTION WELL, TYPE 6, PRECAST POLYMER CONCRETE
- 744506 - CONDUIT JUNCTION WELL, TYPE 7, PRECAST POLYMER CONCRETE
- 744507 - CONDUIT JUNCTION WELL, TYPE 8, PRECAST POLYMER CONCRETE
- 744508 - CONDUIT JUNCTION WELL, TYPE 9, PRECAST POLYMER CONCRETE
- 744509 - CONDUIT JUNCTION WELL, TYPE 10, PRECAST POLYMER CONCRETE
- 744520 - CONDUIT JUNCTION WELL, TYPE 1, PRECAST CONCRETE
- 744523 - CONDUIT JUNCTION WELL, TYPE 4, PRECAST CONCRETE
- 744524 - CONDUIT JUNCTION WELL, TYPE 5, PRECAST CONCRETE
- 744530 - CONDUIT JUNCTION WELL, TYPE 11, PRECAST CONCRETE/POLYMER LID-FRAME
- 744531 - CONDUIT JUNCTION WELL, TYPE 14, PRECAST CONCRETE/POLYMER LID-FRAME
- 744532 - CONDUIT JUNCTION WELL, TYPE 15, PRECAST CONCRETE/POLYMER LID-FRAME

Description:

This work consists of supplying, constructing and installing conduit junction wells as shown on the applicable Plan Sheets or Standard Construction details

Materials:

Concrete shall conform to Section 812, Class B of the Standard Specifications.

Castings shall conform to Section 708.05 of the Standard Specifications.

Frames and lids shall be in accordance with Sections 708 and 744 of the Standard Specifications.

All required hardware and wire for Bonding and Grounding as shown on the Standard Construction or applicable Plan details.

Types 6, 7, 8 and 10 are precast polymer concrete stackable boxes with no base.

Precast polymer concrete is reinforced by heavy-weave fiberglass with a compressive strength of 9,000-15,000 psi, impact energy of 30-72 ft. lbs. and a tensile strength of 800-1,100 psi. Precast polymer concrete should be tested according to the requirements of ASTM Method D-543, Section 7, Procedure 1 for chemical resistance.

All precast polymer concrete covers shall be the heavy-duty type with a design load of 15,000 lbs. over a 10" square. The coefficient of friction should be greater than 0.5. The precast polymer concrete cover logo shall bear the inscription "DelDOT" (Types 6, 8, and 10) or "DelDOT TRAFFIC FIBER OPTICS" (Type 7).

Types 11, 14, and 15 are precast polymer frame and lids installed on a precast concrete base. Precast polymer concrete frame and lids shall be the heavy-duty nonconductive type with a design load of 15,000 lbs. over a 10" square. The coefficient of friction should be greater than 0.5. The precast polymer concrete lid logo shall bear the inscription "DelDOT ELECTRIC"(Types 11, 14, and 15)

Construction Methods:

The conduit junction well shall conform to the dimensions shown on the Standard Construction or applicable Plan Details, or on the manufacturer's specifications and shall be built so as to ensure that the cast iron frame and lid or polymer concrete box and cover are set level with the surrounding surface when constructed within pavement, sidewalks, pedestrian curb ramps, etc., and set above grade and graded to drain away from the junction well when constructed in unpaved areas. More than one conduit may extend into the well and shall conform to the dimensions shown on the applicable plan sheets or Standard Construction Details. A stone base shall be built for all types of junction wells. Grounding and bonding of the units shall be performed as shown on the plans or Standard Construction details.

Method of Measurement:

The quantity of junction wells shall be the actual number of conduit junction wells by type, that are supplied, constructed, complete in place, and accepted, including cast iron frames and lids with grounding lugs, precast polymer concrete frame and covers, or precast polymer concrete covers, stone base, bonding, grounding, and splicing if required. Frames and lids or precast polymer concrete covers must be installed prior to acceptance of this item.

Payment for all conduits extending into the junction well shall be included in the items for conduit installation.

The length of ALL conduits within a junction well shall conform to the Standard Construction or applicable Plan Details or as directed by Engineer. Payment for cutting existing conduit as directed by Engineer, where a junction well is replaced with a larger type of junction well is included in the bid price. The removal and replacement of cables within the conduits to be shortened shall be handled under other items of this contract.

Basis of Payment:

Payment for conduit junction wells as measured above shall be made at the Contract unit price per each junction well of the type indicated, completely installed and constructed, including excavation, backfilling, and stone base. Price and payment will constitute full compensation for all labor, equipment, tools, and incidentals required to complete the work.

2/29/12

- 745601 – FURNISH & INSTALL UP TO 3” FLEXIBLE METALLIC-LIQUIDTIGHT CONDUIT**
- 745602 - FURNISH & INSTALL UP TO 4” SCHEDULE 80 HDPE CONDUIT (BORE)**
- 745603 - FURNISH & INSTALL UP TO 4” SCHEDULE 80 PVC CONDUIT (OPEN CUT)**
- 745604 - FURNISH & INSTALL UP TO 4” SCHEDULE 80 PVC CONDUIT (TRENCH)**
- 745605 - FURNISH & INSTALL UP TO 4” SCHEDULE 80 PVC CONDUIT (ON STRUCTURE)**
- 745606 - FURNISH & INSTALL UP TO 4” GALVANIZED STEEL CONDUIT (TRENCH)**
- 745607 - FURNISH & INSTALL UP TO 4” GALVANIZED STEEL CONDUIT (BORE)**
- 745608 - FURNISH & INSTALL UP TO 4” GALVANIZED STEEL CONDUIT (OPEN CUT)**
- 745609 - FURNISH & INSTALL UP TO 4” GALVANIZED STEEL CONDUIT (ON STRUCTURE)**
- 745610 - FURNISH & INSTALL UP TO 4” NONMETALLIC POLE RISER SHIELD**

Description:

Furnish and install HDPE, PVC, or Galvanized steel conduits of any size less than or equal to 4 inches in diameter (3 inches or less for Flexible Metallic Liquidtight Conduit) as described below.

Materials:

All conduits shall be UL listed.

HDPE Conduit - 4" or less diameter, high density polyethylene (HDPE) schedule 80, smooth wall conduit with permanently pre-lubricated lining, meeting ASTM D2447, ASTM D3035 and NEMA TC7 specifications.

PVC Conduit - 4" or less diameter, schedule 80 rigid polyvinyl chloride (PVC) conduit, meeting Commercial Standard CS-272-65 (PVC), ASTM D-1785 and U.C. Standard 651 specifications.

Galvanized Steel Conduit - 4" or less diameter, rigid galvanized steel conduit meeting National Electric Code 2002, Article 344.

Nonmetallic Pole Riser Shield – 4” diameter or less nonmetallic pole riser shield with belled ends meeting NEMA TC-19 specifications.

Flexible Metallic-Liquidtight Conduit – meets National Electric Code 2002, Article 350

Weatherhead for galvanized or PVC conduit – material shall match the adjoining conduit

Insulated grounding bushing with knockouts - meet or exceed UL 514 B

Condulets for conduit sizes - material shall match the adjoining conduit

Anchors - A 307, Galvanized per A 153

One hole conduit hangers - Steel City Series 6H or 6H-B, CADDY CD3B Rigid Conduit Hanger, or approved equal

End caps - material shall match the adjoining conduit

LONG sweep sections for conduit sizes - material shall match the adjoining conduit, and shall be manufactured 90 degree sweeping bends.

Construction Methods:

General Installation Requirements - The Department has the right to reject any installation method proposed for a given work site. PVC shall not be installed under existing pavement unless it is on a continuous roll or with the Engineer’s written approval.

Conduit installed underground shall be installed in a straight line between terminal points. In straight runs, junction well spacing shall be no more than 600 feet for fiber optic conduit or no more than 300 feet for copper in conduit, or as directed by the Engineer. If bends are required during installation, they must be manufactured sweeping bends. The Engineer will be consulted before any bends are installed to ensure that the proper arc is provided.

Conduit shall have a minimum cover as measured from the finished grade of 24 inches and a maximum cover of 48 inches.

The opening shall be filled half way with the cover material, and tamped down firmly before filling in the remainder of the opening. Additional lifts shall be used as required to install the metallic warning tape at the specified depth. All cover material shall be free of rocks, debris, vegetation or other deleterious material that may damage the conduit. An underground utility warning tape shall be installed as specified in this section and the remainder of the fill shall be added, tamping down the top layer.

Conduit not terminated to a base or in a junction well shall be terminated 2 feet beyond the edge of the pavement unless otherwise directed by the Engineer, and properly capped. Tape is NOT an approved method. Conduit shall not extend more than 3 inches inside a junction well. See Standard Construction Details or applicable Plan Details for typical methods of termination.

All underground conduits shall be marked in the ground with a metallic warning tape. The marking tape shall be buried directly above the conduit run that it identifies, at a depth of approximately 12 inches below final grade. The tape identifying ALL conduits shall be at least 6 inches wide, and have a minimum thickness of 3 mils and 500 percent elongation.

The color of the metallic warning tape identifying fiber optic cable should be bright orange (preferably AULCC orange), and shall read "WARNING - OPTICAL CABLE" or other wording approved by the Engineer that conveys the same message. The color of the tape identifying all other cables shall be bright red, and shall read "WARNING —BURIED ELECTRIC BELOW" or other wording approved by the Engineer that conveys the same message.

Using conduit tools, rigid metallic conduit shall be cut, reamed, and threaded. The thread length shall be as necessary to ensure that the sections of conduits when screwed into a coupling and tightened correctly will butt together and the joint will be watertight. A three-piece threaded union, as approved by the Engineer, shall be used to join two threaded lengths of conduit in the case where a standard coupling will not work. A threaded union shall not be used in a conduit run that is to be driven. At no time is a threadless coupling or a split-bolt coupling to be used for direct buried conduit.

All lengths of HDPE conduit shall be connected with irreversible fusion couplings. Mechanical and removable couplings will not be accepted.

All lengths of PVC conduit shall be connected by one conduit end fitting inside the flared end of the other conduit section. If this is not possible, then a coupling may be used. Regardless of how connection is made, all joints shall be sealed with the appropriate epoxy to ensure that the two conduit pieces bond to one another to form a solid waterproof link. Using conduit tools, the conduit shall be cut and prepared. If approved by the Engineer, a coupler module may be used where conduit segments do not align properly to allow the flared end of one conduit segment to mate with the normal end of the other segment.

Sealed end caps (with knockouts if empty) shall be placed on the ends of all conduits, after compressed air has been used to clear all foreign matter.

If not already pre-installed by the manufacturer, a polyester or polypropylene pulling rope or tape (fish wire) with a minimum rated strength of 1250 pounds shall be installed in each conduit for future use. In instances where the Contractor installs the cable, the fish wire may be eliminated.

All PVC and HDPE conduits shall have a continuous metallic trace wire installed for the entire length of the conduit run for all fiber installations.

Installation Of Conduit Under Existing Pavement, Directional Bore -

Directional bore shall be used for installation of conduits under existing pavement with a conduit diameter not less than 1-1/2". The size of a bore shall not exceed the outside diameter of the conduit by more than 1 inch. If it does, cement grout shall be pumped into the void. **Only HDPE and/or Galvanized Steel conduit may be installed by Directional Bore methods.**

Installation Of Conduit Under Existing Pavement, Open Cut -

Installation by sawcutting the full pavement depth and removing the existing pavement with an excavator or by hand methods, shall be used only for conduits not less than 1-1/2" diameter. The Engineer must first approve all open cutting of roadways. The width and length of open cut and patch restoration materials shall be as shown on the plan details. The Contractor shall be responsible for the removal of all cut pavement and surplus excavation, and for the replacement and correction of any damaged pavement outside the sawcut limits after the conduit(s) are installed. Asphalt pavement, concrete, base course, sawcutting, and/or borrow from an outside source as required to restore the roadway will be paid for separately under their respective bid items.

Installation Of Conduit Under Existing Pavement, Unpaved Trench -

Trenching or other approved method shall be used for installation of conduit in unpaved trench or under new pavement. Backfill in conduit trenches shall be compacted thoroughly as it is being placed. At the discretion of the Engineer, sod, that must be removed for the placement of conduit, shall be removed either by the use of an approved sod cutter and then replaced, or 6 inches of topsoil shall be placed and the surface seeded in accordance with Section 734001 - Seeding. In areas where new pavement is to be placed or in areas where total reconstruction is taking place, sodding or seeding may not be required by the Engineer. Sodding and/or topsoil from an outside source if required will be paid for separately under their respective bid items. Seeding is considered incidental to the conduit item.

Installation Of Conduit On Structure -

Conduit installed on structure shall consist of drilling anchors into concrete, brick, stone, steel or wood and mounting the conduit with the proper clamps or hangers. The conduit shall be attached to the structure by use of one-hole conduit hangers and approved anchors not more than 36 inches apart. Any 90-degree turns in the conduit run shall be accomplished by placing the proper size and type manufactured sweeping bends for the application needed.

Installation of Nonmetallic Riser Shield or Flexible Metallic Liquidtight Conduit -

Riser Shield and/or Flexible Metallic Liquidtight Conduit installed on wood poles, metal poles, structures, and/or mast arms shall be installed in a straight line. The conduit, when attached to poles, shall be attached with 2-hole straps spaced not more than 36 inches apart with the top-most strap being 12 inches from the weatherhead and the lower-most being 12 inches from the conduit. A weatherhead matching the diameter of the conduit shall be installed on the upper end of the conduit. A conduit of the same size as the conduit being installed, but not smaller than 2 inches shall be placed 48 inches above finished grade. Install two, 2-hole straps of the proper size, evenly spaced below the conduit. Nonmetallic pole risers (U-guard) shall be installed on poles to allow interduct to be connected directly to messenger cable. The underground conduit shall be as close to the base of the pole as possible. If the nonmetallic pole riser or metallic liquidtight conduit is not the same size as the conduit, an adapter shall be used at no additional cost to the Department. The nonmetallic pole riser or metallic liquidtight conduit shall be attached to the pole with 1/4" x 1-1/2" galvanized lag bolts with washers. Lag bolts will be used every 36 inches on BOTH sides of the nonmetallic pole riser or liquidtight conduit, and in the top most and bottom most set of slots. Flexible metallic liquidtight conduit shown on the plans to be installed on mast arms or on metal structure shall also include stainless steel banding placed at a maximum of 5 feet intervals.

Method of Measurement:

The quantity of conduit or riser shield installed as specified, shall be measured as the number of linear feet of each conduit or riser shield installed as specified, complete in place, and accepted.

The length of each conduit installed under existing pavement by a directional bore or by open cutting the pavement shall be measured along the path of the bore or open cut, from the point that cannot be trenched to the point that trenching can resume.

The length of any conduit that is reduced or divided (with a junction well or conduit body) shall be measured as part of the larger conduit.

Basis of Payment:

The quantity of conduit or riser shield will be paid for at the Contract unit price per linear foot. Price and payment shall include full compensation for furnishing all conduit and/or riser shield materials, equipment, labor, and incidentals necessary to complete the item.

For conduit installed by Directional Bore, the linear foot payment also includes excavation and backfilling for Bore Equipment, placing the conduit, caps if required, and all other requirements and incidentals listed in the body of this specification.

For conduit installed by Open Cutting existing pavement, the linear foot payment also includes excavating, backfilling, placing the conduit, disposal of excess materials, and all other requirements and incidentals listed in the body of this specification.

For conduit installed in an Unpaved Trench, the linear foot payment also includes excavating, removal of sod if required, backfilling, placing the conduit, disposal of excess materials, replacing excavated on-site sod if required, seeding if required, and all other requirements and incidentals listed in the body of this specification. Sod and/or topsoil furnished from an outside source, will be paid for separately.

For conduit installed on a structure, the linear foot payment also includes furnishing and installing anchors and hangers, removal of excess materials, and all other requirements and incidentals listed in the body of this specification.

For riser shield or flexible metallic conduit installed on poles, mast arms, or structures the linear foot payment also includes furnishing and installing straps, weatherhead, conduit, lag bolts and washers, any other required mounting hardware, and all other requirements and incidentals listed in the body of this specification.

2/29/12

746843 - POLE BASE, TYPE 1
746844 - POLE BASE, TYPE 2
746845 - POLE BASE, TYPE 2A
746846 - POLE BASE, TYPE 2B
746847 - POLE BASE, TYPE 3
746848 - POLE BASE, TYPE 3A
746849 - POLE BASE, TYPE 3B
746850 - POLE BASE, TYPE 4
746851 - POLE BASE, TYPE 5
746852 - POLE BASE, TYPE 6

Description:

This work consists of constructing and furnishing round or square pole bases Types 1, 2, 2A, 2B, 3, 3A, 3B, 4, 5, and 6 for poles in accordance with the Standard Construction Details and at locations as directed by the Engineer.

Materials:

The concrete for pole bases shall conform to Section 812, Class B.

Bar reinforcement shall meet the requirements of Section 603 Grade 60.

Ground rods shall be copper clad, approved by the Underwriter's Laboratory and be supplied with approved clamps for connecting the grounding conductor to the rod.

Conduit for sweeps shall meet the requirements for galvanized rigid steel conduit in Section 745.

Anchor bolts will be supplied by the same entity that supplies the poles. This is the case for all poles base types, with the exception of Type 4. For Type 4, drop-ins are used for breakaway and the Contractor will supply the anchor bolts for Type 4. The anchor bolts and nuts for Types 5 and 6 shall not be hot-dipped galvanized and these anchor bolts and nuts shall meet the requirements of AASHTO M 314. Anchor bolts shall have a minimum yield strength of 55,000 psi (380,000 kPa).

Construction Methods:

The bases shall conform to the dimensions as indicated on the Standard Construction Details. A ground rod shall be installed as shown. A minimum of 8 feet (2.5 m) of the ground rod must be driven into undisturbed soil.

If a utility or a right-of-way conflict is found when a Type 2 or Type 3 base is specified in the Plans, an alternate base of equivalent strength may be used as directed by the Engineer. A Type 2 base has two equivalents, namely Types 2A and 2B. A Type 3 base has two equivalents, namely Types 3A and 3B.

Though the contract calls for the use of a round pole base, the Contractor may use a square base at its discretion.

The end of the conduit sweeps in the ground shall be extended outside the concrete and any forms or sheeting by 12 inches (300 mm) and capped or connected to the existing conduit. If the conduit is to be capped underground for future use, it must be sealed with a galvanized threaded conduit plug. Tape is NOT an approved conduit plug. The location of the conduits shall be marked on the base with arrows drawn in the wet concrete within 6 inches (150 mm) of the outer edge.

Excavation for the pole bases may not exceed the dimension of the foundation by more than 12 inches (300 mm) in any one direction. If a form is used in the excavation more than 18 inches (450 mm) below the ground surface, it is necessary that the area between the form and excavation be filled with Borrow Type C and tamped on all sides in continuous, horizontal layers not to exceed 68 inches (200150 mm) in depth, loose measurement.

Where a pole base is to be placed in existing concrete pavement such as a sidewalk, the concrete shall be saw cut in a square pattern or removed to the nearest joint. In other pavement material, a round hole may be cut using an appropriate tool. Any damage to the existing pavement shall be repaired at the Contractor's expense and shall meet the approval of the Engineer. Any removal or replacement of any type of pavement under this item shall be an incidental cost to this item.

The bases shall be edged and have a broom finish.

Where water or highly unstable material is encountered during the excavation for the pole base, pole base sheeting may be required and the following steps shall apply:

1. The condition exists in the upper half of the excavation. Stop all work until the Bridge Design Section reviews the condition.
2. The condition exists below the upper half of the excavation:
 - a. For a proposed Type 4 Base, increase the depth to 4 feet (1.2 m).
 - b. For a proposed Type 5 Base, substitute a Type 1 Base.
 - c. For a proposed Type 1, 2, or 3 Pole Base, substitute a Type 3A Pole Base for all but a Type 3B Pole Base. The depth of the base shall be as determined in (e) below, or 9 feet (2.7 m), whichever is greater.
 - d. For a proposed Type 6 Pole Base, substitute a Type 2 Pole base and increase the depth in accordance with (e) below.
 - e. Determine the depth of the base, which would be in the unsatisfactory area. Multiply that depth by 0.7 and add the result to the original required depth of the base to obtain the final depth of the base. The reinforcing bars shall be extended using the required pattern to match the final depth in accordance with the requirements of Section 603.07 of the Standard Specifications.

Method of Measurement:

The quantity of pole bases will be measured as the actual number of bases constructed, complete in place and accepted. Concrete, excavation and backfilling around the base, ground rods, and the two conduit sweeps in the base are included in this item.

Furnishing Borrow Type C backfill material will be measured and paid for separately by the cubic yard (cubic meter).

Payment for any additional sweeps shall be paid for separately under the appropriate conduit items. The Contractor's use of square base rather than a specified round base shall not result in any additional cost to the Department.

Basis of Payment:

Borrow Type C will be paid for under Section 210. No payment for Borrow Type C backfill material placed outside of the vertical plans located 18" (450 mm) outside of the neat line perimeter of the vertical face of the pole base foundation.

Any increase in the vertical dimension required herein shall be paid for separately under Item 746614, Pole Base Extension; another item of this contract.

The quantity of pole bases will be paid for at the Contract unit price for each pole base type. If an alternate pole base type is selected by the Engineer, payment will be the Contract unit price for the alternate selected. Price and payment will constitute full compensation for furnishing and placing all materials including concrete, ground rods, and a minimum of two conduit sweeps extending into the base; for excavating, backfilling and compacting around the base; for repairs to damaged existing pavement; for removal or replacement of pavement; and for all labor, equipment, tools, and incidentals required to complete the work.

**746924 - FURNISH & INSTALL LOOP WIRE 1-CONDUCTOR #14 AWG ENCASED IN ¼”
FLEXIBLE TUBING IN A LOOP SAWCUT**

Description:

Sawcut and seal existing pavement, furnish and install loop detector wire, aluminum shielded “home-run” cable, as shown on the Plans.

Materials:

1. **1-conductor #14 AWG Cable in ¼” Flexible Tubing** - shall consist of cable preinstalled in a polyethylene (PE) plastic duct meeting IMSA 51-5. Cable shall be rated for 600 volts. The cable shall have a temperature tolerance range of at least - 65 to + 176 degrees Fahrenheit. The conductor is AWG #14 stranded copper. Outside diameter of the cable is 0.25 inches. Referred to as “loop wire”
2. **2-conductor #14 AWG Aluminum Shielded Cable** – see specifications for furnish and install cable. Referred to as “home-run cable”.
3. **Flexible embedding sealer** - a cold poured, resilient type epoxy joint sealer, Bondo P 606 or Duracote D115 for concrete or asphalt pavement or E Poxy Industry 36 1 for concrete or E Poxy Industry 11 1 for asphalt pavement, or approved equal. A sealer accelerant or retarder may be added per the manufacturers specifications.
4. **Backer Rod** - 5/8" closed cell foam
5. **Tape** – Vinyl electrical tape shall have a PVC base with rubber based pressure sensitive adhesive. The tape shall be a minimum 7 mils thick and be UL listed and marked per UL Standard 510 as flame retardant and cold resistant. It shall be compatible with synthetic cable insulations, jackets and splicing compounds and rated for wire and cable splices up to 600-volts.
6. For splices in Junction Well (see plan detail):
 - a. **Dual Wall Heat Shrink Tubing** – Heat-shrink tubing shall be medium or heavy wall thickness, irradiated polyolefin tubing containing an adhesive mastic inner wall. Minimum wall thickness prior to contraction shall be 40 mils. When heated, the inner wall shall melt and fill all crevices and interstices of the object being covered while the outer wall shrinks to form a waterproof insulation. Each end of the heat-shrink tube or the open end of the end cap of heat-shrink tubing shall, after contraction, overlap the conductor insulation at least one and one-half inches. Heat-shrink tubing shall conform to the requirements in UL Standard 468D and ANSI C119.1, for extruded insulated tubing at 600 V.
 - b. Soldering iron with Rosin Core solder
 - c. Splicing Kit- In-line barrel type design, resin encapsulating compound kit with UL486 rating. Suitable for use in wet or direct buried locations. Resin encapsulating compounds shall be acceptable for use at 16 degrees C.

Construction Methods:

Loop Wire Installation:

The pavement saw cut shall be 5/8” wide and up to 3½” deep. It shall be “wet-cut” in the directions and sizes specified on the Plans, Standard Details or as directed by the Engineer. Contractor shall remove sharp edges in the saw cut and round the corners.

The saw cut shall be blown out with compressed air to remove all dust, water and particles of loose material prior to sealing.

The loop detector wire will then be installed using blunt tools so as to prevent damage to the polyethylene outer cover. One end of a loop detector wire shall be tagged to indicate start ("S"). A 5/8" backer rod will be placed into the bottom of the saw cut as needed to secure the wiring within the saw cut. All loop detector wires shall be laid in saw cuts in a clockwise rotation beginning with "S". The Engineer may require a High Voltage Ground Test with a 500 VDC megger after the loop detector installation is complete and prior to sealing saw cuts. If the resistance to ground is less than 100 megohms, this work will be rejected.

A sealer and sealer accelerant or retarder (if necessary) shall be applied in accordance with the manufacturer's directions and protected from traffic until it has set. A minimum of 1 inch of sealer shall be installed on top of the loop detector wire and finished flush with the pavement. Drilled holes in the pavement shall also be sealed.

Two loop detector wires shall be installed in a saw cut from the loop to the edge of the road. These two wires shall then extend from the end of the saw cut to a junction well (see Plan Details). Wires shall be parallel, twisted a minimum of 5 wraps per foot, and taped every 12" to 18" from the end of the saw cut to a junction well up to the splice. The loop detector wire shall be installed between the end of the saw cut and junction well through a penetration created by a 1 ½" rotary drill as directed by the Engineer.

The loop detector wire shall be continuous and without splices from the junction well, through the saw cuts and conduit.

Home-run Wire Installation - refer to furnish and install cable specifications and conduit installation specifications. Refer to plans for details.

Splicing – splices between the loop detector wire and home-run cable shall be done in accordance with the plan details.

Conductors to be soldered shall be placed side by side with the exposed copper aligned. The copper shall then be twisted clockwise with pliers until a good mechanical connection is affected. The splice shall be coated with flux, heated with a soldering iron, and rosin core soldered in a manner that minimizes insulation damage. After each soldered connection is completed, it shall be properly insulated with heat shrink tubing.

After the electrical and mechanical connection is completed and before the splicing kit is applied, a test shall be made by the Contractor to ensure that all circuits are complete. An approved splice kit shall be installed as per manufacturer's instructions. A continuity test will be performed at the cabinet by the Department technician after the splicing kit is applied. The Department will be notified of the test results. If the continuity test fails the Contractor shall remake the splice and/or loop at his own expense.

If a splice is found to be faulty within 90 calendar days of installation, it shall be the Contractor's responsibility to remake the splice at his own expense.

Method of Measurement:

The quantity of loop detector wire to be measured under this item shall be the number of linear feet of sawcut in which loop detector wire is installed, sealed, tested, and accepted. Sealer, sealer accelerant or retarder shall be incidental to this item.

Loop detector wire routed through the rotary drill penetration is considered incidental to the cost of the loop installation.

Conduit and associated home-run cable between the junction well and cabinet will be measured and paid for under their respective items, separate from this specification.

Splicing of the loop detector wire to a home-run cable in a junction well shall be incidental to the cost of the loop wire.

Basis of Payment:

The quantity of loop detector wire supplied and installed will be paid for at the Contract unit price per linear foot, determined by measuring the footage of sawcut described above. Price and payment shall constitute full compensation for “wet”-sawcutting, furnishing and placing all materials including loop detector wire, backer rod, sealer, and for all labor, equipment, tools, splicing in the junction well, and incidentals necessary to complete this item.

The price bid per linear foot of sawcut with Loop Wire shall include drilling required for installation, concrete and pavement patching, sealing the conduit ends, internal bushings shown on the plans, and all incidentals necessary to complete the item.

7/18/14

747514 - CABINET BASE TYPE F
747515 - CABINET BASE TYPE M
747516 - CABINET BASE TYPE P
747517 - CABINET BASE TYPE R

Description:

This work consists of constructing cabinet base Type F, M, P and R in accordance with the Standard Construction Details or applicable Plan Details and at locations as directed by plans or the Engineer.

Materials:

Class B Concrete
3/4" x 10' sectional copperclad steel ground rods
5/8" Zinc plated or Stainless Steel Drop-in Anchors manufactured by Hilti Systems, Concrete Fastening Systems, or approved equal
5/8" x 1-1/2" galvanized hex bolts
3/4" acorn type ground clamps
PVC conduit sweeps

Construction Methods:

The base shall conform to the dimensions as indicated in the cabinet base detail on the Standard Construction Details or applicable Plan Sheets. A concrete collar is only required when installed in earth areas or as directed by the engineer. Conduits entering the base must enter only in the designated area. A minimum distance of 1 inch shall be maintained between conduits and a minimum distance of 2 inches between conduits and the ground rods.

A minimum of 8 foot of the ground rods must be driven into undisturbed soil through the 2 inch PVC sleeve. The PVC sleeve shall be driven into the ground so that the top of the sleeve will be flush with the concrete when the base is poured.

Method of Measurement:

The quantity of cabinet bases will be measured as the number of bases constructed in accordance with these specifications, complete in place, and accepted.

All conduit sweeps extending into the cabinet base as shown on the Plans or Standard Details as applicable shall be included in the price for each cabinet base..

Basis of Payment:

The quantity of cabinet bases will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for all concrete, ground rods, labor, equipment, tools, conduit sweeps, and incidentals required to complete the work as shown on the standard details or applicable plan sheets.

10/9/2012

- 748506 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 4"**
- 748507 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 6"**
- 748508 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 8"**
- 748509 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 12"**
- 748510 - PERMANENT PAVEMENT STRIPING, SYMBOL/LEGEND, EPOXY RESIN PAINT**
 - 748535 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 4"**
 - 748536 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 6"**
 - 748537 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 8"**
 - 748538 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 10"**
 - 748539 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 12"**
 - 748540 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 16"**
- 748548 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 5"**
- 748549 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 10"**
 - 748557 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 3"**
 - 748559 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 5"**
 - 748568 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 9"**
 - 748569 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 14"**

Description:

This work consists of striping layout, furnishing and applying white or yellow, epoxy reflectorized pavement markings or black epoxy contrast pavement markings at the locations and in accordance with the patterns indicated on the Plans, or as directed by the Engineer, and in accordance with these specifications.

The white/yellow epoxy marking material shall be hot-applied by spray methods onto bituminous and/or Portland cement concrete pavement surfaces as required by the Plans. Following an application of double drop glass beads of two sizes and upon curing, the resultant epoxy marking shall be an adherent reflectorized stripe of the specified thickness and width that is capable of resisting deformation by traffic. All marking materials shall be certified lead free and free of cadmium, mercury, hexvalent chromium, and other toxic heavy metals.

The black epoxy marking shall be a two-component, hot-spray applied epoxy resin pavement marking material to be used for pavement marking on Portland cement concrete pavement surfaces. Following an aggregate drop, and upon curing, it shall produce an adherent stripe of specified thickness and width capable of resisting wear from traffic. Black contrast pavement markings will be required on all Portland cement concrete pavements.

Materials Requirements:

A. White and Yellow Reflectorized Epoxy

1. Epoxy Composition Requirements:

The epoxy resin composition shall be specifically formulated for use as a pavement marking material and for hot-spray application at elevated temperatures. The type and amounts of epoxy resins and curing agents shall be at the option of the manufacturer, providing the other composition and physical requirements of this specification are met.

The epoxy marking material shall be a two-component (Part A and Part B), 100% solids type system formulated and designed to provide a simple volumetric mixing ratio (e.g. two volumes of Part A to one volume of Part B).

Component A of both white and yellow shall conform to the following requirements:

	% BY WEIGHT	
	WHITE:	YELLOW:
Pigments	Titanium Dioxide - 18% Min. (ASTM D476, Type II)	Organic Yellow - 6%-10%
Epoxy Resin	75% Min., 82% Max.	70% Min., 77% Max.

The entire pigment composition shall consist of either titanium dioxide and/or organic yellow pigment. No extender pigments are permitted. The white pigment upon analysis, shall contain a minimum of 16.5% 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 ± 5 F. (23 ± 3 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 ($500 \mu\text{m}$) 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 $625 \mu\text{m}$) 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 \pm 0.25 mm) thick]. Tests shall be conducted at an ambient temperature of 75 \pm 5 F (24 \pm 3 C). The testing machine shall operate at a speed of 0.20" (5.1 mm) per minute.

The total conditioning or drying period, from the time the epoxy composition is first mixed to the time of testing, shall not be less than 24 hours nor more than 96 hours.

Test specimens for tensile strength determination will be prepared as follows:

A 1/8 inch (3 mm) thick sheet of epoxy material is cast from a reservoir-type mold, fabricated from 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 F (24 \pm 3 C).

The total conditioning or drying period, from the time the epoxy composition is first mixed to the time of testing shall not be less than 24 hours nor more than 96 hours.

Test specimens for compressive strength determinations will be prepared as follows:

Five molds will be prepared from 1/2" (12 mm) I.D., 1/16" (1.5 mm) wall thickness acrylic tubing, cut in 1 1/2" (38 mm) lengths. After spraying the inside of the mold with a suitable release agent,⁽¹⁾ the cylindrical tubes are placed in a vertical position on a PTFE sheet base. A sufficient amount of epoxy composition is thoroughly mixed in the proper proportions (A:B) and poured into the mold to a depth of approximately 1 1/4" (32 mm). After a minimum of 72 hours curing, the specimens are removed from the molds and machined to a length of 1" \pm 0.002" (25 mm \pm 0.05 mm).

- h. Hardness. The epoxy composition when tested in accordance with ASTM D2240 shall have a Shore D hardness of between 75 and 100. Samples shall be allowed to dry for not less than 24 hours nor more than 96 hours prior to testing.

B. Reflective Glass Spheres/Beads

Reflective glass spheres for drop-on application shall conform to the following requirements:

The glass spheres shall be colorless; clean; transparent; free from milkiness or excessive air bubbles; and essentially clean from-surface scarring or scratching. They shall be spherical in shape and at least 80% of the glass beads shall be true spheres when tested in accordance with ASTM D1155. At least 80% of the Type IV beads shall be true spheres as measured by the visual method.

The refractive index of the spheres shall be a minimum of 1.50 as determined by the liquid immersion method at 77 F (25 C).

The silica content of the glass spheres shall not be less than 60%.

The crushing resistance of the spheres shall be as follows: A 40 lb. (18 kg) dead weight, for 20 to 30 (850 µm to 600 µm) mesh spheres shall be the average resistance when tested in accordance with ASTM D1213.

The glass spheres shall have the following grading when tested in accordance with ASTM D1214.

M247 AASHTO Type 1 Glass Spheres

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

Type 4 Large Spheres

<u>U.S. Standard Sieve</u>	<u>% Retained</u>	<u>% Passing</u>
#10 (2000 µm)	0	100
#12 (1680 µm)	0-5	95-100
#14 (1410 µm)	5-20	80-95
#16 (1190 µm)	40-80	10-40
#18 (1000 µm)	10-40	0-5
#20 (850 µm)	0-5	0-2
Pan	0-2	

The AASHTO M247 Type 1 glass spheres shall be treated with a moisture-proof coating. They shall show no tendency to absorb moisture in storage and shall remain free of clusters and hard lumps. They shall flow freely from dispensing equipment at any time when surface and atmosphere conditions are satisfactory for marking operations. The moisture-resistance of the glass spheres shall be determined in accordance with AASHTO M247 test method 4.4.1.

Type IV glass spheres shall be treated with an adhesion coating. They shall show no tendency to absorb moisture in storage and shall remain free of clusters and hard lumps. They shall flow freely from dispensing equipment at any time when surface and atmosphere conditions are satisfactory for marking operations. The adhesion coating property of the Type IV beads shall be tested in accordance with the dansyl-chloride test.

C. Black Epoxy Contrast Markings

Epoxy Resin Requirements: The two-component, 100% solids, paint shall be formulated and designed to provide a simple volumetric mixing ratio (e.g. 2 part component A to 1 part component B)

specifically for service as a hot-spray applied binder for black aggregate in such a manner as to produce maximum adhesion. The material shall be composed of epoxy resins and pigments only.

The paint shall be well mixed in the manufacturing process and shall be free from defects and imperfections that may adversely affect the serviceability of the finished product. The paint shall not thicken, curdle, gel, settle excessively, or otherwise display any objectionable properties after storage. Individual components shall not require mixing prior to use when stored for a maximum of 6 months.

The overall paint composition shall be left to the discretion of the manufacturer, but shall meet the following requirements:

Composition:	<u>Component</u>	<u>Percent By Weight</u>
	Carbon Black (ASTM D476 Type III)	7±2 percent, by weight
	Talc	14±2 percent, by weight
	Epoxy Resin	79±4 percent, by weight

D. Black Aggregate

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

<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 -White Edge lines on Portland cement concrete pavements shall have a 3 inch black contrast line running parallel to the white edge line. The contrast line shall be to the inside or travel lane side of the edge line. The black contrast marking is to be applied with a single drop of graded black aggregate. Once it has cured sufficiently so as not to track, the reflectorized white line is to be applied along side of the contrast line and the two lines shall adjoin each other.

Dotted Line: All dotted lines on Portland cement concrete pavements shall have a base of black contrast markings which is 4 inches (100 mm) wider than the reflective white marking. The black contrast marking is to be applied first with a single drop of graded black aggregate. Once it has cured sufficiently so as not to track, the reflectorized white line is to be applied on top of it. The reflective line is to be centered along the black contrast line such that a minimum of 2 inches (50 mm) of black contrast marking is visible on either side of the reflective marking.

F. Defective Epoxy Pavement Markings: Epoxy reflectorized pavement markings, which after application and curing are determined by the Engineer to be defective and not in conformance with this specification, shall be repaired. Repair of defective markings shall be the responsibility of the Contractor and shall be performed to the satisfaction of the Engineer as follows:

1. Insufficient film thickness [(less than 20+1 mils (500 μ m) 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 μ m) minimum line thickness as applicable.

2. Uncured or discolored epoxy (brown patches); insufficient bond to pavement surface (or existing durable marking).

Uncured epoxy shall be defined as applied material that fails to cure (dry) in accordance with the requirements of this specification under MATERIALS, A, 2d. DRYING TIME (FIELD); or applied material that fails to cure (dry) within a reasonable time period under actual field conditions, as defined by the Engineer.

Discoloration (brown patches) shall be defined as localized areas or patches of brown or grayish colored epoxy marking material. These areas often occur in a cyclic pattern and also, often are not visible until several days or weeks after markings are applied.

Repair Method: The defective epoxy marking shall be completely removed and cleaned to the underlying pavement surface to the satisfaction of the Engineer.

The extent of removal shall be the defective area plus any adjacent epoxy pavement marking material extending one foot (300 mm) any direction.

After surface preparation work is complete, repair shall be made by re-applying epoxy over the cleaned pavement surface in accordance with the requirements of this specification.

3. Reflectivity for epoxy resin paint.

After satisfactory completion of all striping work and written notification from the Contractor, the Department shall test the striping to ensure it has the minimum reflectivity. The testing will be completed within 30 calendar days from notification. The Contractor may request that tests be conducted on completed phases or portions of the work. Approval of such a request will be at the discretion of the Engineer. Testing will be done using a LTL-X Retrometer (30 meter geometry). Five readings will be taken per line per mile (1.6 km). Projects less than 1 mile (1.6 km) in length will have a minimum of 5 readings per line. These readings will then be averaged for the overall project average.

The required average minimum initial reflectivity reading in millicandellas shall be:

White 450
Yellow 325

Any single reading shall not be less than 350 millicandellas for white and 250 millicandellas for yellow. Without exception, any pavement markings installed that does not meet the above average minimum initial reflectivity numbers shall be removed and replaced, at the installation contractor's expense.

Other defects not noted above, but determined by the Engineer to need repair, shall be repaired or replaced as directed by and to the satisfaction of the Engineer.

All work in conjunction with the repair or replacement of defective epoxy reflectorized pavement markings shall be performed by the Contractor at no additional cost to the State.

Method of Measurement:

The quantity of permanent pavement striping (white, yellow, or black epoxy resin paint) will be measured by the number of linear feet (meters) of pavement striping line and number of square feet (meter) of symbol installed on the pavement and accepted in accordance with the Plans.

Basis of Payment:

The quantity of permanent pavement striping (white, yellow, or black epoxy resin paint) payment will be paid for at the Contract unit price per linear foot (meter) for 3", 4", 5", 6", 8", 9", 10", 12", 14", 16" (75 mm, 100 mm, 125 mm, 150 mm, 200 mm, 225 mm, 250 mm, 300 mm, 350 mm, or 400 mm) line and the Contract unit price per square foot (meter) of symbol. The quantity of permanent pavement marking (white, yellow, or black epoxy resin paint) will be paid for at the Contract unit price per linear foot (meter) of line and the Contract unit price per square foot (meter) of symbol. Price and payment shall include striping layout, cleaning and preparing the pavement surface, and placing all materials, for all labor, tools, equipment and incidentals necessary to complete the work.

NOTE:

For information only:

The following manufacturers are known to us which manufacturer Epoxy Resin Paint for Pavement Striping. The Department does not endorse or require the use of any of the manufacturers listed below. However, a bidder wishes to use another manufacturer's product, it shall be submitted for review and approval prior to submitting a bid proposal. Should the product be deemed unacceptable by the Department, the successful bidder will be required to use only an approved product.

1. POLY CARB, Inc.
33095 Bainbridge Road
Solon, Ohio 44139
Tel. 1-800-CALLMIX

2. IPS - Ennis Paint
P.O. Box 13582
Research Triangle Park, North Carolina 27709
Tel. 1-877-477-7623
3. Epoplex
One Park Avenue
Maple Shade, NJ 08052
Tel. 1-800-822-6920
4. Or an approved equal.

8/7/2013

748530 - REMOVAL OF PAVEMENT STRIPING

Description:

This work consists of removing pavement markings of all kinds including paint, tape, etc., in accordance with this special provision, notes on Plans and/or as directed by the Engineer. The Contractor shall coordinate with the Engineer for maintaining traffic during the operation, prior to starting the work.

Materials and Construction Methods:

Paint and Epoxy Resins:

Shot/abrasive grit blasting or water blasting equipment shall be used for removal of markings from pavement surfaces.

Alkyd Thermoplastic:

In addition to the removal techniques discussed for paint and epoxy, grinding (erasing machines) equipment may also be used for removal of markings from pavement surfaces.

The removal operation shall be performed in a manner that will not damage the pavement surface.

The Contractor shall collect and dispose of all shot/abrasive grit and pavement marking materials removed from the pavement surface. Washing or sweeping such material to the roadside will not be permitted.

After removal of striping on bituminous concrete asphalt sealer shall be used to cover any exposed aggregate or embedded paint at no additional cost.

Method of Measurement:

The quantity of pavement striping removal will be measured as the number of square feet (meters) of pavement striping removed and accepted. The area of lines will be calculated by multiplying the nominal width of line times the length and the area of symbols will be as specified in Subsection 748.10 of the Standard Specifications.

Basis of Payment:

The quantity of pavement striping removal will be paid for at the Contract unit price per square foot (meter) for "Removal of Pavement Striping". Price and payment shall be full compensation for furnishing all materials, removing the pavement markings, disposing of the removed marking material, covering up the exposed aggregate, and for all labor, equipment, tools and incidentals necessary to complete the work.

Note:

There will be no measurement and payment for removal of pavement markings placed incorrectly by the Contractor.

5/21/2013

- 748541 - PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS,
4"
- 748542 - PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS,
6"
- 748543 - PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS,
8"
- 748544 - PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS,
12"
- 748545 - PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS,
16"
- 748546 - PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS,
SYMBOL/LEGEND
- 748553 - PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS,
BIKE SYMBOL
- 748554 - PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS,
PEDESTRIAN SYMBOL
- 748555 - PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS,
HANDICAP SYMBOL

Description:

This work consists of furnishing and installing preformed retroreflective thermoplastic pavement marking with a preapplied Federal Specification Type IV glass bead coating throughout its entire cross section on bituminous asphalt pavement at the locations and in accordance with the patterns on the Plans, or as directed by the Engineer.

The preformed retroreflective markings shall conform to the size and dimensions as shown in the Federal "Standard Highway Signs" book found at: <http://mutcd.fhwa.dot.gov/SHSe/pavement.pdf> as referred to in the Delaware Manual on Uniform Traffic Control Devices, Part 3, Markings.

Materials:

General: Only materials listed on the Department's Approved Pavement Markings Material List will be used for this item. The preformed retroreflective markings shall be fusible to bituminous asphalt pavement by means of the normal heat of a propane type of torch. Adhesives, primers or sealers are not necessary prior to the preformed retroreflective markings application on bituminous asphalt pavement.

The preformed retroreflective markings shall conform to pavement contours, breaks and faults through the action of traffic at normal pavement temperatures. The markings shall have resealing characteristics and be capable of fusing to itself and previously applied worn hydrocarbon and/or 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±3°F) (23°C) in accordance to ASTM Standard Test Method for Bond Strength of thermoplastic marking Material D4796-88. Place a coarse brick in a 400°F (204°C) oven for 5 minutes. Prepare a 4 square inch test specimen. Place the test specimen on the brick and further heat in the 400°F (204°C) oven for 15 minutes. The test specimen is then allowed to cool to room temperature and prepared for testing.

Low Temperature Cracking (Stress) Resistance for Extended Period: The material shall be tested according to AASHTO T250 Section 7 with Section 7.2.3 modified for and extended cold temperature 15 degrees $\pm 3^{\circ}\text{F}$ ($-9.4 \pm 2^{\circ}\text{C}$) 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 or other type of pole at the locations indicated on the Plans or as directed by the Engineer. This specification also includes installation of posts in boring holes constructed under other items.

A single sign totaling more than 9 square feet, or with any dimension, length or width, greater than or equal to 48 inches shall be installed on multiple sign posts under Item 749690 - Installation or Removal of Traffic Sign on Multiple Sign Posts.

Materials:

The Department will provide all sign materials to be used on this project. The Contractor shall contact the DelDOT Sign Shop Supervisor with project plans and quantity sheets at 302-760-2581. Sign fabrication orders require a minimum of four (4) weeks for completion. Orders placed with less than 4 weeks lead-time will result in a delay. Any delay caused by inadequate lead-time due to a late order will be the sole responsibility of the Contractor. The Contractor shall pick-up the sign materials from the DelDOT Sign Shop and deliver them to the job site without any damage to the sign materials.

Construction Methods:

The Contractor shall pick-up necessary signs, sign posts, hardware, and extensions from the Department and install the signs in the locations indicated on the Plans in accordance with the Delaware MUTCD or as directed by the Engineer. The Contractor shall be responsible for obtaining all necessary utility clearances before the signs may be installed. Signs and plaques shall be mounted no lower than the minimum mounting height specified in the Delaware MUTCD. Signs and plaques shall be mounted no higher than one foot above the minimum mounting height specified in the Delaware MUTCD. Any excess sign post protruding above the top of the top sign shall be cut off and removed. For sign removals, the sign posts shall have all nuts, bolts, and other connectors removed. The disturbed ground shall be graded and backfilled accordingly. The Contractor is responsible for disposal of all signing material removed from the project

Method of Measurement:

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

6/25/2015

749690 - INSTALLATION OR REMOVAL OF TRAFFIC SIGN ON MULTIPLE SIGN POSTS

Description:

This work consists of installing or removing traffic sign(s) on multiple sign posts at the locations indicated on the Plans or as directed by the Engineer. This specification also includes installation of posts in holes installed under other items.

A single sign totaling more than 9 square feet, or with any dimension, length or width, greater than 48 inches shall be mounted on two (2) posts. Signs with a length greater than or equal to 78 inches shall be mounted on three (3) sign posts.

Materials:

The Department will provide all sign materials to be used on this project. The Contractor shall contact the DelDOT Sign Shop Supervisor with project plans and quantity sheets at 302-760-2581. Sign fabrication orders require a minimum of four (4) weeks for completion. Orders placed with less than 4 weeks lead-time will result in a delay. Any delay caused by inadequate lead-time due to a late order will be the sole responsibility of the Contractor. The Contractor shall pick-up the sign materials from the DelDOT Sign Shop and deliver them to the job site without any damage to the sign materials.

Construction Methods:

The Contractor shall pick-up necessary signs, sign posts, hardware, and extensions from the Department and install the signs in the locations indicated on the Plans in accordance with the Delaware MUTCD or as directed by the Engineer. The Contractor shall be responsible for obtaining all necessary utility clearances before the signs may be installed. Signs and plaques shall be mounted no lower than the minimum mounting height specified in the Delaware MUTCD. Signs and plaques shall be mounted no higher than one foot above the minimum mounting height specified in the Delaware MUTCD. Any excess sign post protruding above the top of the top sign shall be cut off and removed. For sign removals, the sign posts shall have all nuts, bolts, and other connectors removed. For sign removals, the sign posts shall have all nuts, bolts, and other connectors removed. The disturbed ground shall be graded and backfilled accordingly. The Contractor is responsible for disposal of all signing material removed from the project..

Method of Measurement:

The number of sign installations or removals will be measured as the total square foot of the sign(s) installed or removed and accepted.

Basis of Payment:

The quantity of sign installations or removals will be paid for at the Contract unit price per square foot. Price and Payment will constitute full compensation for installing or removing signs and sign materials, pick-up and delivery of sign materials, grading disturbed areas, and for all labor, equipment, tools, and incidentals required to complete the work. Signs that are not installed accordance with the Delaware MUTCD or signs installed in the incorrect location shall be moved at no additional cost to the Department.

5/28/2013

753516 - SANITARY SEWER SYSTEM

Description:

Work shall include all work as specified herein and as shown on the Plans.

- A. Cutting and removal of existing pavement, trench excavation, dewatering, location and protection of existing utilities.
- B. Permanent and temporary shoring as required to protect the work and adjacent structures.
- C. Furnishing, installing, and testing of all pipes, fittings, plugs, and other materials required to construct the sewers and force main.
- D. Horizontal directional drill installation of force main.
- E. Connection to existing and new piping, backfilling, accessories, appurtenances and miscellaneous work.
- F. Connections to pipelines and appurtenances;
- G. Furnishing and installation of all valves, piping, flexible joints, pipe expansion joints, wall sleeves, wall pipe, appurtenances, manholes and structures.
- H. Installation of concrete thrust blocks and supports.

References:

The Contractor shall review the noted references before submitting the bids. This work shall be in accordance with these Special Provisions and the latest edition of following references:

- A. New Castle County Department of Special Services Sewer Design Policy.
- B. Recommended Standards for Wastewater Facilities (10 State Standards).
- C. Delaware Department of Natural Resources and Environmental Control (DNREC)
- D. Delaware Department of Transportation (DeIDOT) Standard Specifications for Road and Bridge Construction.
- E. American Society for Testing and Material Standards
- F. American Water Works Association Standards
- G. American National Standards Institute

General Requirements:

All work shall be subject to inspection and subsequent approval/disapproval of the Engineer and the representative of the New Castle County; and the Contractor shall be required to correct the discrepancies at his/her expense.

It is of prime importance that the Contractor, in the performance of his/her work, does not disrupt the operation of the existing sanitary sewer facilities in any manner or at any time, without the expressed prior approval of the New Castle County. Following construction the Contractor shall construct, maintain, and remove such temporary bypasses as may be required during construction to maintain sanitary sewer service.

Emergency Repairs

Any and all emergency repairs required during the period of this Contract shall be the responsibility of the Contractor. In the event New Castle County is unable to contact the Contractor for the immediate emergency repair items of work, or in the event the Contractor does not take action when contacted within a reasonable length of time, New Castle County reserves the right to attend to any and all emergency repair work items and to resubmit the costs directly to the Contractor for complete payment.

Materials:

Ductile Iron Pipe

- A. Ductile iron pipe shall be centrifugally cast pipe conforming to the American National Standard for Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds for Water or Other Liquids, ANSI/AWWA Designation A21.51/C151, latest revision. The pipe sizes shall be as shown on the contract plans with a thickness class of 52 unless otherwise shown on plans. All pipe fittings shall have joints with body thickness and radii of curvature conforming to latest ANSI/AWWA Designation A21.10/C110.
- B. Joints shall employ a single, elongated gasket of such size and shape as to provide an adequate compressive force against the spigot and socket after assembly to effect a positive seal under all combinations of joint and gasket tolerances. Gaskets shall be vulcanized natural or vulcanized synthetic rubber, resistant to common ingredients of sewage, oils, and groundwater. Gaskets shall be free of porous areas, foreign material, and visible defects.
- C. The lubricant shall be suitable for lubricating the parts of the joint assembly. The lubricant shall be nontoxic and shall not support the growth of bacteria and shall have no deteriorating effects on the gasket material.
- D. Push-on joint and mechanical joints shall conform to AWWA C111 (ANSI A21.11), latest revision with a thickness class of 52 unless otherwise noted. Joints shall be U.S. Pipe and Foundry Co.'s "Tyton" Joint; Griffin Pipe Products Co.'s "Super Bell-Tite" Joint; or equivalent.
- E. Cement lining shall be provided unless otherwise indicated. Linings shall conform to AWWA C104-71 (ANSI A21.4) with bituminous seal coat. Cement lining shall be 1/8" thick for all pipes 12" diameter and smaller and 3/16" thick for all pipes 14" diameter and larger.
- F. Flanged ductile iron pipe shall have ductile iron flanges conforming to ANSI B16.1 Class 125 specifications designed for use with AWWA C110 (ANSI A21.10) flanged fittings, with pipe barrel conforming to AWWA C151-65 and AWWA C151a-68 (ANSI A21.51 and A21.51a), or latest revisions. Ductile iron pipe shall be flanged in the foundry. The flanges shall be of the long hub type, shall be screwed on the pipe barrel and power tightened by machine, and faced and drilled after tightening. No ductile iron pipe of class thickness less than Class 53, shall be threaded and flanged.
- G. All buried ductile iron piping in the appurtenances shall receive outside bituminous coating in accordance with AWWA C106-70.
- H. Mechanical Coupling:
 - 1. Coupling shall be designed to couple plain end piping by compression of a ring gasket at each end of the adjoining pipe sections.
 - 2. The coupling shall consist of one middle ring flared or beveled at each end to provide a gasket seat; two follower rings; two resilient tapered rubber gaskets; and bolts and nuts to draw the follower rings toward each other to compress the gaskets.
 - 3. The middle and the follower rings shall be true circular sections free from irregularities, flat spots, and surface defects; the design shall be such as to provide for confinement and compression of the gaskets.
 - 4. The restrained joining system shall be the EBAA Iron Series 3800 or approved equal.

I. Mechanical Joint Restraint:

1. Restraint devices for nominal pipe sizes 3 inch through 48 inch shall consist of multiple gripping wedges incorporated into a follower gland meeting the applicable requirements of ANSI/AWWA C110/A21.10.
2. The devices shall have a working pressure rating of 350 psi for 3-16 inch and 250 psi for 18-48 inch. Ratings are for water pressure and must include a minimum safety factor of 2 to 1 in all sizes.
3. Gland body, wedges and wedge actuating components shall be cast from grade 65-45-12 ductile iron material in accordance with ASTM A536.
4. Ductile iron gripping wedges shall be heat treated within a range of 370 to 470 BHN.
5. Three (3) test bars shall be incrementally poured per production shift as per Underwriter's Laboratory (U.L.) specifications and ASTM A536. Testing for tensile, yield and elongation shall be done in accordance with ASTM E8.
6. Chemical and nodularity tests shall be performed as recommended by the Ductile Iron Society, on a per ladle basis.
7. The restrained joining system shall be the EBAA Iron Series 1100 or approved equal.

J. Ductile Iron Fittings: All ductile iron fittings shall be Class 250 suitable for use with the pipe specified above conforming to the latest edition of American National Standard for Gray Iron and Ductile Iron Fittings, 3 in. through 48 in. for Water and Other Liquids. ANSI/AWWA Designation A21.10/C-110. Fittings shall be externally coated with a uniform thickness of hot applied coal tar coating and the inside shall be cement lined and only mechanical joint fittings shall be used in pressure main lines. End plugs shall be setscrew type, as manufactured by the United States Pipe and Foundry Company, or equivalent. Bolts and gaskets shall conform to the latest edition of ANSI/AWWA Designation A21.11/C-111.

K. Mechanical Joint Retainer Glands: Standard mechanical joint retainer glands are designed to provide a method for restraining mechanical joint pipe and fittings against possible joint separation, rupture or blow-out caused by internal water pressures. Mechanical joint retainer glands must meet the specifications of AWWA C-111 (ANSI A21.11) American Standard for rubber gasket joints. Glands shall be ductile iron and set screws shall be heat treated AISC 4140 steel.

High Density Polyethylene (HDPE) Pipe

- A. All HDPE pipe and fittings shall be from a single manufacturer, who is fully experienced, reputable and qualified in the manufacture of the HDPE pipe to be furnished. The pipe shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these Specifications.
- B. Qualified manufacturers:
1. ISCO Industries; HDPE Pipe
 2. Performance Pipe, Division of Chevron Phillips Chemical Company LP; DriscoPlex®
 3. JM Eagle; HDPE Pipe
 4. Flying W Plastics; HDPE Pipe
 5. Approved Equal.
- C. Pipe Rating
1. HDPE force main pipe and fittings shall be pressure rated at 160 psi at 73.4°F meeting the requirements of Dimension Ration (DR) 11 as MINIMUM STRENGTH.
 2. HDPE casing pipe, shall be pressure rated at 100 psi at 73.4°F meeting the requirements of Dimension Ration (DR) 17 as MINIMUM STRENGTH.
- D. Materials
1. Pipe shall be ductile iron pipe sized (DIPS)
 2. Materials used for the manufacture of polyethylene pipe and fittings shall be made from a PE 3408 high density polyethylene resin compound meeting cell classification 345434C per ASTM D3350; and meeting Type III, Class C, Category 5, Grade P34 per ASTM D1238.
 3. Pipe and fittings shall comply with AWWA Specifications C901 and C906.
 4. If rework compounds are required, only those generated in the Manufacturer's own plant from resin compounds of the same class and type from the same raw material supplier shall be used.

5. Dimensions and workmanship shall be as specified by ASTM F714. HDPE fittings and transitions shall meet ASTM D3261.
 6. HDPE pipe shall have a minimum density of 0.955 grams per cubic centimeter per ASTM D1505.
 7. All HDPE pipe and fittings shall have a Hydrostatic Design Basis (HDB) of 1,600 psi per ASTM D2837.
 8. The pipe Manufacturer must certify compliance with the above requirements.
- E. Pipe Identification
1. The following shall be continuously indent printed on the pipe or spaced at intervals not exceeding 5-feet:
 - a. Name and/or trademark of the pipe manufacturer.
 - b. Nominal pipe size.
 - c. Dimension ratio.
 - d. The letters PE followed by the polyethylene grade in accordance with ASTM

HDPE Fittings

- A. All molded fittings and fabricated fittings shall be fully pressure rated to match the pipe DR pressure rating to which they are made. All fittings shall be molded or fabricated by the manufacturer. No Contractor fabricated fittings shall be used unless approved by New Castle County.
- B. The manufacturer of the HDPE pipe shall supply all HDPE fittings and accessories as well as any adapters and/or specials required to perform the work as shown on the Plans and specified herein.
- C. All fittings shall be installed using butt-fused fittings, electro-fused fittings/couplings, or flanged adapters and must be approved by the Engineer.
- D. All transition from HDPE pipe to stainless steel or PVC pipe shall be made per the approval of Engineer and per the HDPE pipe manufacturer's recommendations and specifications. Ductile iron back-up rings shall mate with flanges per ANSI B16.1.
 1. Transition from new HDPE to existing HDPE piping or valves shall be approved by the Engineer before installation.
 2. No solid sleeves shall be allowed between such material transitions.
 3. Fittings and transitions shall be as manufactured by the pipe manufacturer.
 4. The pipe supplier must certify compliance with the above requirements.
- E. Physical Properties:
 1. Density - ASTM D1505
 2. Melt Index - ASTM D1238
 3. Flex Modulus - ASTM D790
 4. Tensile Strength at Yield - ASTM D638
 5. ESCR - Environmental Stress Crack Resistance - ASTM D1693
 6. Hydrostatic Design Basis - ASTM D2837
 7. ESCR - Compressed Ring - ASTM F1248
 8. Cell Classification - ASTM D3350; PE 345434
- F. All molded fittings shall be manufactured per ASTM D326.
- G. Pipe joints and fittings shall be supplied to the job site ready for simultaneous butt fusion. The fabricator shall show that the materials are capable of butt fusion and shall provide a procedure to consistently produce sound welds.
- H. End termination fittings shall be used to seal the system at the ends. The fitting shall be simultaneously butt fused to the carrier and containment pipe to seal the annular space. No other closure or termination will be allowed. This fitting will also provide transition to single wall.
- I. Contractor is responsible for compatibility between pipe materials, fittings and appurtenances.

Electrofusion HDPE Fittings

- A. Fittings shall be PE3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350-02.
- B. Electrofusion fittings shall have a manufacturing standard of ASTM F1055.
- C. Fittings shall have a pressure rating equal to the pipe unless otherwise specified on the plans.
- D. All electrofusion fittings shall be suitable for use as pressure conduits, and per AWWA C906, have nominal burst values of three and one-half times the Working Pressure Rating (WPR) of the fitting.

Casing Spacers

- A. Band Material: 14 gauge 304 stainless steel
- B. Liner:
 - 1. Material: Polyvinyl Chloride
 - 2. Thickness: 0.090" minimum
 - 3. Hardness: Durometer "A" 85-90
- C. Acceptable Manufacturers:
 - 1. PSI Model "S"
 - 2. CCI Pipeline Systems
 - 3. Advance Products & Systems

End Seals

- A. Material: Neoprene Rubber 1/8" thick
- B. Band clamps: 1/2" wide 304 stainless steel
- C. Acceptable Manufacturers:
 - 1. PSI Model "C"
 - 2. CCI Pipeline Systems
 - 3. Advance Products & Systems

Tracer Wire

- A. #10 AWG or larger copper clad steel wire with high molecular weight polyethylene insulation.
- B. Green insulation cover in accordance with American Public Works Association (APWA) Uniform Color Code for Underground Utility Lines.

Valves

- A. The Contractor shall furnish and install all valves as necessary to fulfill the intent of the Plans and Specifications.
- B. Gate Valves
 - 1. Gate Valves: Gate valves 3"-12" shall be resilient seat, epoxy coated ASTM A126 Class B iron body, non-rising bronze stem with modified wedge disk suitable for a working pressure of 250 psi and shop tested at 400 psi. The valves shall meet or exceed AWWA C509 Standard, latest edition.
 - 2. Acceptable Manufacturer
 - a. US Pipe Metroseal 250
 - b. Mueller® A-2360 Series Resilient Wedge Gate Valve
 - c. or NCC approved equal.
 - 3. The ends of the valves shall correspond in type and dimensions with those of the pipe. All valves shall be arranged to open in counter-clockwise direction and operating nuts shall be 2" square. The valve shall be tested to a pressure of not less than 400 lbs. per square inch.
 - a. Equip valve with a cast iron handwheel for operation.
- C. Sewage Air Release Valves
 - 1. Air release valves shall be installed at high points on the force main.

2. Air release valves shall be of full body design, unless otherwise approved by New Castle County.
3. The body and cover shall be of cast iron conforming to ASTM A126 class B. All internal parts of the air release valve shall be of stainless steel.
4. The air release valve shall be float operated and shall employ a compound lever mechanism to enable the valve to automatically release accumulated air and gases from the pipe while the system is pressurized and operating. The linkage/lever mechanism shall be able to be removed from the valve without disassembly of the mechanism.
5. The air release valve shall close drip tight, incorporating an adjustable orifice button.
6. Valve shall be specified with manufacturer's back flushing kit for backwashing with clear water.
7. Air /vacuum release valves shall be as manufactured by GA Industries, APCO, ARI or New Castle County approved equal.

Line Caps

- A. Ductile iron caps shall be installed as shown on the plans or as directed by the engineer. The caps shall be mechanical joint fittings and be fully protected with adequate thrust blocking. The caps shall conform to all requirements outlined under ANSI/AWWA C110/A21.10 for caps and plugs.
- B. The Contractor is to conduct cutting and capping of pressurized line during the night when usage is lowest. Contractor is to coordinate with the Owner for the cut-in times and location of adjacent valves.

Concrete Thrust Blocks

- A. Class of concrete for thrust blocks shall be DelDOT Class B and shall have a minimum twenty-eight (28) day comprehensive strength of 2,500 lbs. per square inch. All materials shall conform to the applicable provisions of the latest edition of Section 812 of the DelDOT Standard Specifications for Road and Bridge Construction.

Valve Vault

- A. Precast Concrete (shown in NCC Detail SS-FM-5)
 1. Description: ASTM C 478, precast, reinforced concrete, of diameter and depth indicated, with provision for sealant joints.
 2. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
 3. Base Section: 6-inch minimum thickness for floor slab and 5-inch minimum thickness for walls and base riser section; with separate base slab or base section with integral floor.
 4. Riser Sections: 5-inch minimum thickness, of length to provide depth indicated.
 5. Top Section: Flat-slab-top type with New Castle County approved manhole frame and cover (NCC Detail SS-MH-9)bolted to the slab top.
 6. Load Rating: H25 minimum
 7. Steps: New Castle County approved reinforced polypropylene manhole steps. (NCC Detail SS-MH-10)
 8. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
 9. Manufacturer:
 - a. Atlantic Concrete Products
 - b. Gillespie Precast

Warning Tape

- A. Warning tape for sanitary sewer shall be printed polyethylene plastic tape with a metallic core, manufactured specifically for warning and identification of buried utility lines. The tape shall be of a roll type, 2" (50 mm) minimum width, and color coded for sewer (green), with warning and identification imprinted in bold black letters continuously and repeatedly over entire length of tape. The code and letter color shall be permanent and unaffected by moisture and other substances contained in trench backfill materials. Imprinted on the tape shall be "Caution, Buried Sewer Line Below", or a similar message as approved by the Engineer.

Construction Methods (Horizontal Directional Drilling):

Alignment:

- A. The bore path alignment and design for HDD shall be based on the Engineer's plans and other factors. Some of these factors are the pipe bell and barrel diameters, bore path inside diameter and maximum deflection capabilities of the joint. Prior to the start of drilling, reaming and pipe placement operations, the Contractor shall properly locate and identify all existing utilities in proximity to the pipe line alignment. The Contractor shall confirm the alignment of all critical utilities, using vacuum excavation or other suitable excavation method, for further detailed confirmations as necessary.
 - 1. The bore path shall be designed by the drilling contractor to ensure that pipe joints do not deflect more than 50% of manufacturer's recommended maximum deflection.

Jointing Method

- A. The pipe shall be joined with butt, heat fusion joints as outlined in ASTM D2657. All joints shall be made in strict compliance with the manufacturer's recommendations. A factory qualified joining technician as designated by pipe manufacturer or experienced, trained technician shall perform all heat fusion joints in the presence of the Engineer.
- B. Lengths of pipe shall be assembled into suitable installation lengths by the butt-fusion process. Pipe so joined shall be made from the same class and type of raw material made by the same raw material supplier.
- C. On days butt fusions are to be made, the first fusion shall be a trial fusion in the presence of the Engineer or inspector. The following shall apply:
 - 1. Heating plates shall be inspected for cuts and scrapes. The plate temperature shall be measured at various locations to ensure proper heating/melting per manufacturer's recommendations and approval by the Engineer.
 - 2. The fusion or test section shall be cut out after cooling completely for inspection.
 - 3. The test section shall be 12" or 30 times (minimum) the wall thickness in length and 1" or 1.5 times the wall thickness in width (minimum).
 - 4. The joint shall be visually inspected as to continuity of "beads" from the melted material, and for assurance of "cold joint" prevention (i.e. - joint shall have visible molded material between walls of pipe). Joint spacing between the walls of the two ends shall be a minimum of 1/16" to a maximum 3/16".
- D. The polyethylene flange adapters at pipe material transitions shall be backed up by stainless steel flanges conforming to ANSI B16.1 and shaped as necessary to suit the outside dimensions of the pipe. The flange adapter assemblies shall be connected with corrosion resisting bolts and nuts of Type 316 Stainless Steel as specified in ASTM A726 and ASTM A307. All bolts shall be tightened to the manufacturer's specified torques. Bolts shall be tightened alternately and evenly. After installation apply a bitumastic coating to bolts and nuts.

HDPE Piping Installation

- A. HDPE Pipe shall be installed in accordance with the instruction of the manufacturer, as shown on the Plans and as specified herein. A factory qualified joining technician as designated by the pipe manufacturer shall perform all heat fusion joints.
- B. Pipe shall be installed to lines and grade shown on the Plans.
- C. When laying or drilling is not in progress, including lunchtime, the open ends of the pipe shall be closed by fabricated plugs, or by other approved means.
- D. Sections of pipe with cuts, scratches or gouges exceeding 5 percent of the pipe wall thickness shall be removed completely and the ends of the pipeline rejoined.
- E. Mechanical connections of the polyethylene pipe to auxiliary equipment such as piping, valves, pumps and tanks shall be through flanged connections which shall consist of the following:
 - 1. A polyethylene flanged mechanical joint adapter thermally butt-fused to the stub end of the pipe.

2. EBAA Iron Series 1100 Megalug, or approved equal.
 3. Flange connections shall be provided with a full-face nitrile gasket.
- F. All HDPE pipe must be at the temperature of the surrounding soil at the time of backfilling and compaction.
- G. If a defective pipe is discovered after it has been installed, it shall be removed and replaced with a sound pipe in a satisfactory manner at no additional cost. All pipe and fittings shall be thoroughly cleaned before installation, shall be kept clean until they are used in the work and when laid, shall conform to the lines and grades required.

Tracer Wire Installation

- A. The #10 insulated solid wire must be laid directly over the sanitary sewer force main. To insure that it is directly over the main and remains so during backfilling, the Wire must be attached to the pipe at regular intervals.
- B. Wherever a length of Wire stops and another begins, the two ends shall be mechanically joined together by weatherproof Wire nuts.

Horizontal Directional Drilling

- A. DelDOT and New Castle County must be notified five days in advance of starting work. The directional bore shall not begin until an authorized representative is present at the job site and agrees that proper preparations for the operation have been made. Approval for beginning the installation shall in no way relieve the Contractor of the ultimate responsibility for the satisfactory completion of the work as authorized under the Contract. The Plans show existing utilities believed to be near the directional drill alignment. There is no guarantee that these utilities are located as shown or other utilities may not be present. The Contractor is to field locate existing utilities in advance of the work so as not to delay work and avoid conflict or disruption of utility services.
- B. All personnel shall be fully trained in their respective duties as part of the directional drilling crew and in safety. Contractor must show job history and reference list of equal or greater size and length of piping involved. The Supervisor must have at least two years directional drilling experience. A competent and experienced supervisor representing the Drilling Contractor shall be present at all times during the actual drilling operations. A responsible representative who is thoroughly familiar with the equipment and type work to be performed, must be in direct charge and control of the operation at all times.
- C. Work site as indicated on Plans, within right-of-way, shall be graded or filled to provide a level working area. No alterations beyond what is required for operations are to be made. Contractor shall confine all activities to designated work areas. Entire drill path shall be accurately surveyed with entry and exit stakes placed in the appropriate locations within the areas indicated on Plans. If Contractor is using a magnetic guidance system, drill path shall be surveyed for any surface geomagnetic variations or anomalies. Contractor shall adhere to all applicable state, federal and local safety regulations and all operations shall be conducted in a safe manner. Pipe lengths shall be connected together in one length, if space permits. Pipe shall be placed on pipe rollers before pulling into bore hole with rollers spaced close enough to prevent excessive sagging of pipe. Pilot hole shall be drilled on bore path with no deviations greater than 5% of depth over a length of 100'. In the event that pilot does deviate from bore path more than 5% of depth in 100', Contractor shall notify Engineer and Engineer may require Contractor to pull-back and re-drill from the location along bore path before the deviation. Upon successful completion of pilot hole, Contractor shall ream bore hole to a minimum of 25% greater than outside diameter of pipe bell for straight pulls and 50% greater for curved or radius pulls using the appropriate tools. Contractor shall have the option to pre-ream or ream and pull back pipe in one operation if conditions allow. Contractor shall not attempt to ream at one time more than the drilling equipment and mud system are designed to safely handle. After successfully reaming bore hole to the required diameter, Contractor shall pull the pipe through the bore hole. In front of the pipe shall be a swivel. Once pull-back operations have commenced, operations must continue without interruption until pipe is completely pulled into bore hole. During pull-back operations Contractor shall not apply more than the maximum safe pipe pull force at any time. In the event that pipe becomes stuck, Contractor shall notify Engineer. Engineer, Contractor, and/or the maintaining agency shall discuss

options and then work shall proceed accordingly. Excess pipe shall be removed and the bore hole associated with this excess pipe shall be filled with flowable fill or grout unless the area of the excess pipe is excavated and backfilled as part of the tie-in operations. In the event that a drilling fluid fracture, inadvertent returns or returns loss occurs during pilot hole drilling operations, Contractor shall cease operations and shall discuss corrective options with the Engineer and/or maintaining agency, then work shall proceed accordingly.

Record Keeping:

- A. Contractor shall maintain a daily record of the drilling operations and a guidance system log with a copy given to Engineer at completion of boring. As-built drawings shall be certified by the Contractor, for accuracy.

Drilling Systems:

- A. The directional drilling machine shall consist of a hydraulically powered system to rotate, push and pull hollow drill pipe into the ground at variable angles down to 8 degrees above horizontal, while delivering a pressurized fluid mixture to a guidable drill (bore) head. The machine shall have a capacity to adequately complete the drilling and piping installation. The machine shall be anchored to the ground to withstand the pulling, pushing and rotating pressure required to complete the crossing. The hydraulic power system shall be self-contained with sufficient pressure and volume to power drilling operations. Hydraulic system shall be free of leaks. Rig shall have a system to monitor the maximum pull-back pressure during the pull-back operation. The rig shall be grounded during drilling and pull-back operations. There shall be a system to detect electrical current from the drill string and an audible alarm, which automatically sounds when an electrical current is detected. The drill head shall be a steerable type and shall provide the necessary cutting surfaces and drilling fluid jets. Mud motors shall be adequate power to turn the required drilling tools.

Guidance System:

- A. A conventional electromagnetic sound walkover system, Magnetic Guidance System (MGS) probe or proven gyroscopic probe and interface shall be used to provide a continuous and accurate determination of the location of the drill head during the drilling operation. The guidance shall be capable of tracking at the maximum depth required and in any soil condition, including hard rock. It shall enable the driller to guide the drill head by providing immediate information to the tool face, azimuth (horizontal direction), and inclination (vertical direction). The guidance system shall be accurate to $\pm 2\%$ of the vertical depth of the borehole at sensing position at depths up to one hundred feet and accurate within 1.5 meters horizontally. The Guidance System shall be of a proven type and shall be setup and operated by personnel trained and experienced with this system. The Operator shall be aware of any geo-magnetic anomalies and shall consider such influences in the operation of the guidance system if using a magnetic system.

Drilling Fluid (Mud) System:

- A. A self-contained, closed, drilling fluid mixing system shall be of sufficient size to mix and deliver drilling fluid composed of bentonite clay, potable water and appropriate additives. Mixing system shall be able to molecularly shear individual bentonite particles from the dry powder to avoid clumping and ensure thorough mixing. The drilling fluid reservoir tank shall be a minimum of 500 gallons. Mixing system shall continually agitate the drilling fluid during drilling operations. Additives to drilling fluid such as drill soap, polymers, etc. shall be "environmentally safe" and be approved for such usage. No diesel fuel shall be used.

Other Equipment:

- A. Pipe Rollers
 - 1. Pipe rollers shall be of sufficient size to fully support the weight of the pipe while being hydro-tested and during pull-back operations. Sufficient number of rollers shall be used to prevent excess sagging of pipe. Rollers shall be used as necessary to assist in pull back operations and in layout/jointing of piping. Hydraulic or pneumatic pipe rammers may only be used if necessary and with the authorization of Engineer. Other devices or utility placement systems for providing horizontal thrust other than those previously defined in the preceding sections shall not be used

unless approved by the Engineer prior to commencement of the work. Consideration for approval shall be made on an individual basis for each specified location. The proposed device or system shall be evaluated prior to approval or rejection on its potential ability to complete the utility placement satisfactorily without undue stoppage and to maintain line and grade within the tolerances prescribed by the particular conditions of the project.

Field Quality Control

- A. Prior to installation, all Polyethylene shall be thoroughly inspected for compliance with the materials specifications. Each length of Polyethylene shall be thoroughly cleaned, inspected, and examined for defects before it is installed. Any split or defective piece discovered after installation shall be removed and replaced with a sound piece in a satisfactory condition.
- B. The interior and the ends of all Polyethylene shall be kept free from dirt and foreign matter at all times.
- C. All Polyethylene shall be thoroughly cleaned before it is laid and kept clean until it is accepted in the completed work.
- D. At times when installation is not in progress, any open ends of Polyethylene shall be closed off, and at no times shall trench water be permitted to enter the Polyethylene
- E. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
 - 1. Submit separate report for each system inspection.
 - 2. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
 - c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.
 - 3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
 - 4. Re-inspect and repeat procedure until results are satisfactory.
- F. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects in accordance with Section 33 34 00 "Sanitary Utility Sewerage Force Mains."
 - 1. Do not enclose, cover, or put into service before inspection and approval.
 - 2. Test completed piping systems according to requirements of authorities having jurisdiction.
 - 3. Schedule tests and inspections by authorities having jurisdiction with at least 48 hours' advance notice.
 - 4. Submit separate report for each test.
- G. Leaks and loss in test pressure constitute defects that must be repaired.
- H. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

Transition Anchor

- A. Concrete anchor poured around HDPE pipe and wall stop prior to transition coupling into ductile iron pipe.

Surface Restoration

- A. Following drilling operations, the Contractor shall de-mobilize equipment and restore the work-site to original condition. Any noticeable surface defects, due to the drilling operation, shall be repaired by the Contractor.

Construction Methods:

Pipe Installation

- A. Where pipe crossings occur, the lower pipe shall be laid first and all backfill compacted to the level of the higher pipe before the higher pipe is laid. At the discretion of the Engineer, backfill material under such conditions may be earth, broken stone or 2500 lb. concrete.
- B. The extent of excavation shall conform to the dimensions provided in the construction details. If the Contractor exceeds these dimensions, it shall replace the specified pipe with a pipe of greater crushing strength, or install pipe in a higher class bedding, or both, as directed by the Engineer at no increase in cost to the Owner. The extent of excavation open at any time shall not exceed 50 lineal feet per pipe crew.
- C. If, in the opinion of the Engineer, the material at or below the grade to which the excavation would normally be carried is unsuitable for foundation, it shall be removed to such widths and depths as directed and be replaced with coarse aggregate as specified in DelDOT standards.
- D. If the bottom of any excavation is taken beyond the limits indicated on the Plans and details or in accordance with the preceding specifications, it shall be backfilled at the Contractor's expense with compacted granular material or crushed stone to the pipe subgrade designated on the plans. No additional payment will be made for excavation and/or backfill below the grade shown on the plan.
- E. All suitable excavated materials shall be temporarily stored on-site in such a manner as to not interfere with traffic or to cause overloading of the sides of the trench.
- F. If, in the opinion of the Engineer, the material from a portion of the pipe trench is unsuitable for backfill, it shall be removed and disposed of at an off-site location.
- G. All pipe shall be laid on a solid, dry foundation. Pipe shall be laid true to the lines and grades shown on the Contract Plans with the bell ends upstream. Each section of pipe shall rest upon the pipe bed the full length of its barrel and for a minimum of one-half its diameter with recesses excavated to accommodate bells and joints. Any pipe which has its grade or joints disturbed after laying shall be taken up and re-laid at the Contractor's expense. The Contractor shall close the ends of all unconnected pipe with a waterproof stopper. Bedding shall be a minimum of six inches of AASHTO No. 57 stone.
- H. All pipes and joints shall be installed in accordance with the manufacturer's requirements. When the requirements contained in this specification exceed the manufacturer's specifications, the specifications contained herein shall govern.
- I. All pipe shall be joined in strict accordance with the manufacturer's specifications. Voids under joints shall be filled with proper bedding material.
- J. Piping and appurtenances shall be cleaned of foreign matter before being lowered into the trench and shall be kept clean during the laying operations by plugging or other approved means. Cutting of pipe shall be done in a neat and workmanlike manner with an approved type of mechanical cutter without damage to the pipe or lining so as to leave a smooth end at right angle to the axis of the pipe.
- K. The vertical separation at a crossing of sewer and water shall be at least 18" with water on top. Where this is not possible the sewer shall be encased in concrete for a distance of at least 10 feet on either side of the crossing and in conformance with concrete encasement detail.
- L. Joints of piping, couplings, fittings and specials, whether push-on type, flange, or mechanical type, shall be made up in accordance with the manufacturer's printed recommendations.
- M. At areas where ductile iron pipe runs parallel to cathodically protected utility lines on the same side of the road or where ductile iron pipe and utility lines cross, the ductile iron pipe shall be protected by encasing it with polyethylene plastic pipe encasement. The polyethylene shall be applied loosely but continuously around the entire circumference of the pipe to the required limits with joints in plastic made by overlapping a minimum of 1 foot and securing with 2" wide polyethylene adhesive tape. Care shall be taken in the installation and backfilling operation to prevent tearing the plastic and exposing the metal pipe.

- N. All gaskets and mating surfaces shall be thoroughly cleaned and lubricated in accordance with the manufacturer's specifications. The pipe shall be aligned with the previously installed pipe and, with gasket in place, put together. After pipes are put together, the joint shall be inspected to verify that gasket is properly positioned and that the joint has been properly made and is tight.
- O. If, while making the joint, the gasket becomes loose or misplaced, the pipe shall be removed and the joint remade watertight.
- P. Unless otherwise approved by the Engineer, the Contractor shall backfill and compact all trenches at the end of each working day with suitable material from the trench excavation or temporary stockpile.
- Q. All trenches shall be paved with bituminous stabilized based in accordance with these specifications within 24-hours of completion of backfill and compaction, unless approved otherwise by Engineer. Backfill shall be brought to elevations which allow construction of paving specified elsewhere in these specifications.
- R. If, in the opinion of the Engineer, the excavated material is unsuitable, and material from temporary stockpile material is unavailable, select off-site material shall be provided as approved by DeIDOT.
- S. Upon completion of construction, all dirt and other foreign material shall be removed from pipelines and their appurtenances.
- T. Existing storm drains in roadways which are disturbed during construction shall be repaired. A brick collar shall be built around the joint and floated with a cement layer.

Laying and Jointing - General

- A. All pieces shall be carefully examined for defects, and no piece known to be defective shall be laid. Any defective piece discovered after laying, shall be removed and replaced in a satisfactory manner, regardless of any prior approvals.
- B. All pipe and castings shall be thoroughly cleaned before being lowered into the trench, or before jointing. The exposed ends of all uncompleted lines shall be closed with tight wooden plugs adequately set and thoroughly secured. Pipe shall be laid in a manner to assure that valve stems and boxes will be set plumb.
- C. Special care shall be exercised at the outside face of structures and manholes to support piping bridging the excavation for such structures or manholes. The pipe shall be supported by compacted gravel bedding or Class D concrete or Class C concrete piers as directed by the Engineer. The cost for these supports shall be deemed included in the lump sum and/or unit price bid for the work.
- D. Where required for proper location of laterals, valve fittings, or other castings, or for any other purpose or where ordered, pipe or fittings shall be cut with approved pipe cutter. Cutting shall be carefully done by experienced men, in such a manner as to leave a smooth end normal to the axis of the pipe.
- E. Concrete thrust blocks shall be provided on all pressure buried pipelines, all tees, bends, dead-ends, and where required by the Engineer. Thrust block placement and size shall be as indicated on the detail "Thrust Blocks Table." Class of concrete for thrust blocks shall be as shown on the detail in plans and shall have a minimum 28-day compressive strength of 4,000 lbs. per square inch. All materials shall conform to the applicable provisions of the latest edition of Section 812 of the DeIDOT Standard Specifications for Road and Bridge Construction.

Inspection and Rejection of Pipe

- A. The quality of all materials, the process of manufacture, and the finished pipe shall be subject to inspection and approval of the Engineer. Such inspection may be made at the place of manufacture or on the work site after delivery, or at both places, and the pipe shall be subject to rejection at any time on account of failure to meet any of the specification requirements even though sample pipes may have been accepted as satisfactory at the place of manufacture.

- B. The Contractor shall submit to the Engineer, for its approval, material certificates from this manufacturer indicating that the pipe and fittings meet the specifications set forth herein.
- C. Any pipe or fitting found to be damaged after delivery will be rejected and, if such pipe has already been laid in the conduit line, it shall be repaired in a manner acceptable to the Engineer or, at the Engineer's option, removed and replaced and made good solely at the Contractor's expense. The ends of the pipe shall be free of dents and gouges which will affect the tightness of the joint. ASTM and ANSI/AWWA specifications require rejection of any pipes or fittings containing cracks, holes, foreign inclusions, or other injurious defects.

Testing

- A. General: The Contractor shall provide all labor, materials, equipment, gauges, air, water, caps, plugs, taps, temporary bracing, and all else necessary to pressure test all piping systems installed under this Contract. Temporary bracing shall be dismantled and removed upon completion of the pressure test by the Contractor.
- B. The Contractor shall provide for hydraulic pressure test of the force main to be observed by the Owner as follows:
 - 1. Hydraulic pressure testing shall conform to AWWA Standard C-600.
 - 2. A hydrostatic test pressure shall be maintained in the pipeline for a minimum period of two (2) hours. At the end of the test period, if the test pressure has remained constant, the pipeline shall have passed the test. If the pipe does not hold pressure, the Contractor shall locate the leak, permanently repair the section of piping where the leak is occurring to the satisfaction of the Engineer, and retest the pipe line as specified above. This process shall be repeated until the pipeline has successfully passed the pressure test.
 - 3. Contractor shall make certain that all air is expelled from a pipe line before it is tested. All caps, plugs, and fittings shall be adequately braced and anchored to withstand the test pressures.
 - 4. Hydrostatic test pressure shall be 150 psi or 1.5 times the working pressure measured at the highest elevation in the pipeline under test, whichever is greater.
 - 5. The leakage test may be performed concurrently with the pressure test. If no pressure drop is seen during pressure test, the leakage test may be waived by the engineer.
 - 6. If leakage is encountered during the hydrostatic test, the Contractor shall begin this leakage test which shall be accomplished by increasing the hydrostatic pressure to a specified value and maintaining of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain the specified leakage test pressure after the air in the pipeline has been expelled.
 - 7. The hydrostatic pressure for the leakage test shall be 150 psi.
 - 8. Flanged, victaulic, and welded pipe lines shall no leakage at the test pressure. The leakage for mechanical joint, and push-on joint pipe lines shall not exceed the allowable leakage computed by the following formula:

$$L = \frac{N D (P)^{1/2}}{7400}$$

where:

L is the allowable leakage in gallons per hour.

N is the number of joints in the length of the pipeline being tested.

D is the nominal diameter of the pipe in inches.

P is the average test pressure during the leakage test in pounds per square inch gauge.

Excavation and Backfill

The excavation and backfill for the pipe shall be performed in accordance with the applicable requirements including backfill requirements of Section 612 of the Delaware Standard Specifications, unless otherwise modified on the Plans, or in conflict with the requirements of the New Castle County. If there is a conflict between the Delaware Standard Specifications (including these Special Provisions) and the Specifications of New Castle County, the latter will prevail.

Emergency Repairs to Damaged Utilities

Known or Field Located Utilities - In the event that the Contractor or his Subcontractor during the execution of the work breaks any known or field located pressure or gravity main causing the disruption of service and/or an eminent hazard, it shall be the responsibility of the Contractor/Subcontractor to immediately notify New Castle County at the designated emergency telephone number and immediately undertake measure to repair the damaged utility. To that effect the Contractor/Subcontractor shall ascertain prior to initiating the work that the necessary repair parts, tools, equipment, and labor are on ready and available onsite to complete the repair work without delays. New Castle County personnel shall witness the repair work.

If the Contractor/Subcontractor estimates or determines that he is not going to be able to restore service within a less than two-hour period, the Contractor shall immediately contact the New Castle County to initiate repair.

The New Castle County will undertake the repair work and will back charge the Contractor. The New Castle County will submit an itemized bill within 30 calendar days from the occurrence of the event. Unknown or Inaccurately Located Utilities - If the utility was not field located or it was inaccurately located in accordance with the prescribed procedures under the Miss Utility One-Call guidelines and the Contractor/Subcontractor cause a line break during the execution of the work, the same notification procedure as above must be followed. The Utility PCU Operations will undertake the repair work at no cost to the Contractor.

Basis of Payment:

Price and payment for the Sanitary Sewer System shall be included as part of the lump sum bid price for Item 753516 which shall constitute full compensation for furnishing and installing sanitary sewer pipes; bends, wyes, clean-outs, warning tape, tracer wire, valves and related fittings, concrete thrust blocks and connection to the existing pipes. Backfill and the decommission (abandonment) of the existing pipe is incidental to the cost of the items.

A breakout sheet attached to the Proposal lists the different elements of work or materials involved in completing this item. The Contractor shall fill in a unit price to install each item and the cost (unit price times the proposed quantity). The Lump Sum cost for Item 753516, shall be derived from the total sum of the cost of all items listed.

The Owner reserves the right to delete from the Contract one or more items listed and the right to add or subtract from the quantity of each item. The total price to be paid will be adjusted in accordance with the Contractor's unit prices as required above. There will be no extra compensation or increase in unit prices in the breakout sheet if such additions and/or deletions are made to the quantities.

11/13/14

760507 - PROFILE MILLING, BITUMINOUS CONCRETE
760508 - PROFILE MILLING, CONCRETE

Description:

This work consists of furnishing a pavement-milling machine or cold planer and planing the existing bituminous concrete pavement or P.C.C. Pavement at the locations and to the nominal depths shown on the Plans and/or as directed by the Engineer to obtain a smooth profile on the existing roadway surface. Unless otherwise noted on the Plans or specifications the Contractor shall reuse, salvage and/or dispose of the milled material.

Equipment:

The milling equipment shall be a commercially designed and manufactured milling machine capable of performing the work in a manner satisfactory to the Engineer. The machine shall be power-operated and self-propelled, shall have sufficient power, traction and stability to remove a thickness of material to a specified depth. In addition, the machine must accurately and automatically establish profile grades by referencing the existing pavement surface. This shall be accomplished by means of 1.) a ski of 30 (9 m) minimum length with an accuracy of ± 0.125 in 30 (3 mm in 9 m) or 2.) a minimum of three (3) ultra sonic, non-ground contacting sensors with an accuracy of ± 0.100 in 25 (2.5 mm in 7.5 m). If noted on the Plans, a profile grade shall be established independent of the existing pavement surface. In such case the machine shall be capable of following the independent grade line (e.g. string line). The machine shall have an automatic system for controlling grade elevation and cross slope. The machine shall also be equipped with a means to effectively control dust generated by the cutting operation.

Construction Methods:

The surface resulting from the planing operation shall be in accordance with notes and details on the Plans and shall be characterized by uniform, discontinuous longitudinal striations and shall not be gouged or torn. Imperfections exceeding 5/16" (8 mm) at any point along the surface as a result of missing teeth or faulty operation shall be removed by approved methods. Before opening the milled surface to traffic, all loose material shall be removed from the surface with a power vacuum sweeper.

Whenever the milling operation causes water to pond or lay within the wheelpaths of the roadway the Contractor shall alleviate this problem by cutting bleeders into the shoulder or median to provide positive drainage. Cost for such work will be incidental to this item.

If the road is to remain open to traffic, longitudinal vertical drop-offs in excess of 2" (50 mm) at lane lines or at the centerline shall not be left overnight. Transverse faces at the beginning and end of the milling operation existing at the end of a work period shall be tapered 20:1 or flatter in a manner approved by the Engineer to avoid a hazard for traffic.

Surface material that cannot be removed by cold planing equipment because of physical or geometrical restraints shall be removed by other methods acceptable to the Engineer.

If independent grade reference is required, it shall be designated in the Plans and/or Contract documents and elevations shall be provided by the Plans or at the direction of the Engineer.

If a severe bump exist in the pavement surface extra effort shall be taken at these locations to improve the profile. Manual changes to the cutter head may be needed at these locations to achieve this. It is the intent to remove bumps and irregularities in the pavement and produce a smooth milled surface for hot-mix resurfacing.

If the existing bituminous surface is over concrete the intent is to remove all of the existing bituminous material to the top of the concrete surface unless otherwise directed by the Plans or the Engineer.

If milling to remove open graded hot mix, the milling operation must remove all of the open graded hot mix from the roadway surface.

Method of Measurement:

The quantity of pavement milling will be measured as the number of square yards per inch (square meters per 25 mm) of depth as shown on the Plans or established by the Engineer. The nominal depth shown on the Plans and initially set on the milling machine, even though it will vary automatically during profiling, will be the depth measured and paid.

Basis of Payment:

The quantity of pavement milling will be paid for at the Contract unit price per square yard per inch (square meter per 25 mm) of depth. Price and payment will constitute full compensation for furnishing an accepted pavement-milling machine and operator, for removal and disposal of the milled material or delivery to a designated site, for transporting equipment, for all labor, tools equipment and incidentals necessary to complete the item.

10/25/13

763501 - CONSTRUCTION ENGINEERING

Description:

This work consists of construction lay out including; stakes, lines and grades as specified below. Subsection 105.10 Construction Stakes, Lines and Grades of the Standard Specifications is voided.

Based on contract plans and information provided by the Engineer, the Contractor shall stake out right-of-way and easements lines, limits of construction and wetlands, slopes, profile grades, drainage system, centerline or offset lines, benchmarks, structure working points and any additional points to complete the project.

The Engineer will only establish the following:

- (a) Original and final cross-sections for borrow pits.
- (b) Final cross-sections for all excavation items.
- (c) Line and grade for extra work added on to the project plans.

Equipment:

The Contractor shall use adequate equipment/instruments in a good working order. He/she shall provide written certification that the equipment/instrument has been calibrated and is within manufacturer's tolerance. The certification shall be dated a maximum of 9 months before the start of construction. The Contractor shall renew the certification a minimum of every 9 months. The equipment/instrument shall have a minimum measuring accuracy of [3mm+2ppmxD] and an angle accuracy of up to 2.0 arc seconds or 0.6 milligons. If the Contractor chooses to use GPS technology in construction stakeout, the Contractor shall provide the Engineer with a GPS rover for the duration of the contract. The GPS rover shall be in good working condition and of similar make and model used by the Contractor. The Contractor shall provide up to 8 hours of formal training on the Contractor's GPS system to a maximum of four Engineer's appointees. At the end of the contract, the Engineer will return the GPS rover to the Contractor. If any of the equipment/instruments are found to be out of adjustment or inadequate to perform its function, such instrument or equipment shall be immediately replaced by the Contractor to the satisfaction of the Engineer. The Contractor may utilize GPS equipment to perform the excavation and embankment for the project as indicated on the plans. Use of this procedure and equipment is intended for grading the subgrade surface only; it is not intended for use in constructing final surface grades. GPS technology and machine control technology shall not be used in the construction of bridge or structures such as, but not limited to, curb, drainage inlets, manholes, junction boxes, pole bases and pipe inverts.

Engineering/Survey Staff:

The Contractor shall provide and have available for the project an adequate engineering staff that is competent and experienced to set lines and grades needed to construct the project. The engineering personnel required to perform the work outlined herein shall have experience and ability compatible with the magnitude and scope of the project. Additionally, the Contractor shall employ an engineer or surveyor licensed in the State of Delaware to be responsible for the quality and accuracy of the work done by the engineering staff. When individuals or firms other than the Contractor perform any professional services under this item, that work shall not be subject to the subcontracting requirements of Subsection 108.01 of the Standard Specifications. The Contractor shall assume full responsibility for any errors and/or omissions in the work of the engineering staff described herein. If construction errors are caused due to erroneous work done under Construction Engineering the Contractor accepts full responsibility, no matter when the error is discovered. Consideration will not be given for any extension of contract time or additional compensation due to delays, corrective work, or additional work that may result from faulty and erroneous construction stakeout, surveying, and engineering required by this specification.

Construction Methods:

Performance Requirements:

- (a) Construction Engineering shall include establishing the survey points and survey centerlines; finding, referencing, offsetting the project control points; running a horizontal and vertical circuit to check the accuracy of given control points. Establishing plan coordinates and

elevations marks for culverts, slopes, subbase, subsurface drains, paving, subgrade, retaining walls, and any other stakes required for control lines and grades; and setting vertical control elevations, such as footings, caps, bridge seats and deck screed. The Contractor shall be responsible for the preservation of the Department's project control points and benchmarks. The Contractor shall establish and preserve any temporary control points (traverse points or benchmarks) needed for construction. Any project control points (traverse points) or benchmarks conflicting with construction of the project shall be relocated by the Contractor. The Contractor as directed by the Engineer must replace any or all stakes that are destroyed at any time during the life of the contract. The Contractor shall re-establish centerline points and stationing prior to final cross-sections by the Engineer. The Vertical Control error of closure shall not exceed 0.05 ft times [Square root of number of miles in the level run] (0.01 m times [square root of number of kilometers]). The Horizontal Control accuracy ratio shall not exceed an error of closure of 1 foot per 20,000 feet (1 meter per 20,000 meters or 1:20,000) of distance traversed prior to adjustment.

- (b) The Contractor shall perform construction centerline layout of all roadways, ramps and connections, etc. from project control points set by the Engineer. The Contractor using the profiles and typical sections provided in the plans shall calculate proposed grades at the edge of pavement or verify information shown on Grades and Geometric sheets.
- (c) The Contractor shall advise the Engineer of any horizontal or vertical alignment revisions needed to establish smooth transitions to existing facilities. The Contractor shall immediately bring to the attention of the Engineer any potential drainage problem within the project limits. The Engineer must approve any proposed variation in profile, width or cross slope.
- (d) The Contractor shall establish the working points, centerlines of bearings on bridge abutments and on piers, mark the location of anchor bolts to be installed, check the elevation of bearing surfaces after they are ground and set anchor bolts at their exact elevation and alignment as per Contract Plans. Before completion of the fabrication of beams for bridge superstructures, the Contractor shall verify by accurate field measurements the locations both vertically and horizontally of all bearings and shall assume full responsibility for fabricated beams fitting and bearing as constructed. After beam erection and concurrently with the Department project surveyors, the Contractor shall survey top of beam elevations at a maximum of 10-ft (3.0-meter) stations and compute screed grades. These shall be submitted to the Engineer for review and approval before the stay in place forms are set. Construction stakes and other reference control marks shall be set at sufficiently frequent intervals to assure that all components of the structure are constructed in accordance with the lines and grades shown on the plans. The Contractor will be responsible for all structure alignment control, grade control and all necessary calculations to establish and set these controls.
- (e) The Contractor, using contract plans, shall investigate proposed construction for possible conflicts with existing and proposed utilities. The Contractor shall then report such conflicts to the Engineer for resolution. All stakes for advanced utility relocation, which will be performed by others, shall be paid for under item 763597 – Utility Construction Engineering.
- (f) The Contractor shall be responsible for the staking of all sidewalk and curb ramp grades in accordance with the plans and the Departments Standard Construction Details. The Contractor shall review the stakeout with the Engineer prior to construction. The Engineer must approve any deviation from plans, Department Standard Construction Details and Specifications in writing. The Contractor shall be responsible for any corrective actions resulting from problems created by adjustments if they fail to obtain such approval.
- (g) If wetland areas are involved and specifically defined on the Plans the following shall apply:
 - i. It is the intent of these provisions to alert the Contractor, that he/she shall not damage or destroy wetland areas, which exist beyond the construction limits. These provisions will be strictly enforced and the Contractor shall advise his/her personnel and those of any Subcontractor of the importance of these provisions.
 - ii. All clearing operations and delineation of wetlands areas shall be performed in accordance with these Special Provisions. Before any clearing operation commences the Contractor shall

demarcate wetlands at the Limits of Construction throughout the entire project as shown on the Plans labeled as Limits of Construction or Wetland Delineation to the satisfaction of the Engineer.

- iii. The material to be used for flagging the limits of construction shall be orange vinyl material with the wording "Wetland Boundary" printed thereon. In wooded areas, the flagging shall be tied on the trees, at approximate 20-foot (6.1 meter) intervals through wetland areas. In open field and yard areas that have been identified as wetlands, 3 foot (one meter) wooden grade stakes shall be driven into the ground at approximate 20 foot (6.1 meter) intervals and tied with the flagging.
- iv. If the flagging has been destroyed and the Engineer determines that its use is still required, the Contractor shall reflag the area at no cost to the Department. If the Contractor, after notification by the Engineer that replacement flagging is needed, does not replace the destroyed flagging within 48 hours, the Engineer may proceed to have the area reflagged. The cost of the reflagging by the Engineer will be charged to the Contractor and deducted from any monies due under the Contract.
- v. At the completion of construction, the Contractor shall remove all stakes and flagging.
- vi. The Contractor shall be responsible for any damages to wetlands located beyond the construction limits, which occurs from his/her operations during the life of the Contract. The Contractor shall restore all temporarily disturbed wetland areas to their preconstruction conditions. This includes restoring bank elevations, streambed and wetland surface contours and wetlands vegetation disturbed or destroyed. The expense for this restoration shall be borne solely by the Contractor.

Submittals:

All computations necessary to establish the exact position of all work from the control points shall be made and preserved by the Contractor. All computations, survey notes and other records necessary to accomplish the work shall be made available to the Department in a neat and organized manner at anytime as directed by the Engineer. The Engineer may check all or any portion of the stakeout survey work or notes made by the Contractor and any necessary correction to the work shall be made as soon as possible. The Contractor shall furnish the Engineer with such assistance as may be required for checking all lines, grades, and measurements established by the Contractor and necessary for the execution of the work. Such checking by the Engineer shall not relieve the Contractor of his/her responsibility for the accuracy or completeness of the work.

The Contractor shall submit any of the following at the Engineer's request:

- (a) Proposed method of recording information in field books to ensure clarity and adequacy.
- (b) A printout of horizontal control verification, as well as coordinates, differences and error of closure for all reestablished or temporary Control Points.
- (c) A printout of vertical control verification, with benchmark location elevation and differences from plan elevation.
- (d) Sketch of location of newly referenced horizontal control, with text printout of coordinates, method of reference and field notes associated with referencing control.
- (e) Description of newly established benchmarks with location, elevation and closed loop survey field notes.
- (f) All updated electronic and manuscript survey records.
- (g) Stakeout plan for each structure and culvert.
- (h) Computations for buildups over beams, screed grades and overhang form elevations.

- (i) A report showing differences between supplied baseline coordinates and field obtained coordinates, including a list of preliminary input data.
- (j) Any proposed plan alteration to rectify a construction stakeout error, including design calculations, narrative and sealed drawings.
- (k) Baseline for each borrow pit location.
- (l) Detailed sketch of proposed overhead ground mounted signs or signals showing obstructions that may interfere with their installation.
- (m) Copies of cut sheets.

Method of Measurement:

The quantity of Construction Engineering will not be measured.

Basis of Payment:

Payment will be made at the Lump Sum price bid for the item "Construction Engineering". The price bid shall include the cost of furnishing all labor, equipment, instruments, stakes and other material necessary to satisfactorily complete the work as herein described under this item for all roads and structures that are a part of the contract. Adjustment in payment will be made for the deletion or addition of work not shown in the contract documents.

Monthly payment will be made under this item in proportion to the amount of work done as determined by the Engineer.

6/11/2012

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

Description:

Plan, schedule and construct the Project by using a Critical Path Method Project Schedule (CPM) meeting the requirements of these specifications. Use the CPM for coordinating and monitoring the Work specified in the Contract Documents including all activities of Subcontractors, vendors, suppliers, utilities, railroads, the Department, and all other parties associated with the construction of the Contract. Include all Work in the CPM; including but not limited to submittals, major procurement, delivery, and construction activities. Include all activities, including bid items, quantified in the Contract Documents. Base the CPM upon the entirety of the Contract Documents. Utilize CPM software that generates files compatible with Primavera P6 Project Management Release: 7.0.0.

Scheduling Representative:

Designate a scheduling representative prior to submission of the Original Critical Path Method Project Schedule (OCPM). The scheduling representative is the person primarily responsible for development and maintenance of the CPM schedule; the Contractor's representative in all matters regarding the schedule; and the Contractor's designated attendee for all schedule related meetings. The scheduling representative shall also be knowledgeable of the status of all parts of the Work throughout the duration of the Project. Replacement of the scheduling representative will require written approval from the Engineer.

Submit the qualifications of the scheduling representative to the Engineer for approval. This approval is required before the OCPM will be accepted. The scheduling representative shall have at least three years of verifiable experience for preparing and maintaining CPM project schedules on Contracts of similar size and complexity.

Critical Path, Project Completion Date, and Float:

The critical path is defined as the series of activities in a CPM that has the longest path in time. The submitted activity sequence and durations must generate a CPM with only one critical path. Divide Project wide activities such as Maintenance of Traffic, Construction Engineering, or Temporary Erosion Control that, by their nature, generate long durations and complement other activities into "establish" and "conclude" activities to prevent this type of Work from occupying a significant portion of the critical path.

The project start date, or initial data date, of the original CPM shall be the first chargeable day of Work. Nonproductive Work and administrative activities may begin and/or end prior to the project start date. The Original CPM must use all of the Contract Time and contain a critical path containing exactly zero float. Early completion schedules are not permitted. The schedule ending date of the Original CPM that uses all of the Project Time is the contract completion date.

Total Float is the difference between the schedule's finish date and the contract completion date. Free float is the difference in time between an activity's early finish and late finish. Free float is a shared commodity for the use of the Department and the Contractor and is not for the exclusive use or benefit of either party. Both parties have the full use of free float until depleted.

Submittal of the OCPM; the Start of Work and the Schedule of Record:

Complete and submit the proposed original CPM schedule (OCPM) database and the written narrative (WN) within 30 calendar days after Contract is Awarded. The WN is a description of any elements of the Schedule that deviate from the proposed construction sequence shown in the Contract Documents. Submit the OCPM in CPM format fully compatible with Primavera P6 Project Management Release: 7.0.0 by email or CD ROM as a single compressed database in CPM format.

The Engineer will complete the review of the OCPM within 30 calendar days after submittal. If required, a Joint Review Conference will be convened at which time the Engineer and Contractor may make corrections and adjustments to the proposed OCPM. If a revision is necessary due to the Engineer's review or

the Joint Review Conference, submit the proposed revision within seven calendar days after receiving the Engineer's review comments or within seven calendar days after the date of the Joint Review Conference, whichever is the latest. Make revisions in accordance with the requirements for the OCPM. The Engineer will respond to the revised OCPM within seven calendar days after receipt. Clearly identify each submittal and resubmittal for clarity by labeling "2nd Draft", "3rd Draft", etc.

Do not start any Work until the OCPM is accepted. If the Engineer is ready to issue a Notice to Proceed but the OCPM is not yet accepted, the Engineer may issue the NTP and start Contract Time, but forbid Work to begin until the OCPM is accepted. The Engineer may partially accept a OCPM and allow Work to begin if the required corrections to the OCPM are minor, but the Engineer will not accept submittals that do not show the complete schedule. The Engineer will not pay any estimates until the OCPM is partially accepted. Once the OCPM is partially accepted, the Engineer will pay the first estimate. If the Contractor fails to make a good faith effort to address the Engineer's comments before the second estimate is due for payment, the Engineer will not pay the second estimate until a good faith effort is made by the Contractor to comply. The Engineer may not withhold an estimate payment if, within the estimate period in question, the Engineer has failed to provide timely review comments in response to the Contractor's submittal. The Engineer may, however, withhold the payment of subsequent estimates if the Contractor fails to make a good faith effort to address the Engineer's comments. Upon issuance of the Notice to Proceed, the start date utilized in the OCPM will be adjusted to comply with the first chargeable day of Work. Any delay in starting Work caused by the acceptance of the OCPM by the Engineer will not be considered as a basis for any adjustment in the Contract amount or time. For Contracts that have fast-tracked starts, the Engineer and the Contractor may agree to alter the response times and approval dates listed above.

Upon notification that the OCPM has been accepted, the corrected copy will become the CPM of record. The CPM of record shall be the Contractor's work plan for completing the entire Contract as specified in the Contract Documents.

Requirements for the OCPM:

The format of the OCPM database shall be the precedence diagram method with days as the planning unit and shall be based on Calendar Days. Use the Department's partially predetermined coding structure (CS) that is furnished by the Engineer.

Activity Sequencing. Activity sequence must be logical and representative of the Contractor's order of the Work. Successors and predecessors determine the schedule logic or activity sequence. A given activity cannot start until all of the given activity's predecessors have been completed. Use only finish to start dependency relationships (links); do not use lag times without approval from the Engineer. The Engineer may request that the Contractor resequence the activities to reflect realistic job logic. When scheduling using multiple resources, each resource unit shall have a corresponding activity. Durations of activities include all the time necessary to complete the activity including, but not limited to, Contractor's non-work periods (other than those shown on the calendars), reasonably foreseeable inclement weather, weekends and holidays. Base schedule calculations on retained logic, contiguous durations, and total float as finish float.

Activity Resources. Sequence activities to reflect resource apportionment. Logically connect and code each activity to reflect the crew (resource) performing the operation. Submit a summary list of crews, their crew codes, and their operation(s) with each schedule submission, unless unchanged. Identify responsibility for each activity. Identify Subcontractors, DBE's, utilities and Work performed by others that affects the Schedule.

Breakdown and Durations of Activities. An individual activity is required for each construction element or each activity not under the control of the Contractor that affects the sequence or progress of the Work. The Engineer reserves the right to require additional breakdown of the Work activities at any time. Each activity must be identified by a name, symbol and coding, and shall have a duration, sequence, responsibility and resource(s). Choose activity names that are descriptive and identify single construction elements. Activity symbols, or ID's, shall be unique and systematic.

Activity types must be either "task", "start milestone", or "finish milestone". Do not use "hammock" type activities. Date constraints, float and duration constraints, and/or flags for activities are not permitted.

Assign a reasonable duration to each activity representative of its scope. Durations may not exceed 14 calendar days unless approved by the Engineer. Determine the duration of each activity by using productivity rates based on Calendar Days.

Include the preparation and approval of Working Drawings as activities. Include phasing (staging) milestones as activities. Correlate phasing milestones with the sequence of construction provided in the Contract Documents. Use a separate start and finish milestone activity to delineate each phase (stage).

Utility Work. Include all Work performed by utilities on the Project as activities in the OCPM. Include each utility item of Work shown in the Contract's Utility Statement as an activity. Durations for utility activities shall be the same as the durations shown in the Utility statement for each activity unless otherwise approved by the Engineer.

Calendars. Assign a calendar to each activity in the schedule. Use a minimum of 6 calendars, when applicable: (1) Full Schedule; (2) Permit Requirements; (3) Winter Condition; (4) Concrete Work; (5) Asphalt Paving Work; and (6) Nighttime Asphalt Paving Work. Use additional calendars if needed. Calendar non-work periods shall reflect the average Delaware weather history for the jobsite and the restrictions identified in the Contract Documents. The Contractor may choose perform Work during an activity's calendar non-work period at no additional cost to the Department if weather conditions are favorable for such Work and the Work does not violate a set forth in the Contract Documents. The maximum allowable non-work period for each calendar is set forth below. The Contractor may choose to shorten non-work periods at his/her discretion.

CALENDAR	MAXIMUM NON-WORK PERIOD
Full Schedule	None
Winter Condition	December 1 through March 15
Concrete Work	December 1 through March 15
Asphalt Paving	November 15 through March 15
Nighttime Asphalt Paving	October 15 through April 30

Written Narrative (WN). Provide a written narrative (WN) as part of the OCPM explaining the following:

- (a) Relationships between activities not obviously identified
- (b) Equipment usage and limitations.
- (c) Manpower usage and limitations.
- (d) Use of additional shifts and overtime.
- (e) Activity codes, abbreviations, and activity identification system.
- (f) All calendars utilized in the CPM and the basis of determining each non-work period
- (g) All abbreviations.
- (h) Use of calendars.
- (i) Any other conditions that affect the schedule and are not readily discernible in the database.

CPM Updates:

Provide monthly updates to the CPM of record. Meet with the Engineer once a month prior to submitting the update to review the status of the schedule's activities. Prepare an updated list of activities showing all of the actual start and actual finish for each of the schedule's activities so that both parties can agree on the dates. Use the dates that were agreed upon in the meeting to status the CPM of record and submit the updated schedule to the Engineer for approval. Assign a unique file name to each update (Number/version). The data date of the update shall be the next day after the end of the update period. As part of the monthly update, submit a written description that identifies any delays or disruptions to the schedule experienced during the period of an update, any change in manpower or equipment, and any potential delays to the completion date of the schedule.

Do not include any revisions to the CPM without prior approval. Failure to submit complete updates in a timely manner may result in the withholding of estimates by the Engineer. The Engineer agrees to refrain from withholding estimates unless the Contractor is habitually late in providing updates, is more than four weeks late in submitting an update or has failed to submit an update that is part of a resolution to a serious problem that must be addressed immediately.

Revisions to the Schedule of Record:

Revisions are defined as any changes to the database other than status updates, log entries and moving the data date. Discuss any proposed revisions to the CPM verbally with the Engineer. If the revision is minor

in nature, the Engineer may allow the revision to be included on the next Update of the CPM. If the Engineer determines that the revision is not minor in nature, submit the proposed revision for review and approval prior to deviating from the approved CPM. When a revision to the CPM is required due to changes in the Contract initiated by the Engineer, immediately contact the Engineer to discuss the changes. The Engineer may allow a deviation from the approved CPM for specific mitigating activities.

The Engineer may direct the Contractor to revise the schedule of record at the Contractor's expense if: the critical path has less than minus ten (-10) Calendar Days of total float due to the Contractor's failure to perform the Work in accordance with the schedule; the Contractor requests to re-sequence the Work; and/or the Contractor has performed a significant amount of Work out of sequence. The Engineer may direct the Contractor to revise the schedule for any other reason; and such a revision will be paid at the unit cost for a CPM Revision.

The Engineer will review and respond to the proposed revision within 7 Calendar Days after receipt. Resubmit, if required, within seven calendar days after receipt of the Engineer's review comments. The Engineer reserves the right to reject any proposed revision that adversely impacts the Department, utilities, or other concerned parties.

Extensions of Contract Time and/or Incentive/Disincentive Dates.

Make requests for extension of Contract time in writing and subject to the notice and timeliness of submission provisions as provided for elsewhere in the Contract. Requests for an extension of Contract time or change in an incentive/disincentive date will be evaluated by the Engineer's analysis of the CPM of record and any proposed revision submitted. Include in the request a written narrative of the events that impacted the schedule and a detailed explanation of why the Contractor cannot meet the requirements of the schedule of record. Only delays to activities that affect the Contract completion date or will be considered for an extension of Contract time. Only delays to activities that affect the completion duration of an incentive/disincentive period will be considered for an extension of an incentive/disincentive completion date. The extension of the specified Contract completion date or incentive/disincentive date will be based upon the number of Calendar Days the Contract completion date or incentive/disincentive date is impacted as determined by the Engineer's analysis. The Engineer and Contractor may agree to defer the analysis of a potential impact to the schedule until the completion of the activities that are affected. Such a deferment does not relieve the Contractor of his/her duty to identify potential impacts to the schedule in the applicable schedule updates.

All requests for extensions of Contract Time must be supported by the most recent CPM Update. If, within a reasonable period of time, the Contractor fails to make a good faith effort to produce an acceptable CPM update and uses an unacceptable CPM update to support a request for a time extension, the Contractor loses the right to receive that time extension; and/or the right to receive compensation for that delay caused in whole or in part by the Engineer.

Final As Built Schedule.

Submit a final CPM Schedule database within 14 Calendar Days of Substantial Completion. Failure to submit a final CPM Schedule may result in the withholding of estimates by the Engineer.

Method of Measurement:

The Project Control System will be measured in two items. The item, "Project Control System Development Plan" will be lump sum. The item "CPM Schedule Updates and/or Revised Updates" will be measured one each per update that is submitted and accepted.

Basis of Payment:

The item, "763508 – Project Control System Development Plan" will be paid at the Contract's lump sum bid price on the next monthly estimate after completion of the requirements of the Project Control System Development Plan, which includes the approval of the Original CPM Schedule. Price and payment will constitute full compensation for preparing the CPM database, acquiring the necessary software, attending all scheduling meetings with the Department, submitting and resubmitting all documents and for all labor, tools, equipment and incidentals necessary to complete the Work.

The item, "763509 – CPM Schedule Updates and/or Revised Updates" will be paid at the Contract unit price per each approved CPM schedule update as described above. Price and payment will constitute full compensation for preparing, submitting and resubmitting all CPM updates, for attendance at all scheduling meetings with the Department, for preparing and reviewing a list of actual start and actual finish dates with the Engineer, and for all labor, tools, Equipment and incidentals necessary to complete the Work.

3/28/14

763533 - SUMP PUMP CONNECTIONS

Description:

This work consists of locating existing sump drains, stakeout of proposed sump pump drain and connection locations, confirmation of outfall location with Engineer prior to construction, coordination with homeowners and furnishing all materials, labor, tools, equipment, hauling, excavation and backfilling, grading and incidentals necessary to complete the work in accordance with the notes on the Plans, these specifications and as directed by the Engineer.

Materials:

PVC, Sch 40 pipe in accordance with ASTM D1785, ASTM D2665, ASTM D2564, ASTM D2321 and ASTM F1668.

Construction Methods:

The Contractor shall notify the Engineer and Mark Harbeson (mark.harbeson@state.de.us) as soon as an existing sump drain is located. The Contractor shall note the size of the existing PVC drain and notify the Engineer accordingly prior to any further excavation in the area.

The Contractor shall identify, stakeout or paint, the proposed outfall location in DelDOT's preference of outfall alternatives prior to construction for approval by the Engineer; (1) proposed ditch in front of property, (2) proposed drainage inlet in front of property, (3) proposed pipe, if no proposed ditch or proposed drainage inlet in front of property or (4) terminate at State right-of-way line in proposed curb and gutter condition with no enclosed drainage or ditch in front of property.

Contractor shall determine elevation of existing sump drain and ensure positive flow and minimum slope of 1/4" per foot be achieved to ensure flow to the outfall and obtain Engineer approval prior to Construction.

Contractor shall use PVC, Sch 40 pipe and match the size of existing sump drain. Contractor shall not use PVC pipe less than 2" in diameter without Engineer approval. Contractor shall minimize use of bends and no bend shall exceed 45 degrees.

If the Sump Drain outfalls directly to a drainage inlet, the Contractor shall core drill the hole in the drainage inlet (saw-cut and jack hammer not acceptable). Following installation of discharge sump pump connection, the hole shall be sealed with non-shrink grout to prevent leakage. The connection shall be at least 12" from any walls, joints or holes and approved by the Engineer.

If the Sump Drain outfalls directly to a drainage pipe, the Contractor shall core drill the hole in the drainage pipe (saw-cut and jack hammer not acceptable) in the upper half of the pipe. Discharge pipe shall not protrude past the inside face of the pipe more than two (2) inches. Following installation of discharge sump pump connection, the hole shall be sealed with non-shrink grout to prevent leakage. The connection shall be at least 12" from any pipe joints and approved by the Engineer.

Prior to backfill and acceptance, the Engineer shall approve Sump Pump Drain and Connection system is water tight.

During construction, the Contractor shall never leave the Sump Pump Drain and Connection excavation or system exposed or open to the homeowner. Plywood shall be used to temporarily cover the Sump Pump Drain and Connection excavation at all times as needed to ensure safety.

Method of Measurement:

The quantity of sump pump drain and connections will be measured as the actual number of linear feet (linear meters) constructed and accepted.

Basis of Payment:

The quantity of sump pump drain and connections will be paid for at the Contract unit price per linear foot (linear meter) measured and approved by the Engineer. Price and payment will constitute full compensation for the stakeout and furnishing of all materials, coordination with homeowner, labor, tools, equipment, hauling, excavation and backfilling, grading and incidentals necessary to complete the work.

7/29/15

763537 - SUBDIVISION ENTRANCE SIGN

Description:

The item shall consist of preparing shop drawings to match existing sign to be replaced, furnishing all materials, constructing, painting and installing subdivision entrance sign in accordance with the specified location(s), details and notes on the Plans and as directed by the Engineer.

General Requirements:

Prior to the removal of the existing Meadow Glen subdivision entrance sign at Sweet Hollow Drive, the contractor shall survey the dimensions and features of the existing sign, to be used in the fabrication of proposed subdivision entrance signs described herein.

The Contractor shall supply shop drawings detailing the proposed features of the sign, including the brick pillars, caps and foundations, decorative fence connection between pillars, and sign structure in center of entrance sign.

Materials and Construction Methods:

Following Department approval of the shop drawings, the sign materials shall be supplied and installed according to the details on the plans and approved shop drawings.

The wood portion used shall be pressure treated in accordance with Water Borne Preservative as specified in Section 601 of the Standard Specifications. Treated timbers and boards shall be free from heat checks, water bursts, excessive checking, results of chafing or from any other damage or defects that would impair their usefulness or durability.

The masonry portions of the sign shall be detailed on the shop drawings, showing all foundation limits and dimensions for pillars and caps.

The decorative fence portion of the sign shall be detailed on the shop drawings to match the existing profile and material as surveyed in the field.

The dimensions of the wood sign portion, lettering sizes and style, the wording and word arrangement and hardware shall be as shown on the shop drawings. The sign wording shall be routed on one side to a minimum depth of one-quarter inch (1/4") and a maximum depth of one-half (1/2") unless otherwise required by the Plans.

The diameter of holes must match diameter of bolts. All holes shall be centered-straight and perpendicular from point of entry to point of exit on all surfaces to ensure optimum bearing of all hardware. All cuts and bore holes made after treatment shall be painted or swabbed with four heavy coats of CCA. Each application shall be allowed to dry before applying subsequent coats. All routed letters shall be painted as specified in this Special Provision.

All hardware to be used for the sign shall be steel galvanized conforming to the requirements of Section 601 of the Standard Specifications. All lag screws shall be securely drawn, but at no point shall washers be drawn into the wood surface.

Paint materials for painting the sign structure shall be a high quality exterior grade having at least a 10-year life expectancy.

Surface to be painted shall be clean and dry prior to the application of paint. Pitch pockets and knots shall be scraped and sealed with a shellac varnish. No paint shall be applied until the prepared surfaces have been inspected and approved by the Department personnel. Unless otherwise specified on the drawings, surfaces shall be painted with one coat of exterior priming paint and two coats of exterior oil paint.

Each coat shall be applied in such a manner as to produce a paint film of uniform thickness with a finished surface free from runs, drops, ridges, laps or excessive brush marks. The drying time between coats shall be in accordance with the manufacturer's recommendations. The coverage in square feet per unit shall not exceed the manufacturer's recommendations. The surface of each dried coat shall be cleaned, if necessary, before application of the next coat.

Paint shall not be applied when the temperature of the wood surface or of the surrounding air is less than 45 degrees F., nor when atmospheric conditions result in condensation of moisture on the surface to be painted. Surfaces protected from atmospheric conditions by special cover, heating or ventilation shall remain so protected until the paint is dry.

Basis of Payment:

The payment for the item shall be made for at the contract unit price per Each bid for "Subdivision Entrance Sign", which price and payment shall constitute full compensation for supplying shop drawings, furnishing and installing all materials as described herein and on the Plans including excavation, grading, concrete foundations, brick pillars and caps, wood sign, painting, decorative fence connections and lettering for all labor, connection hard ware, tools, equipment and necessary incidentals to complete the work.

11/13/14

900500 - ENVIRONMENTAL PERFORMANCE INCENTIVE (DISINCENTIVE)

Description:

This work consists of maintaining the project's erosion and sediment control items and provides an incentive payment for that Work.

Materials:

There are no materials included in this specification.

Construction Methods:

Continuously maintain all erosion and sediment control items per the approved plan throughout the duration of the Project. Repair, replace, and/or maintain any erosion and sediment control measures as noted on the ES2M Inspection Rating Reports

http://www.deldot.gov/information/business/drc/pd_files/plan_development/es2m_inspection_rating_form.pdf?050415

and as directed by the Engineer. Maintain access to all sediment control devices until construction phasing and stabilization allow the removal of those controls that are no longer required.

The incentive payment is based on performance. Performance is determined by the score obtained only on the weekly ES2M Inspection Rating Reports.

Compliance procedures for failure to perform will be implemented per Section 901.06.

Method of Measurement:

There is no method of measurement in this specification.

Basis of Payment:

The total incentive awarded for this Contract will not exceed **\$ 392,000.00**. This amount applies to all erosion and sediment control work shown on the Plans or required by the Engineer to complete the Work and any erosion and sediment control work that is required to perform work that is added to the Contract.

Divide the total incentive by the number of Calendar Days originally assigned to the Contract to obtain the daily incentive amount. At the end of each estimate period, the Engineer will multiply the number of Calendar Days consumed during the estimate period times the daily incentive amount times the incentive factor taken from the table below. This amount will be paid on the next estimate

Payments will be made per each Calendar Day charged until either (1) Substantial Completion or (2) the total incentive amount reaches **\$392,000.00** or (3) the expiration of Contract time (including approved time extensions), whichever occurs first.

Environmental Performance Incentive Schedule	
Average ES2M Inspection Rating Report Score (Sum of the scores of the reports received during the estimate period divided by the number of reports)	Incentive Factor
100 – 90	1.00
89.9 – 80	0.75
79.9 – 70	0.50
69.9 – 0	0.00

6/24/15

905500 - SUPER SILT FENCE

Description:

This work consists of furnishing, installing, constructing, maintaining, and ultimately removing super silt filter fences as a temporary measure to control sedimentation within the limits of construction. Super silt fence shall be constructed as shown on the details in the Plans, at the locations shown on the Plans, and as directed by the Engineer.

Materials:

General. All materials shall be approved prior to use by the Department's Materials and Research Section.

Chain Link Fence. The construction requirements for the placement of the chain link fence shall be as specified in **SECTION 727 FENCES AND GATES** with the following exceptions:

(a) Concrete footings (727.07), Top Rail, Tension Wire, Horizontal Braces shall not be used.

Fasteners. Aluminized steel tie wires long enough to securely attach the fabric to the posts.

Seed. Seed shall conform to the requirements of Section 908.

Mulch. Mulch shall conform to the requirements of Section 908.

Geotextile. Geotextile shall conform to the requirements of Section 827. It shall be a minimum of 36" (900 mm) wide.

Construction Methods:

Construction of Super Silt Fence.

The Contractor shall excavate the trench along the upstream side of the post line as shown on Standard Construction Detail, Super Silt Fence. Posts shall be installed on the Downstream edge of the trench, along the established fence line. The geotextile shall be fastened to the upstream side of the chain link. The geotextile and chain link must extend a minimum of 33" above the ground. The chain link fabric and geotextile shall be embedded 8 inches into the excavated trench. The trench shall be backfilled and compacted over the chain link and geotextile to prevent water from flowing under the chain link and geotextile.

The super silt fence shall not be constructed across a ditch, or swale, or area of concentrated flow. On slopes, the terminal ends of super silt fence shall be turned upslope a sufficient distance to eliminate flow around the ends of the super silt fence. All geotextile damaged prior to installation, during installation, or during the life of the Contract shall be repaired or replaced to the satisfaction of the Engineer.

Maintenance of Super Silt Fence.

Throughout the Project construction period, the super silt fence shall be maintained by removing trapped sediment. The Contractor shall clean the geotextile of trapped sediment by tapping the geotextile when dry. No trash shall be allowed to accumulate to the height of the fence. Any geotextile that does not function due to clogging or deterioration shall be replaced.

Sediment Removal.

After every heavy rainfall, the Contractor shall check for excessive buildups of sediment which must be removed so that the super silt fence can continue to function as intended. Remove accumulated sediment when it reaches 50% of the height of the super silt fence.

Removal of Super Silt Fence.

The super silt fence shall be removed when the Engineer determines that it is no longer required. The super silt fence and all materials incidental to the super silt fence construction shall be removed. All areas affected by the construction of the super silt fence shall be restored to the original or plan contours and stabilized with seed and mulch.

Method of Measurement:

The quantity of super silt fence will be measured as the actual number of linear feet (linear meters) of super silt fence placed and accepted.

Basis of Payment:

The quantity of super silt fence will be paid for at the Contract unit price per linear foot (linear meter) for each type of fence. Price and payment will constitute full compensation for furnishing all materials; for excavating and backfilling associated with the construction of the super silt fence; for maintaining the super silt fence during the Project construction period; sediment removal, for removing the super silt fence with all related hardware after completion of the Project; for restoring the site; for seeding and mulching; and for all labor, equipment, tools and incidentals required to complete the work. No payment will be made for any replacement of or repairs to the super silt fence damaged prior to installation, during installation, or during the life of the Contract. No payment will be made for the replacement of the super silt fence.

11/18/2014

907506 - EARTH DIKE, TYPE A-1
907507 - EARTH DIKE, TYPE A-2
907508 - EARTH DIKE, TYPE B-1
907509 - EARTH DIKE, TYPE B-2

Description:

Construct, maintain, and remove various types of earth dikes as detailed in this specification and indicated on the Plans. Prevent clean runoff from entering disturbed areas by intercepting and diverting runoff to stabilized outlets, or intercept sediment-laden runoff and divert it to a sediment trapping device.

Materials:

Borrow - Material excavated onsite or supplied from an outside source meeting 209.04(f)

Seed and Mulch - Section 908.02

Erosion Control Blanket - Section 908.02

Riprap (R-4) - Section 712.04

Geotextile - Section 827.06

Construction Methods:

General Requirements for all Types:

1. Convey runoff from disturbed areas to a sediment trapping device
2. Outlet diverted runoff from undisturbed areas to an undisturbed stabilized area at non-erosive velocity.
3. Construct the earth berm having side slopes no steeper than 2:1. Top surface and height dimensions as listed below under Type A-1, A-2, B-1, or B-2. Compact the soil using earthmoving equipment or mechanical tamps to at least 90% of maximum density (per AASHTO T 99 Method C, Modified). Construct in lifts not to exceed 12 inches loose measurement.
4. Begin earth dike stabilization within seven days of the start of construction or prior to the earth dike becoming operational, whichever is sooner.
5. Stabilize the top surface and outside slope (opposite the side conveying runoff) with seed and mulch chosen by the Contractor.
6. Stabilize the side slope carrying water, and the adjoining existing ground using materials and dimensions specified below under Earth Dikes, Type A-1, A-2, B-1, or B-2.
7. Remove accumulated sediment when it reaches 50% of the earth dike height.
8. Maintain the original dimensions and function of the earth dike throughout its life.
9. Remove the temporary earth dike when no longer needed, or as directed by the Engineer. Perform restoration, final grading, seeding and stabilization of the area.

Type A-1: Use where shown on the plans when the profile of the water carrying channel is between 0.5% and 2.0%. Stabilize the water carrying channel with seed and Erosion Control Blanket. Place the seed and blanket covering the water carrying channel created by the earth dike to a length of 14 inches measured along the dike slope and a length of 48 inches along the adjoining existing ground. Construct the earth dike to an overall height of 12 inches measured from the channel flow line to top of earth dike. Top surface of the earth dike shall be 12 inches wide.

Type A-2: Use where shown on the plans when the profile of the water carrying channel is between 2.1% and 8.0%. Stabilize the water carrying channel with stone meeting R-4 riprap gradation on geotextile. Excavate and place the riprap covering the water carrying channel created by the earth dike to a

length of 14 inches measured along the dike slope and a length of 48 inches along the adjoining existing ground. Construct the earth dike to an overall height of 12 inches measured from the channel flow line to top of earth dike. Top surface of the earth dike shall be 12 inches wide.

Type B-1: Use where shown on the plans when the profile of the water carrying channel is between 0.5% and 2.0%. Stabilize the water carrying channel with seed and Erosion Control Blanket. Place the blanket covering the water carrying channel created by the earth dike to a length of 27 inches measured along the dike slope and a length of 72 inches along the adjoining existing ground. Construct the earth dike to an overall height of 18 inches measured from the channel flow line to top of earth dike. Top surface of the earth dike shall be 24 inches wide.

Type B-2: Use where shown on the plans when the profile of the water carrying channel is between 2.1% and 8.0%. Stabilize the water carrying channel with stone meeting R-4 riprap gradation on geotextile. Excavate and place the riprap covering the water carrying channel created by the earth dike to a length of 27 inches measured along the dike slope and a length of 72 inches along the adjoining existing ground. Construct the earth dike to an overall height of 18 inches measured from the channel flow line to top of earth dike. Top surface of the earth dike shall be 24 inches wide.

Method of Measurement:

Linear foot measured along the earth dike's centerline at the top surface.

Basis of Payment:

Linear foot measurement includes soil placement, compacting, and grading; applicable stabilization (seeding and mulching, erosion control blanket, and /or riprap), removal when no longer required, maintenance, sediment removal, restoration, final grading, and final stabilization of the area. Pay for clearing and grubbing under the respective items if required. Furnish and pay for soil required to construct the earth dikes as follows:

For Borrow from an outside source - Pay under item 209006, Borrow, Type F

For Borrow excavated from the job - Payment will be made under the applicable excavation item when the material is initially excavated. Hauling and placing the material in the earth dike is incidental to the applicable earth dike being constructed.

1/14/15

UTILITY STATEMENT
State Contract No. T200504110
Project ID No. 04-00161
N54, Howell School Road from SR 896 to SR 71
New Castle County, Delaware
June 30, 2015

The following utility companies maintain facilities within the project limits:

Artesian Water Company, Inc.	Water
Comcast Cable	Communications
Delaware State Highway Department	Communications/ITMS
Delmarva Power	Electric
Delmarva Power	Gas
Eastern Shore Natural Gas Company	Gas
New Castle County – Special Services	Sanitary Sewer
Verizon of Delaware, Inc.	Telephone

The following is a breakdown of the utilities involved, adjustments and/or relocations as required (all station counts, offsets, lengths, working days and calendar days are approximate):

Artesian Water Company, Inc (Water)

Artesian Water Company (Artesian) maintains the following facilities within the project limits:

1. Artesian maintains an underground 12” DIP water line that runs from beyond the project limits along the North side of Denny Road to the intersection of Denny Road and SR 896, and then crosses beneath SR 896 at approximately Station 435+45 and is protected by a 287’ long 20” steel casing. The line terminates on the East side of SR 896 at approximately Station 115+10, left.
2. Artesian maintains a 16” DIP water main on the East side of Northbound SR 896 that begins at approximately Station 435+25 and extends North beyond the project limits.
3. There is an existing 12” DIP water main that begins on the East side of SR 896 at Station 438+60 and continues East into the Meadow Glen Subdivision along the North side of Sweet Hollow Drive and extends to Meadow Glen Drive.
4. There is an existing 8” DIP main that enters into the project site from the North along the West side of Meadow Glen Drive. Artesian maintains a 20’ easement within Parcel 2-R that borders Parcel 3-R to the East. The easement encompasses the existing 8” DIP main. This main crosses Proposed Howell School Road at Station 124+60, then continues South and intersects Existing Howell School Road at Station 910+25 and is protected by a 26’ long, 16” steel casing.
5. Artesian maintains an 8” DIP water main from the connection with the main at Station 910+25 and runs East along the South side of Existing Howell School Road and terminates at the water valve prior to the water service meter pit at Station 135+00. Artesian’s ownership of the water supply feeding Lums Pond State Park terminates at this location. All water facilities extending from and including the water service meter pit into the state park is privately owned and not maintained by Artesian.

UTILITY STATEMENT

Phase 2 – B

Phase 2-B includes work to be performed by the contractor, to install water service to the Lums Pond State Park, inclusive of a water meter vault. The contractor shall install water service beginning at the water valve at Station 134+05, 49' RT., and continuing to the water meter vault as shown on the plans. The meter vault shall be installed according to the following criteria:

- The meter vault provided by the contractor shall meet the Artesian standards.
- The contractor shall coordinate the transfer of water service with Artesian.
- No water valve or other control device on the existing Artesian water system shall be operated for any purpose by the contractor. Contractor shall coordinate with the Artesian Inspector so that all existing system devices are operated by the proper water company forces.
- The meter vault shall be installed according to the plans, details and specifications included in the contract documents.

All materials necessary to complete this work shall be paid under the project contractor item 614508 – Watermain and Accessories, as directed by the engineer.

Comcast Cable (Communications)

Comcast Cable maintains overhead coaxial cable facilities within the limits of the project. Comcast also maintains Fiber-Optic facilities on poles within the project limits. The aerial fiber-optic facilities are located on existing Delmarva poles along Howell School Road, Denny Road, and SR 896. Existing Comcast aerial facilities on Delmarva poles will be relocated to the proposed pole locations shown on the construction plans.

Comcast will abandon an existing fiber optic cable and install a proposed fiber optic cable along the same alignment along the east side of Robert Peoples Boulevard from riser pole 43730/37094 on the south side of Howell School Road to the north project limit along at Robert Peoples Boulevard. An existing vault will be abandoned.

Comcast will complete these changes. These relocations/adjustments are expected to take approximately 21 calendar days to complete after Comcast has been given a minimum of 28 calendar days advance notice that work shall begin and the right-of-way and proposed work has been laid out in the field by the State's contractor and that Delmarva Power has completed their necessary work.

Delaware State Highway Department (Communications/ITMS)

DelDOT maintains underground ITMS Cable along the Southbound SR 896 corridor from beyond project limits extending South to Station 429+35. The ITMS line crosses SR 896 and intersects an existing ITMS line that runs along the shoulder along Northbound SR 896. At this intersection the ITMS line extends East along Howell School Road. The line terminates in a junction well at Station 135+75 right. As part of this project DelDOT requested that the ITMS line be extended from this junction well. The proposed ITMS line extends east along the Southern side of Howell

UTILITY STATEMENT

1. Relocate Delmarva utility pole DP&L 43134-37081 at Station at 107+90 right 34 Feet and relocate aerial line from DP&L 43146-37081. Install new utility pole and guy wire at Station 108+84 right and attach aerial line from relocated utility pole DP&L 43134-37081. Relocate Delmarva Utility pole DP&L 43179-37082 to Station 110+40 right 61 Feet and aerial line from proposed utility pole at Station 108+84 right 48 Feet.
2. Relocate existing aerial lines, utility poles, and associated guy wires along the Southbound side of SR 896 and at the intersection of Denny Road/SR 896/Proposed Howell School Road as shown on the Construction Plans at the following locations; Station 111+60 left, Station 111+98 right 74 Feet and Station 433+00 left. The guy wire existing location and relocation area will only be cleared. No grubbing will occur.
3. Relocate existing aerial lines, utility poles, and associated guy wires along the Northbound side of SR 896 and at the intersection of Denny Road/SR 896/Proposed Howell School Road as shown on the Construction Plans at the following locations; Station 433+00 right, Station 434+25 right, Station 436+10 right, Station 437+50 right, Station 438+85 right, Station 442+00 right, Station 440+50 right, Station 444+00 right and Station 444+50 right.
4. At Sweet Hollow drive, the relocated lines shall connect into the existing 1 Phase 25 kV underground lines running on the North and South sides of the existing road. Delmarva will install 2-4" PVC ducts under the proposed cul-de-sac.
5. There are no anticipated relocations or adjustments needed for the existing 1 Phase 25 kV underground electric lines running along the East and West sides of Meadow Glen drive.
6. Between Station 132+00 and Station 149+00, Delmarva will relocate the 3 Phase 25 kV aerial line along with associated utility poles and guy wires as shown on the Construction Plans. The relocations will occur at the following locations; Station 134+00 right, Station 135+80 right, Station 138+00 right, Station 140+10 right, Station 141+75 right, Station 143+35 right, Station 145+10 right, Station 147+00 right, and Station 148+90 right. In line with above relocations, install proposed utility poles as shown on construction plans at Station 132+00 left and Station 141+75 left.
7. At the Lums Pond State Park entrance, the 3 Phase 25 kV underground electric line and associated electric box will be relocated between Station 137+50 and Station 138+00 to tie into the relocated utility pole at Station 138+00.
8. Delmarva will relocate utility poles and associated aerial and underground lines crossing Howell School Road at Station 146+75 as shown on the construction plans at Station 146+65 left.
9. Delmarva will relocate and/or adjust two (2) 3 Phase 25 kV underground lines feeding into the Delmarva Power Substation on the South side of Howell School Road at Station 156+85 right.
10. Delmarva will relocate DP&L 43638-37082 and DP&L 43642-37083 and associated aerial line running to DP&L 43643-37079 and DP&L 13842-2 on the South side of Howell School Road.
11. Delmarva will relocate aerial connections from residencies on Parcels 18-R and 19-R, along with utility pole DP&L 43710-37092 at Station 163+75 right and an unknown DP&L pole at Station 164+60 left with connecting 1 Phase 25 kV aerial line.
12. There are no anticipated relocations or adjustments needed for the 3 Phase 25 kV underground line within the center median at the entrance to Caravel Woods Subdivision.

Delmarva Power will supply and install proposed lighting as shown on the plans, and execute the lighting agreement through the tariff system with the Department.

UTILITY STATEMENT

7. Delmarva maintains a 6" PHP gas line that extends to the North along the East side of Robert Peoples Boulevard at Station 165+75.

The following adjustments are required for the existing Delmarva Power Distribution facilities. All gas main locations and depths are approximate and locations and depths shall be verified in the field prior to construction.

1. Adjust two (2) vents and gas valve at the intersection of SR 896 and Proposed Howell School Road at Station 115+25 left.
2. Adjust two (2) gas valves at Station 115+25 right. Adjust gas line at Station 432+00 right. Adjust gas valve at Station 438+00 right. Adjust gas valve at Station 439+00 right.
3. Adjust gas line on the South side of Sweet Hollow Drive.
4. There are no anticipated relocations or adjustments needed for the 2" PHP line that runs along the East and West sides of Meadow Glen Drive into the Meadow Glen Community.
5. The Company proposes to offset the existing 8" plastic high pressure gas main on Howell School Road at STA 135+50 to STA137+50, STA 138+75, STA141+92 and STA 144+96 offset right. This work will take 75 working days to complete and require 140 cubic yards of select. If the State requires Delmarva to move the existing gas main out of future paving in this area the relocation will be from STA 135+50 to STA 144+92 (a distance of 942') offset right. This work will take 60 calendar days to complete and require 300 cubic yards of select. The Company proposes to offset the existing 8" plastic high pressure gas main at STA146+48 offset left. This work will take 15 calendar days to complete and require 20 cubic yards of select. The Company proposes to offset the existing 8" plastic high pressure gas main at STA165+71 and STA166+50 offset left. This work will take 30 calendar days to complete and require 40 cubic yards of select. If the State requires Delmarva to move the existing gas main out of the future paving in this area the relocation will be from STA163+50 to STA166+75 offset left. This work will take 45 calendar days to complete and will require 120 cubic yards of select. Relocate gas meter at Station 134+00 right.
6. Adjust gas valve at Station 31+15 left.
7. Adjust gas valve at Station 165+75 left.

Delmarva will complete these changes. The installation and relocation work will take a total of 120 calendar days if work occurs between April 1 and November 1. If the installation work is to occur outside of this time frame, 60 extra calendar days will be needed to account for reduced productivity during inclement weather. Also the addition of any time restrictions on this project will add 30 more days to the utility statement. The total amount of select required is 200 cubic yards.

Work on individual installation efforts within this project must be continuous without crew holdups or work stoppages. The existing mains will be abandoned in place after the new mains are installed and activated with services tied over. The abandonment will take place after the relocation work is completed. Work can start after notification, clearing and grubbing, rough grading and survey layout has been completed.

Eastern Shore Natural Gas Company (Gas)

Eastern Shore Natural Gas Company maintains one existing 8" steel gas main that runs along the East side of Northbound SR 896 (Summit Bridge Road) and extends beyond the project limits to

UTILITY STATEMENT

This line extends East on the South side of Howell School Road, until Station 141+75, where it crosses to the North side of Howell School Road. This line then continues running East along the North side of Howell School Road until it terminates at an existing pump station at approximately Station 146+15.

4. The County maintains an 8" PVC line that begins at a manhole at SR 896 Station 435+60 right and runs South along the East side of Northbound SR 896 to Station 429+75 right.
5. The County maintains an additional 8" PVC force main that begins at Station 901+50 left and extends East along the North side of Existing Howell School Road until Station 135+15, where it crosses under Howell School Road then continues East along the South side of Howell School Road. This line crosses back to the North side of Howell School Road at Station 141+90 and then runs East along the North side of Howell School Road until it terminates at an existing pump station at approximately Station 146+15.
6. The County maintains 6" force main that extends from Caravel Woods Subdivision on the West side of Robert Peoples Boulevard and runs East under Howell School Road to an existing pumping station on the West side of Howell School Road, at Station 180+50.
7. Extending from the pumping station at Station 180+50 the County maintains a 4" force main that runs East on the North side of Howell School Road, extending beyond the project limits.

The following adjustments and/or relocations are required for the existing county facilities. All adjustments or relocations shall be performed so that there are no unnecessary disruptions of services:

1. Adjust manhole at Station 115+25 left.
2. There are no anticipated relocations or adjustments needed for the 8" PVC or 12" PVC line in this location. The 8" and 12" force mains must remain in service during the relocation described in section three below. The 8" force main can be redirected into 12" force main during the relocation work and the 12" force main can be redirected into the 8" force main to manage flow for work on each pipeline. Install isolation valve in 12" force main west of 896 prior to relocation work.
3. Adjust sewer manholes at the following Stations along this run as shown on the construction plans; Station 917+25 left, Station 133+50 left, Station 133+50 right, Station 141+90 left, Station 143+15 left, Station 145+55 left, and Station 146+20 left. Adjust sewer line between Stations 142+00 and 143+00 left. Adjust sewer vents as shown on the construction plans at Station 143+60 left and Station 143+80 left. The 8" and 12" force mains will be relocated at the proposed culvert crossing at Sta. 135+25. The relocation will be relocated according to the plans and special provisions included for this work. The existing force main shall be encased at the following inlet locations: Station 137+70 right; 138+91 right; 138+96 right and 140+16 right, at the inlets constructed above the force main.
4. Adjust sewer manholes at Stations 432+00 Right and 435+60 right.
5. Adjust sewer manholes at the following Stations along this run as shown on the construction plans; Station 901+50 right, Station 917+25 left, Station 135+15 right, Station 137+10 right, Station 138+25 right, Station 146+05 left. Adjust sewer vent at Station 141+90 right.
6. Adjust sewer manhole at Station 163+75 right.
7. There are no anticipated relocations or adjustments needed for the 4" PVC line in this location.

UTILITY STATEMENT

3. Verizon will transfer aerial facilities to the relocated DP&L poles on the east side of SR 896 between DP&L #43219-37179 at Station 444+00 and DP&L #43234-37073. Anchors and guys will be placed as necessary. (Sheets 20, 31)
4. Verizon will transfer aerial facilities to the relocated DP&L poles on the south side of Howell School Road from DP&L #43394-37052 at Station 917+20 to DP&L #43927-37118 at Station 186+00. Anchors and guys will be placed as necessary. (Sheets 22 - 29)

Verizon of Delaware Inc. proposed changes to the underground facilities include but are not limited to:

1. Verizon will extend spare conduit at Station 108+46 R to two new DP&L pole locations. (Sheet 19) and relocate associated facilities.
2. Verizon will relocate buried cables at DP&L #43352-37059 (Station 138+05 R – Sheet 23), DP&L #43749-37097 (Station 167+85 R – Sheet 26), DP&L #43730-37094 (Station 165+90 R – Sheet 26), DP&L #43225-37133 (Station 438+85 R – Sheet 31), and DP&L #43223-37148 (Station 440+50 R – Sheet 31).

Verizon of Delaware Inc. will complete these changes. These relocations/adjustments are expected to take approximately 60 calendar days to complete after the company has been given a minimum of 45 calendar days advance notice that work shall begin and the right-of-way and proposed work has been laid out in the field by the State's contractor and required tree trimming and clearing has been performed. Verizon relocations would begin after DP&L has completed their work.

GENERAL NOTES:

1. If utility work is being performed in advance of the project, all bidders are to determine the extent of completion of the advanced utility work, and predicated their bid prices on the extent of utility work completed and anticipated to be completed prior to the start of construction.
2. The Utility Company's forces will perform any additional relocations/adjustments that may be necessary during construction of the project. The time to complete any additional relocations/adjustments will depend upon the nature of the work, the required advance notice to the Utility Company, the need for the State's Contractor to stake out the right-of-way or proposed work, and any work that needs to be done by the State's Contractor in advance of the utility relocation/adjustment.
3. 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, but not more than ten working days in advance of starting the work. 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.

UTILITY STATEMENT

UTILITY CONTACT LIST:

Mr. Carmen Hunter	Artesian Water Company	302-453-7153
Mr. Ken Stronski	Comcast Cable	302-661-4435
Ms. Silvana Croope	Delaware State Highway Department	302-659-4606
Mr. Angel Collazo	Delmarva Power Electric	302-454-4370
Mr. Ted Waugh	Delmarva Power Gas	302-429-3706
Mr. Jason Woody	Eastern Shore Natural Gas Company	302-734-6710
Mr. Daniel C. Netta	New Castle County - Sewer	302-395-5817
Mr. George Zang	Verizon of Delaware, Inc.	302-422-1238

The information shown in the Contract Documents, including this Utility Statement, concerning the location, type and size of existing and proposed utility locations and timing has been compiled by the Preparer based on information furnished by each of the involved Utility Companies. It shall be the responsibility of the State's Contractor to verify all information and coordinate with the Utility Companies prior to and during construction, as specified in section 105.09 of the standard specifications.

Prepared and Recommended by:


PENNONI ASSOCIATES, Terry K. Foester, PE


DATE

Approved as to form by


Utilities Section, DelDOT


DATE

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
PO BOX 778
DOVER, DELAWARE 19903

CERTIFICATE OF RIGHT-OF-WAY STATUS

STATE PROJECT NO. T200504110

F.A.P. NO. ESTP-N54(04)

HSIP NCC, N54, HOWELL SCHOOL ROAD, SR 896 TO SR 71

NEW CASTLE COUNTY

Certificate of Right-of-Way Status - Stipulated

Status - Level 2

As required by 23 CFR, Part 635, and other pertinent Federal and State regulations or laws, the following certifications are hereby made in reference to this highway project:

All necessary rights-of-way, including control of access rights when pertinent, have not been fully acquired, however, the right to occupy and to use all rights-of-way required for the proper execution of the project in accordance with the project right-of-way plans has been acquired; and,

All necessary real property interests have been or shall be acquired in accordance with current FHWA/State directives covering the acquisition of real property; and,

Any residential displaced individuals or families have been relocated to decent, safe and sanitary housing, or adequate replacement housing has been made available in accordance with the provisions of the current Federal Highway Administration (FHWA) directive(s) covering the administration of the Highway Relocation Assistance Program; and,

Any occupants have vacated all lands and improvements. The State has physical possession and the right to remove, salvage, or demolish any improvements acquired as part of this project, and enter on all land; and,

RIGHT OF WAY SECTION



Robert Cunningham
Chief of Right of Way

July 1, 2015



STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
800 BAY ROAD
P.O. BOX 778
DOVER, DELAWARE 19903

JENNIFER COHAN
SECRETARY

August 28, 2015

ENVIRONMENTAL REQUIREMENTS

FOR

State Contract No. T200504110

Federal Aid No.: ESTP-N054(04)

Contract Title: HSIP NCC, N54, Howell School Road, SR 896 to SR 71

In accordance with the procedural provisions for implementing the National Environmental Policy Act of 1969, as amended, the referenced project has been processed through the Department's Environmental Review Procedures and has been classified as a Level D/ Class II Action. As such, a Categorical Exclusion has been prepared to evaluate potential adverse impacts resulting from construction of the proposed project (per 23 CFR 771.117 d(1)), and the following special provisions have been developed to mitigate and/or minimize these impacts.

PERMIT REQUIREMENTS:

The construction work that will occur as part of the HSIP NCC, SR 54, Howell School Road, SR 896 to SR 71 project, New Castle County, Delaware requires permit approval from the agencies listed below. It is the responsibility of the contracting agency -- the Delaware Department of Transportation, Division of Transportation Solutions -- to obtain the necessary permits to ensure that the contractor complies with the requirements and conditions established by the regulatory agencies. The permit coordination for this project is ongoing. Written authorization from the permitting agencies is required and paperwork for on-site posting is anticipated. As such, the construction work that will occur as part of the HSIP NCC, SR 54, Howell School Road, SR 896 to SR 71 project, New Castle County, Delaware is authorized under the permits/exemptions listed below:

REQUIRED PERMITS AND APPROVAL STATUS:

- **U.S. Army Corps of Engineers (COE)** - Nationwide Permit (NWP) #23 with a Preconstruction Notification (PCN) - **approved** - CENAP-OP-R-2008-1575, dated 07-27-15 (valid until 03-18-17)
- **Delaware Department of Natural Resources and Environmental Control (DNREC)** - Subaqueous Lands Permit – **approved** – SP-132/15, dated 08-18-15 (valid until 08-18-18)
- **DNREC Coastal Zone Management (CZM)** – Waived (project is not located in CRW)
- **DNREC Water Quality Certification** – Waived (project is not located in CRW)
- **New Castle County Department of Land Use** – Floodplain Permit – **approved** - Extension of two 54" culverts under SR 896, dated 05-28-15 (valid until 11-24-15)

SPECIFIC REQUIREMENTS:

Compliance with all requirements of the permits is the responsibility of the contractor, who will follow all special conditions or requirements as stated within those permits. The contractor will be subject to penalties, fines, and the risk of shut down as mandated by laws governing permitting agencies if such conditions and requirements are violated or ignored. Therefore, all special conditions, general requirements, and/or other required provisions specified within the permits must be followed. Those obligations are indicated or listed within the permit package, which can be obtained from the DelDOT Contract Administration Office.

Additional requirements by DelDOT not specified within the permits, but listed below, are also the responsibility of the contractor. Noncompliance with these requirements may result in shut down of the project at the contractor's expense.

1. The contractor shall employ measures during construction to prevent spills of fuels or lubricants. If a spill should occur, efforts shall be undertaken to prevent its entry into wetlands, aquatic, or drainage areas. Any spills entering wetlands, aquatic, or drainage areas shall be removed immediately. The Division of Water Resources (DNREC), Wetlands & Aquatic Protection Branch, 302-739-4691, shall be notified of any spill(s) within six (6) hours of their occurrence. That office will determine the effectiveness of spill and contamination removal and specify remediation efforts as necessary.
2. All construction debris, excavated material, brush, rocks, and refuse incidental to the work shall be placed either on shore above the influence of flood waters or on some suitable disposal site approved by the department.
3. The disposal of trees, brush, and other debris in any stream corridor, wetland surface water or any drainage ditch is prohibited.

4. There shall be no stockpiling of construction materials or temporary fills in wetlands or subaqueous lands unless otherwise specified on project plans and approved by permitting agencies that govern them. It is the contractor's responsibility to coordinate and secure those additional permits/amendments in deviating from the plan.
5. Construction debris shall be kept from entering adjacent waterways, wetlands, ground cover, or drainage areas. Any debris that enters these areas shall be removed immediately. Netting, mats, or establishing confined work areas in stages may be necessary to address these issues.
6. Refuse material resulting from routine maintenance of worker equipment and heavy machinery is prohibited from being disposed or deposited onto or into the ground. All used oils and filters must be recycled or disposed of properly.
7. Use of harmful chemical wash water to clean equipment or machinery is discouraged. If undertaken, the residue water and/or material must be collected or contained such that it will be disposed of properly. It shall not be deposited or disposed of in waterways, streams, wetlands, or drainage areas.
8. The contractor shall follow all requirements as indicated in the Environmental Compliance Sheet. It is the contractor's responsibility to ensure that workers also follow this requirement. As part of the restrictions, please note the timetables reflected in the contract for the in-stream/water work for endangered species protection.
9. Fill material shall be free of oil and grease, debris, wood, general refuse, plaster and other pollutants, and shall contain no broken asphalt.

ENVIRONMENTAL COMPLIANCE SHEET:

The contractor shall pay special attention to specific construction requirements as indicated in the Environmental Compliance Sheets (sheets 78-86).

1. Please note the environmental requirement as indicated in Note 3 on sheet 79 (EC-02), this project has a Section 4(f) *deminimis* finding. Any modifications to the plans within this area are to be coordinated with the District Engineer and the Environmental Studies Office (Contact Michael Hahn 302-760-2131 or MichaelC.Hahn@state.de.us)
2. Specifically, please note the environmental requirements as indicated on sheet 79 (EC-02) in:
 - Note 4 on for Stream Restoration and Slope Riprap Treatment
 - see DNREC Special Conditions #6 - #8 and #10

- Note 5 for Protection of Resources
 - Specifically regarding the Northern Long Eared Bat -see DNREC Special Condition #2 and Environmental Compliance Note 5E
 - Specifically regarding the use of sandbags to secure silt fence in lieu of trenching adjacent to wetlands/wooded uplands and streams – see DNREC Special Condition #5 and Environmental Compliance Note 5C
 - Note 6 for Planting Guidance, work done by DelDOT
 - Restoration of the forested and riparian buffers shall be restored as necessary – see DNREC Special Condition #14
 - Note 7 for Mitigation which states that to offset for impacts associated with the project, wetland replacement obligations will be met through the Glennville Bank
3. DelDOT Environmental Studies Section (302) 760-2264 must be notified if there are any changes to the project methods, footprint, materials, or designs, to allow the Department to coordinate with the appropriate resource agencies (COE, DNREC, DOI, NCC, and SHPO), for approval.



STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
 800 BAY ROAD
 P.O. Box 778
 DOVER, DELAWARE 19903

SHAILEN P. BHATT
 SECRETARY

RAILROAD STATEMENT

For

State Contract No.: T200504110

Federal Aid No.: ESTP-N54(04)

Project Title: HSIP, NCC, N54 Howell School Road, SR896 to SR 71

The following railroad companies maintain facilities within the contract limits:

- | | |
|--|---|
| <input type="checkbox"/> Amtrak | <input type="checkbox"/> Maryland & Delaware |
| <input type="checkbox"/> CSX | <input type="checkbox"/> Norfolk Southern |
| <input type="checkbox"/> Delaware Coast Line | <input type="checkbox"/> Wilmington & Western |
| <input type="checkbox"/> East Penn | <input checked="" type="checkbox"/> None |

In accordance with 23 CFR 635, herein is the railroad statement of coordination (check one):

- No Railroad involvement.

- Railroad Agreement unnecessary but railroad flagging required. The contractor shall follow requirements stated in the DeIDOT Maintenance of Railroad Traffic Item in the Special Provisions. Contractor shall coordinate railroad flagging with DeIDOT's Railroad Program Manager at (302) 760-2183.

- Railroad Agreement required. The necessary railroad agreement, attached, is complete and fully executed. Railroad related work to be undertaken and completed as required for proper coordination with physical construction schedules. The Contractor shall follow requirements stated in the DeIDOT Maintenance of Railroad Traffic Item in the Special Provisions. Contractor shall coordinate railroad flagging with DeIDOT's Railroad Program Manager at (302) 760-2183.

Approved As To Form:

Robert A. Perrine
 DeIDOT Railroad Program Manager

12/22/2014

DATE

BID PROPOSAL FORMS

CONTRACT T200504110.01

FEDERAL AID PROJECT ESTP-N54(04)

CONTRACT ID: T200504110.01

PROJECT(S): T200504110

All figures must be typewritten.

CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS

SECTION 0001 ROAD

0010	201000 CLEARING AND GRUBBING	LUMP		LUMP		
0020	202000 EXCAVATION AND EMBANKMENT	CY	52835.000			
0030	207000 EXCAVATION AND BACKFILL FOR STRUCTURES	CY	715.000			
0040	208000 EXCAVATION AND BACKFILLING FOR PIPE TRENCHES	CY	5614.000			
0050	208001 FLOWABLE FILL	CY	60.000			
0060	209001 BORROW, TYPE A	CY	4950.000			
0070	209002 BORROW, TYPE B	CY	6768.000			
0080	210000 FURNISHING BORROW TYPE "C" FOR PIPE, UTILITY TRENCH, AND STRUCTURE BACKFILL	CY	4849.000			
0090	211000 REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LUMP		LUMP		

CONTRACT ID: T200504110.01

PROJECT(S): T200504110

All figures must be typewritten.

CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0100	212000 UNDERCUT EXCAVATION	8351.000 CY				
0110	302007 GRADED AGGREGATE BASE COURSE, TYPE B	11170.000 CY				
0120	302011 DELAWARE NO. 3 STONE	77.000 TON				
0130	401801 BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS PG 64-22 (CARBONATE STONE)	6246.000 TON				
0140	401810 BITUMINOUS CONCRETE, SUPERPAVE, TYPE B, 160 GYRATIONS, PG 64-22	5363.000 TON				
0150	401819 BITUMINOUS CONCRETE, SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 160 GYRATIONS, PG 64-22	4885.000 TON				
0160	501001 PORTLAND CEMENT CONCRETE PAVEMENT, 8"	358.000 SY				
0170	601520 TEMPORARY TIMBER MAT	LUMP	LUMP			
0180	602001 PORTLAND CEMENT CONCRETE MASONRY, CLASS A	2.000 CY				

CONTRACT ID: T200504110.01

PROJECT(S): T200504110

All figures must be typewritten.

CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0190	602547 WATERPROOFING BRIDGE DECKS, SIDEWALKS ETC.	135.000 SF				
0200	602736 PRECAST CONCRETE CULVERT	100.000 CY				
0210	602738 PRECAST CONCRETE RETAINING WALL	30.000 CY				
0220	608000 COARSE AGGREGATE FOR FOUNDATION STABILIZATION AND SUBFOUNDATION BACKFILL	85.000 TON				
0230	612002 REINFORCED CONCRETE PIPE, 15", CLASS III	16.000 LF				
0240	612003 REINFORCED CONCRETE PIPE, 18", CLASS III	1452.000 LF				
0250	612007 REINFORCED CONCRETE PIPE, 30", CLASS III	2381.000 LF				
0260	612010 REINFORCED CONCRETE PIPE, 42", CLASS III	21.000 LF				
0270	612012 REINFORCED CONCRETE PIPE, 54", CLASS III	24.000 LF				
0280	612200 REINFORCED CONCRETE ELLIPTICAL PIPE, 14"X23", CLASS III	1509.000 LF				

CONTRACT ID: T200504110.01

PROJECT(S): T200504110

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CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0290	612201 REINFORCED CONCRETE ELLIPTICAL PIPE, 19"X30", CLASS III	1068.000 LF				
0300	612202 REINFORCED CONCRETE ELLIPTICAL PIPE, 24"X38", CLASS III	135.000 LF				
0310	612207 REINFORCED CONCRETE ELLIPTICAL PIPE, 29"X45", CLASS, III	361.000 LF				
0320	614508 WATERMAIN AND ACCESSORIES	LUMP	LUMP			
0330	617003 REINFORCED CONCRETE FLARED END SECTION, 18"	4.000 EACH				
0340	617007 REINFORCED CONCRETE FLARED END SECTION, 30"	4.000 EACH				
0350	617010 REINFORCED CONCRETE FLARED END SECTION, 42"	1.000 EACH				
0360	617164 REINFORCED CONCRETE FLARED END SECTION, 19" X 30"	3.000 EACH				
0370	617165 REINFORCED CONCRETE FLARED END SECTION, 14" X 23"	11.000 EACH				
0380	617171 REINFORCED CONCRETE FLARED END SECTION, 29" X 45"	2.000 EACH				
0390	617515 HEADWALL	3.000 EACH				

CONTRACT ID: T200504110.01

PROJECT(S): T200504110

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CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0400	701010 PORTLAND CEMENT CONCRETE CURB, TYPE 1-8	268.000 LF				
0410	701011 PORTLAND CEMENT CONCRETE CURB, TYPE 2	307.000 LF				
0420	701012 PORTLAND CEMENT CONCRETE CURB, TYPE 1-4	286.000 LF				
0430	701016 INTEGRAL PORTLAND CEMENT CONCRETE CURB & GUTTER, TYPE 1-4	6902.000 LF				
0440	701025 PORTLAND CEMENT CONCRETE CURB, TYPE 2 MODIFIED	315.000 LF				
0450	701027 PORTLAND CEMENT CONCRETE CURB, TYPE 1-2 MODIFIED	25.000 LF				
0460	705001 P.C.C. SIDEWALK, 4"	1819.000 SF				
0470	705002 P.C.C. SIDEWALK, 6"	3848.000 SF				
0480	705007 SIDEWALK SURFACE DETECTABLE WARNING SYSTEM	590.000 SF				
0490	705530 TRIANGULAR CHANNELIZING ISLANDS	13328.000 SF				

CONTRACT ID: T200504110.01

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CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0500	707005 UNDERDRAIN OUTLET	13.000 EACH				
0510	708051 DRAINAGE INLET, 34" X 24"	14.000 EACH				
0520	708052 DRAINAGE INLET, 48" X 30"	19.000 EACH				
0530	708053 DRAINAGE INLET, 48" X 48"	26.000 EACH				
0540	708054 DRAINAGE INLET, 66" X 30"	1.000 EACH				
0550	708055 DRAINAGE INLET, 66" X 48"	2.000 EACH				
0560	708056 DRAINAGE INLET, 66" X 66"	1.000 EACH				
0570	708057 DRAINAGE INLET, 72" X 24"	1.000 EACH				
0580	708058 DRAINAGE INLET, 72" X 48"	7.000 EACH				
0590	708112 MANHOLE, 48" X 48"	1.000 EACH				

CONTRACT ID: T200504110.01 PROJECT(S): T200504110

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CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0600	708113 MANHOLE, 66" X 30"	1.000 EACH				
0610	710506 ADJUST AND REPAIR EXISTING SANITARY MANHOLE	23.000 EACH				
0620	712007 RIPRAP, R-6	245.000 SY				
0630	712020 RIPRAP, R-4	180.000 TON				
0640	712021 RIPRAP, R-5	115.000 TON				
0650	712531 CHANNEL BED FILL	75.000 CY				
0660	713001 GEOTEXTILES, STABILIZATION	8320.000 SY				
0670	713003 GEOTEXTILES, RIPRAP	439.000 SY				
0680	715001 PERFORATED PIPE UNDERDRAINS, 6"	11680.000 LF				
0690	715500 UNDERDRAIN OUTLET PIPE, 6"	277.000 LF				

CANNOT BE USED FOR BIDDING

CONTRACT ID: T200504110.01 PROJECT(S): T200504110

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CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0700	720050 GALVANIZED STEEL BEAM GUARDRAIL, TYPE 1-31	792.000 LF				
0710	720054 GUARDRAIL OVER CULVERTS, TYPE 2-31	3.000 EACH				
0720	720055 CURVED GUARDRAIL SECTION	121.000 LF				
0730	720509 GALVANIZED AND FUSION - BONDED POLYESTER COATED GUARDRAIL	965.620 LF				
0740	720586 GUARDRAIL END TREATMENT ATTENUATOR, TYPE 2-31	8.000 EACH				
0750	726001 END ANCHORAGE 31	2.000 EACH				
0760	727003 CHAIN-LINK FENCE, 4' HIGH	556.000 LF				
0770	727004 CHAIN-LINK FENCE, 6' HIGH	240.000 LF				
0780	727009 CHAIN-LINK FENCE, 5' HIGH	49.000 LF				
0790	727014 CONSTRUCTION SAFETY FENCE	2156.000 LF				

CONTRACT ID: T200504110.01

PROJECT(S): T200504110

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0800	727015 MONUMENTS	25.000 EACH				
0810	727510 WOOD RAIL FENCE	609.000 LF				
0820	727535 WOOD FENCE, 6' HIGH	97.000 LF				
0830	727555 RIGHT-OF-WAY MARKER, CAPPED REBAR	34.000 EACH				
0840	743000 MAINTENANCE OF TRAFFIC	LUMP		LUMP		
0850	743003 ARROWPANELS, TYPE C	480.000 EADY				
0860	743004 FURNISH AND MAINTAIN PORTABLE CHANGEABLE MESSAGE SIGN	480.000 EADY				
0870	743005 FURNISH AND MAINTAIN PORTABLE LIGHT ASSEMBLY	212.000 EADY				
0880	743006 PLASTIC DRUMS	15145.000 EADY				
0890	743007 TRAFFIC OFFICERS	2380.000 HOUR		75.00000		178500.00

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CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0900	743010 FURNISH AND MAINTAIN TRUCK MOUNTED ATTENUATOR, TYPE II	364.000 EADY				
0910	743015 FURNISH AND MAINTAIN PORTABLE PCC SAFETY BARRIER	2142.000 LF				
0920	743016 RELOCATION PORATBLE SAFETY BARRIER	1830.000 LF				
0930	743023 TEMPORARY BARRICADES, TYPE III	33336.000 LFDY				
0940	743024 TEMPORARY WARNING SIGNS AND PLAQUES	47254.000 EADY				
0950	743025 INSTALL TEMPORARY IMPACT ATTENUATOR	3.000 EACH				
0960	743029 FURNISH TEMPORARY IMPACT ATTENUATOR - NON-GATING, REDIRECTIVE, TEST LEVEL 3	5.000 EACH				
0970	743030 RELOCATE TEMPORARY IMPACT ATTENUATOR	2.000 EACH				
0980	743031 ATSSA CERTIFIED TRAFFIC CONTROL SUPERVISOR	3296.000 HOUR				
0990	743050 FLAGGER, NEW CASTLE COUNTY, STATE	5130.000 HOUR				

CONTRACT ID: T200504110.01

PROJECT(S): T200504110

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
1000	743062 FLAGGER, NEW CASTLE COUNTY, STATE, OVERTIME	1026.000 HOUR				
1010	744506 CONDUIT JUNCTION WELL, TYPE 7, PRECAST POLYMER CONCRETE	7.000 EACH				
1020	744523 CONDUIT JUNCTION WELL, TYPE 4, PRECAST CONCRETE	1.000 EACH				
1030	744530 CONDUIT JUNCTION WELL, TYPE 11, PRECAST CONCRETE/ POLYMER LID-FRAME	13.000 EACH				
1040	744531 CONDUIT JUNCTION WELL, TYPE 14, PRECAST CONCRETE/ POLYMER LID-FRAME	17.000 EACH				
1050	745602 FURNISH & INSTALL UP TO 4" SCHEDULE 80 HDPE CONDUIT (BORE)	173.000 LF				
1060	745603 FURNISH & INSTALL UP TO 4" SCHEDULE 80 PVC CONDUIT (OPEN CUT)	58.000 LF				
1070	745604 FURNISH & INSTALL UP TO 4" SCHEDULE 80 PVC CONDUIT (TRENCH)	9545.000 LF				
1080	746847 POLE BASE, TYPE 3	4.000 EACH				
1090	746850 POLE BASE, TYPE 4A	8.000 EACH				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
1100	746924 FURNISH & INSTALL LOOP WIRE 1-CONDUCTOR #14 AWG ENCASED IN 1/4" FLEXIBLE TUBING IN A LOOP SAWCUT	1529.000 LF				
1110	747516 CABINET BASE, TYPE P	2.000 EACH				
1120	748015 PERMANENT PAVEMENT STRIPING, SYMBOL/LEGEND ALKYD-THERMOPLAST IC	3391.000 SF				
1130	748019 TEMPORARY MARKINGS, PAINT, 4"	20514.000 LF				
1140	748026 TEMPORARY MARKINGS, PAINT SYMBOL/LEGEND	179.000 SF				
1150	748033 PERMANENT PAVEMENT STRIPING, ALKYD-THERMOPLASTIC, 5"	58.000 LF				
1160	748530 REMOVAL OF PAVEMENT STRIPING	2452.000 SF				
1170	748548 PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 5"	38825.000 LF				
1180	748549 PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 10"	416.000 LF				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
1190	748553 PREFORMED RETROREFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS, BIKE SYMBOL	47.000 EACH				
1200	749000 REINFORCED CONCRETE MASONRY SIGN FOUNDATION	3.000 EACH				
1210	749687 INSTALLATION OR REMOVAL OF TRAFFIC SIGN(S) ON SINGLE SIGN POST	111.000 EACH				
1220	749690 INSTALLATION OR REMOVAL OF TRAFFIC SIGNS ON MULTIPLE SIGN POSTS	675.000 SF				
1230	750000 ADJUST WATER VALVE BOXES	8.000 EACH				
1240	753516 SANITARY SEWER SYSTEM	LUMP	LUMP			
1250	758000 REMOVAL OF EXISTING PORTLAND CEMENT CONCRETE PAVEMENT, CURB, SIDEWALK, ETC.	1095.000 SY				
1260	759004 FIELD OFFICE, TYPE I	19.000 EAMO				
1270	760000 PAVEMENT - MILLING, HOT-MIX	5400.000 SYIN				
1280	760507 PROFILE MILLING, BITUMINOUS CONCRETE	13242.000 SYIN				

CONTRACT ID: T200504110.01

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
1290	762001 SAW CUTTING, BITUMINOUS CONCRETE	5346.000 LF				
1300	762002 SAW CUTTING, CONCRETE, FULL DEPTH	155.000 LF				
1310	763000 INITIAL EXPENSE	LUMP	LUMP			
1320	763501 CONSTRUCTION ENGINEERING	LUMP	LUMP			
1330	763508 PROJECT CONTROL SYSTEM DEVELOPMENT PLAN	LUMP	LUMP			
1340	763509 CPM SCHEDULE UPDATES AND/OR REVISED UPDATES	19.000 EAMO				
1350	763533 SUMP PUMP CONNECTIONS	160.000 LF				
1360	763537 SUBDIVISION ENTRANCE SIGN	2.000 EACH				
1370	900500 ENVIRONMENTAL PERFORMANCE INCENTIVE (DISINCENTIVE)	LUMP	LUMP			392000.00
1380	905001 SILT FENCE	4391.000 LF				
1390	905003 SEDIMENT TRAP	972.000 CY				

CONTRACT ID: T200504110.01

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
1400	905004 INLET SEDIMENT CONTROL, DRAINAGE INLET	56.000 EACH				
1410	905005 INLET SEDIMENT CONTROL, CURB INLET	77.000 EACH				
1420	905500 SUPER SILT FENCE	1665.000 LF				
1430	906003 SUMP PIT	15.000 EACH				
1440	906005 WELL POINT SYSTEM	LUMP		LUMP		
1450	907011 STONE CHECK DAM	34.000 TON				
1460	907506 EARTH DIKE, TYPE A-1	1706.000 LF				
1470	908004 TOPSOIL, 6" DEPTH	49266.000 SY				
1480	908010 TOPSOILING, 6" DEPTH	9540.000 SY				
1490	908014 PERMANENT GRASS SEEDING, DRY GROUND	62795.000 SY				

CONTRACT ID: T200504110.01

PROJECT(S): T200504110

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CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
1500	908015 PERMANENT GRASS SEEDING, WET GROUND	2278.000 SY				
1510	908017 TEMPORARY GRASS SEEDING	64582.000 SY				
1520	908020 EROSION CONTROL BLANKET MULCH	8912.000 SY				
1530	908021 TURF REINFORCEMENT MATTING, TYPE 1	693.000 SY				
1540	908023 STABILIZED CONSTRUCTION ENTRANCE	86.000 TON				
1550	909001 SANDBAG DIKE	43.000 CF				
1560	909002 SANDBAG DIVERSION	102.000 CF				
	SECTION 0001 TOTAL					
	TOTAL BID					

CANNOT BE USED FOR BIDDING

BREAKOUT SHEET INSTRUCTIONS

BREAKOUT SHEET(S) MUST BE SUBMITTED EITHER WITH YOUR BID DOCUMENTS; OR WITHIN SEVEN (7) CALENDAR DAYS FOLLOWING THE BID DUE DATE BY THE LOWEST APPARENT BIDDER.

BREAKOUT SHEETS ARE TO BE SUBMITTED TO DELDOT'S CONTRACT ADMINISTRATION AS SHOWN BELOW. BREAKOUT SHEETS CANNOT BE CHANGED AFTER AWARD. THE DEPARTMENT WILL REVIEW THE FIGURES SUBMITTED ON THE BREAKOUT SHEET(S) TO ENSURE THEY MATCH THE RESPECTIVE LUMP SUM BID AMOUNT(S). MATHEMATICALLY INCORRECT BREAKOUT SHEETS WILL BE RETURNED FOR IMMEDIATE CORRECTION.

BREAKOUT SHEETS MAY BE SUBMITTED;

VIA E-MAIL TO: DOT-ASK@STATE.DE.US
SUBJECT: **T200504110.01** Breakout Sheet

OR MAILED TO: DELDOT
CONTRACT ADMINISTRATION
PO BOX 778, DOVER, DE 19903

'BREAKOUT SHEET' AND THE PROJECT NUMBER
MUST APPEAR ON THE ENVELOPE.

BREAKOUT SHEET - 1
Item 614508 - Water Service and Meter Assembly

CONTRACT NO. T200504110.01

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
1	1	LS	Mobilization/Demobilization	\$	\$
2	240	LF	8" DIP CL52 Water Main	\$	\$
3	7	EA	Bends 45 Degrees, 8"	\$	\$
4	2	EA	Bends 22.5 Degrees, 8"	\$	\$
5	1	EA	MJ Sleeve, 8"	\$	\$
6	22	EA	8" EBAA Series 1100 Megalug	\$	\$
7	35	LF	20" Steel Encasement (Jack and Bore)	\$	\$
8	1	EA	AC Miller Badger FSAA-01 8" Meter Pit & Assembly	\$	\$
9	1	EA	8" Gate Valve w/ Screw Type Valve Box	\$	\$
TOTAL ITEM 614508 – Water Service and Meter Assembly \$ (LUMP SUM BID PRICE FOR ITEM 614508)					

USED FOR
BIDDING

**BREAKOUT SHEET - 2
753516 - SANITARY SEWER SYSTEM**

CONTRACT NO. T200504110.01

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
1	1	LS	Mobilization/Demobilization	\$	\$
2	310	LF	8" HDPE Force Main and 12" HDPE Casing Pipe Directional Drill Installation	\$	\$
3	310	LF	12" HDPE Force Main and 20" HDPE Casing Pipe Directional Drill Installation	\$	\$
4	310	LF	8" DR 11 Carrier Pipe	\$	\$
5	310	LF	12" DR 17 Casing Pipe	\$	\$
6	310	LF	12" DR 11 Carrier Pipe	\$	\$
7	310	LF	20" DR 17 Casing Pipe	\$	\$
8	1	EA	12" Gate Valve	\$	\$
9	20	LF	8" DIP CL52 Force Main	\$	\$
10	30	LF	12" DIP CL52 Force Main	\$	\$
11	4	EA	8" DIP 22.5 Degree Bend	\$	\$
12	4	EA	12" DIP 22.5 Degree Bend	\$	\$
13	8	EA	8" EBAA 1108 MegaLug	\$	\$
14	8	EA	12" EBAA 1112 MegaLug	\$	\$
15	2	EA	8" EBAA 3808 Mega-Coupling	\$	\$
16	2	EA	12" EBAA 3812 Mega-Coupling	\$	\$
17	2	EA	8" HDPE to DIP Transition Anchor	\$	\$
18	2	EA	12" HDPE to DIP Transition Anchor	\$	\$
19	390	LF	Abandon Existing 8" Force Main	\$	\$
20	375	LF	Abandon Existing 12" Force Main	\$	\$
21	1	EA	Air Release Manhole, Valve, and Connection	\$	\$
TOTAL ITEM 753516 - SANITARY SEWER SYSTEM \$					
				(LUMP SUM BID PRICE FOR ITEM 753516)	

"ATTENTION"

TO BIDDERS

BREAKOUT SHEET(S) MUST BE SUBMITTED EITHER WITH YOUR BID DOCUMENTS; OR WITHIN SEVEN (7) CALENDAR DAYS FOLLOWING THE BID DUE DATE BY THE LOWEST APPARENT BIDDER.

BREAKOUT SHEETS ARE TO BE SUBMITTED TO DELDOT'S CONTRACT ADMINISTRATION AS SHOWN BELOW. BREAKOUT SHEETS CANNOT BE CHANGED AFTER AWARD. THE DEPARTMENT WILL REVIEW THE FIGURES SUBMITTED ON THE BREAKOUT SHEET(S) TO ENSURE THEY MATCH THE RESPECTIVE LUMP SUM BID AMOUNT(S). MATHEMATICALLY INCORRECT BREAKOUT SHEETS WILL BE RETURNED FOR IMMEDIATE CORRECTION.

BREAKOUT SHEETS MAY BE SUBMITTED;

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PO BOX 778, DOVER, DE 19903

'BREAKOUT SHEET' AND THE PROJECT NUMBER
MUST APPEAR ON THE ENVELOPE.

CERTIFICATION

Contract No. T200504110.01
Federal Aid Project No. ESTP-N54(04)

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								
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BIDDERS MUST ACKNOWLEDGE RECEIPT OF ALL ADDENDA

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. T200504110.01, to be paid to the **State** for the use and benefit of its Department of Transportation
("**DelDOT**") for which payment well and truly to be made, we do bind ourselves, our and each of our heirs,
executors, administrators, and successors, jointly and severally for and in the whole firmly by these presents.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH That if the above bounden **Principal** who
has submitted to the **DelDOT** a certain proposal to enter into this contract for the furnishing of certain
materiel and/or services within the **State**, shall be awarded this Contract, and if said **Principal** shall well and
truly enter into and execute this Contract as may be required by the terms of this Contract and approved by
the **DelDOT**, this Contract to be entered into within twenty days after the date of official notice of the award
thereof in accordance with the terms of said proposal, then this obligation shall be void or else to be and
remain in full force and virtue.

Sealed with _____ seal and dated this _____ day of _____ in the year of our Lord
two thousand and _____ (20 ____).

SEALED, AND DELIVERED IN THE
presence of

Name of Bidder (Organization)

Corporate
Seal

By: _____
Authorized Signature

Attest _____
Title

Name of **Surety**

Witness: _____ By: _____
Title