STATE OF DELAWARE

THIS COPY IS FOR INFORMATION ONLY. YOU MUST PURCHASE THE PROPOSAL IN ORDER TO SUBMIT A BID.

DEPARTMENT OF TRANSPORTATION

BID PROPOSAL

for

CONTRACT T200510602.01

FEDERAL AID PROJECT NO. NH-N059(34)

I-95 & US 202 INTERCHANGE

NEW CASTLE COUNTY

Completion Date 1,090 Calendar Days

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

Bids will be received in the Bidder's Room, Transportation Administration Center, 800 Bay Road, Dover, Delaware

until 2:00 P.M. local time ~~July 26, 2011~~ **August 11, 2011**

Addendum 1
July 20, 2011

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
PO BOX 778
DOVER, DELAWARE 19903

JACK MARKELL
GOVERNOR

SHAILEN P. BHATT
SECRETARY

(302) 760-2030
FAX (302) 739-2254

VIA WEBSITE POSTING

July 20, 2011 REVISED

Contract No. T200510602.01
Federal Aid Project No.NH-N059(34)
I-95 & US 202 INTERCHANGE
New Castle County

Ladies and Gentlemen:

Enclosed is Addendum No. 1 for the referenced contract consisting of the following:

NOTE: **The date for the receipt of bids has been moved to Thursday August 11, 2011.**

Bids will be received until 2:00 P.M., Local Time, the Bidder's Room (B1.11.01), in the DelDOT Transportation Administration Center, 800 Bay Road, U.S. Route 113 South, Dover, DE.

1. One (1) page, Bid Proposal Cover, revised, to be substituted for the same page in the Proposal. This changes the Bid Date to Thursday August 11, 2011.

2. One (1) page, Location/Description, page i, revised, to be substituted for the same page in the Proposal. This changes the anticipated Notice to Proceed date to October 17, 2011.

3. For proposal holders, there is an Amendment Disk being sent to you. The disk includes this Addendum 1, and the full set of plan sheets. There were no changes to plan sheets, this is being sent because the following Plan Sheets would not print from the original disk: Plan Sheets 43, 45, 47, 49, 51, 53, 55, 57, 59, 64, & 69.

Please note the revisions listed above and submit your bid based upon this information.

Sincerely,

Scott S. Gottfried
Competitively Bid Contracts Coordinator

:ssg
Enclosures

Contract No.T200510602.01

Federal Aid Project No. NH-N059(34)

I-95 & US 202 INTERCHANGE
NEW CASTLE COUNTY

LOCATION

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

DESCRIPTION

The improvements consist of furnishing all labor and materials for I-95 & US 202 Interchange, and other incidental construction in accordance with the location, notes and details shown on the plans and as directed by the Engineer.

COMPLETION DATE

All work on this contract must be complete within 1,090 Calendar Days . The Contract Time includes an allowance for 180 Weather Days

It is the Department's intent to issue a Notice to Proceed such that work starts on or about ~~September 22, 2011.~~ **October 17, 2011**.

ELECTRONIC BIDDING

This project incorporates the electronic bidding system Expedite 5.2b. Bidders wishing to use the electronic bidding option will find a bid file on the CD. The installation software may be downloaded by clicking **here**.

PROSPECTIVE BIDDERS NOTES:

1. No retainage will be withheld on this contract.
2. The Department has adopted an External Complaint Procedure. The procedure can be viewed on our website at; www.deldot.gov/information/business/, or you may request a copy by calling (302) 760-2555.
3. Please note the Special Provision titled **Changes to Project Documents During Advertisement**. The Department is using an alternative method of providing bid documents for this contract.
4. Please note there are **TRAINEES** required for this project, and proposed Trainee Plans must be submitted 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 acceptable OJT Trainee Programs within 10 Calendar Days of notification of apparent low bidder status shall create a non-rebuttable presumption that the bid is non-responsive.**
5. **SUBMISSION REMINDER:**
   a. Copy(ies) of the American Traffic Safety Services Association (ATSSA) Certification(s).
   b. Standard Specification Section 110.08 Site Reviewer requires that the name, DNREC certification number, and designated PE of each Site Reviewer be submitted to the Department. The level of certification and number required are listed in the applicable plan notes.
   c. Certification of Steel Structures Painting Council(special provision 605533/605629).

   Note: Items a, b., and c. above require copies of the current certifications for those individuals proposed for use on this Contract.

   Failure of the apparent low bidder to present copies of the required certifications within 10 Calendar Days of notification of apparent low bidder status shall create a non-rebuttable presumption that the bid is non-responsive.

STATE OF DELAWARE
CONSTRUCTION ITEMS UNITS OF MEASURE

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

*Not used for units of measurement for payment.

LOCATION i

DESCRIPTION i

CONSTRUCTION ITEMS UNITS OF MEASURE iii

GENERAL NOTICES 1
Road Closures, Detours, Interim Milestones, and Road User Costs. 1
SPECIFICATIONS. 4
CLARIFICATIONS. 4
ATTESTING TO NON-COLLUSION. 5
QUANTITIES. 5
REQUIREMENT BY DEPARTMENT OF LABOR FOR SWORN PAYROLL INFORMATION. . 5
PREFERENCE FOR DELAWARE LABOR. 5
CONFLICT WITH FEDERAL STATUTES OR REGULATIONS. 6
EQUALITY OF EMPLOYMENT OPPORTUNITY ON PUBLIC WORKS. 6
TAX CLEARANCE. 6
LICENSE. 6
TO REPORT BID RIGGING ACTIVITIES. 6
CONVICT PRODUCED MATERIALS:. 7
NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246). 8
STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS (EXECUTIVE ORDER 11246). 8
TRAINING SPECIAL PROVISIONS. 12
INTERMODAL SURFACE TRANSPORTATION EFFICIENCY ACT & TRANSPORTATION EQUITY ACT. 13
DISADVANTAGED BUSINESS ENTERPRISE (DBE) PROGRAM SPECIFICATION. 13
CRITICAL DBE REQUIREMENTS. 15
GUIDANCE FOR GOOD FAITH EFFORT. 16
REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS. . . . 17
I. GENERAL. 17
II. NONDISCRIMINATION. 18
III. NONSEGREGATED FACILITIES. 21
IV. PAYMENT OF PREDETERMINED MINIMUM WAGE. 22
V. STATEMENTS AND PAYROLLS. 26
VI. RECORD OF MATERIALS, SUPPLIES, AND LABOR. 27
VII. SUBLETTING OR ASSIGNING THE CONTRACT. 28
VIII. SAFETY: ACCIDENT PREVENTION. 28
IX. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS. 29
X. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT. 29
XI. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION. 30
XII. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING 32
DIFFERING SITE CONDITIONS. 33
PREVAILING WAGES. 34
PREVAILING WAGE REQUIREMENTS. 34
PREVAILING WAGE DETERMINATION - Highway Construction. 36
APPLICABILITY OF DAVIS-BACON LABOR STANDARD PROVISIONS TO FLAGGERS. . 39
ALL AGENCY MEMORANDUM NO. 130. 39

SUPPLEMENTAL SPECIFICATIONS. 41

SPECIAL PROVISIONS. 43
CONSTRUCTION ITEM NUMBERS. 45
CHANGES TO PROJECT DOCUMENTS DURING ADVERTISEMENT. 46
MODIFICATIONS TO REQUIRED FEDERAL CONTRACT PROVISIONS. 47
401502 - ASPHALT CEMENT COST ADJUSTMENT. 48
202518 – SETTLEMENT MONUMENT. 49
205500 - ROCK EXCAVATION FOR ROADWAY. 53

206500 - ROCK EXCAVATION FOR STRUCTURES AND TRENCHES. 57
207501 - SHEETING AND SHORING. 58
211509 - REMOVAL OF SIGN STRUCTURES 59
272503 – TRASH RACK. 60
401517 - STONE MATRIX ASPHALT (SMA) WEARING SURFACE.. 61
401577 - PAVER-LAID ULTRATHIN HOT MIX.. 65
401660 - SUPERPAVE, TYPE B HOT-MIX, 160 GYRATIONS, PG 76-22. 68
401663 - SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 160 GYRATIONS, PG 64-22 68
401665 - SUPERPAVE, TYPE C HOT-MIX, 160 GYRATIONS, PG 64-22, PATCHING. 68
401667 - SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 160 GYRATIONS, PG-64-22, PATCHING. 68
401669 - SUPERPAVE, TYPE B HOT-MIX, 160 GYRATIONS, PG-64-22, WEDGE. 68
401711 - SUPERPAVE, TYPE C HOT-MIX, 160 GYRATIONS, PG 76-22, (NON-CARBONATE STONE). 68
401699 - QUALITY CONTROL/QUALITY ASSURANCE OF BITUMINOUS CONCRETE. . . . 74
401752 – SAFETY EDGE FOR ROADWAY PAVEMENT. 90
601502 - TEMPORARY PROTECTIVE SHIELD. 92
602553 -MECHANICALLY STABILIZED EARTH WALLS, TYPE 1. 94
602557 -MECHANICALLY STABILIZED EARTH WALLS, TYPE 2. 94
602670 -MECHANICALLY STABILIZED EARTH WALLS, TYPE 3. 94
602572 - REPAIRING EXISTING P.C.C. STRUCTURES. 99
602579 - DRILLING HOLES AND INSTALLING DOWELS. 100
602586 - REHABILITATION OF CONCRETE STRUCTURE. 101
602611 - REPAIR OF CONCRETE STRUCTURES BY EPOXY INJECTION. 103
602646 - SILICONE ACRYLIC CONCRETE SEALER. 105
602650 - PRECAST CAPSTONES, TYPE III. 107
605002 - STEEL STRUCTURES. 110
605522 - URETHANE PAINT SYSTEM, EXISTING STEEL. 111
605524 - BRIDGE DRAINAGE SYSTEM.. 116
605525 - RELOCATING SIGN SUPPORT STRUCTURE. 119
605528 – UTILITY SUPPORT. 120
605533 - CLEANING EXISTING STEEL STRUCTURES, HAZARDOUS BASE (L.S.). 122
605641 - JOINT REPAIR, (COMPRESSION SEAL), 1". 150
605581 – ELASTOMERIC BEARING PADS. 152
605607 - JACKING BRIDGE. 154
605657 - STRIP SEAL EXPANSION JOINT 1 1/2". 155
605659 - STRIP SEAL EXPANSION JOINT 3". 155
605664 - STEEL SIGN STRUCTURES. 157
605697 - POT BEARINGS. 159
611500 - STONE MASONRY. 167
612528 - CORRUGATED POLYETHYLENE PIPE, TYPE C, 24". 168
612523 - CORRUGATED POLYETHYLENE PIPE, TYPE S, 18".. 170
612529 - PIPE VIDEO INSPECTION. 172
614861 - STRUCTURAL PLATE ARCH (STEEL).. 174
618526 - DRILLED SHAFT FOUNDATIONS. 177
619511 - EXPLORATORY DRILLING. 189
619512 - PRE-DRILLING FOR END BEARING PILES.. 191
619519 - DYNAMIC PILE TESTING BY CONTRACTOR. 192
701500 - INTEGRAL PORTLAND CEMENT CONCRETE CURB AND GUTTER, SPECIAL 195
705519 - PATTERNED PORTLAND CEMENT CONCRETE SIDEWALK, 6". 196
708505 - JUNCTION BOX, SPECIAL.. 198
708512 - DRAINAGE INLET, SPECIAL I. 199
708582 – MANHOLE, SPECIAL. 200
708583 - PERSONNEL GRATE FOR PIPE INLET. 201
710502 - ADJUSTING CATCH BASINS. 202
710504 - ADJUSTING MANHOLES.. 202
712524 - CONCRETE SLOPE PAVING REPAIR, 4". 203
712527 - TURF REINFORCING MAT. 205
715500 - UNDERDRAIN OUTLET PIPE, 6". 207
720506 - RELOCATING PORTABLE P.C.C. SAFETY BARRIER. 208
720529 - P.C.C. SAFETY BARRIER PERMANENT, SINGLE FACE. 209

720526 - FURNISHING PORTABLE P.C.C. STRUCTURE-MOUNTED SAFETY BARRIER.. 210
720532 - INSTALL PORTABLE IMPACT ATTENUATOR. 212
720534 - FURNISH PORTABLE IMPACT ATTENUATOR 212
720539 - RELOCATE PORTABLE IMPACT ATTENUATOR 212
720540 - DELINEATORS. 214
720544 - REFLECTORS, WHITE, CONCRETE. 215
720545 - REFLECTORS, YELLOW, CONCRETE. 215
720550 - PORTLAND CEMENT CONCRETE BARRIER, MODIFIED. 216
720551 - RELOCATING PORTABLE P.C.C. STRUCTURE-MOUNTED SAFETY BARRIER 217
720567 - FURNISH AND MAINTAIN PORTABLE P.C.C. SAFETY BARRIER. 218
720585 - GUARDRAIL END TREATMENT ATTENUATOR, TYPE 1 - 31. 220
720588 - GUARDRAIL END TREATMENT ATTENUATOR, TYPE 3 -31. 220
720636 - FURNISH AND MAINTAIN PINNED PORTABLE P.C.C. SAFETY BARRIER, DOUBLE FACE. 222
720621 - RELOCATING PINNED PORTABLE P.C.C. SAFETY BARRIER. 224
734551 – NATIVE GRASS SEEDING: NO MOW MIX. 225
735535 - SOIL RETENTION BLANKET MULCH, TYPE 5. 227
737523 - PLANTING. 229
743501 - WARNING LIGHTS, TYPE B. 231
743504 - WARNING SIGNS. 231
743507 - TEMPORARY BARRICADES, TYPE III. 231
743525 - TEMPORARY WARNING SIGNS.. 231
744506 - CONDUIT JUNCTION WELL, TYPE 7, 36" x 60" PRECAST POLYMER CONCRETE 234
744520 - CONDUIT JUNCTION WELL, TYPE 1, 20" x 20" PRECAST CONCRETE. 234
744523 - CONDUIT JUNCTION WELL, TYPE 4, 20" x 42 ½" PRECAST CONCRETE. 234
744505 - ADJUST OR REPAIR EXISTING CONDUIT JUNCTION WELL 236
744519 - RELOCATION OF EXISTING JUNCTION WELL.. 237
744525 - REMOVAL OF EXISTING JUNCTION WELL. 238
745506 - GALVANIZED CONDUIT IN/ON STRUCTURE, 2" (50 mm). 239
745521 - SUPPLY OF 4" SDR-13.5 HDPE CONDUIT. 240
745524 - SUPPLY OF 4" SCHEDULE 80 PVC CONDUIT. 240
745526 - SUPPLY OF 3" GALVANIZED STEEL CONDUIT. 240
745527 - SUPPLY OF 2 1/2" GALVANIZED STEEL CONDUIT. 240
745528 - SUPPLY OF 2" GALVANIZED STEEL CONDUIT. 240
745530 - SUPPLY OF 1" GALVANIZED STEEL CONDUIT. 240
745532 - SUPPLY OF 3" SCHEDULE 40 PVC CONDUIT. 240
745542 - INSTALLATION OF CONDUIT UNDER EXISTING PAVEMENT - DIRECTIONAL BORE 242
745543 - INSTALLATION OF CONDUIT UNDER EXISTING PAVEMENT - OPEN CUT. . . . 242
745544 - INSTALLATION OF CONDUIT IN UNPAVED TRENCH. 242
745545 - INSTALLATION OF CONDUIT ON WOOD POLE. 242
745546 - INSTALLATION OF CONDUIT ON STRUCTURE. 242
745547 - INSTALLATION OF ADDITIONAL CONDUITS IN TRENCH OR OPEN CUT PAVEMENT. 242
745548 - INSTALLATION OF ADDITIONAL CONDUITS IN DIRECTIONAL BORE. 242
745551 - REMOVAL OF CONDUIT FROM WOOD POLE.. 246
746511 - CABLES, 1/#4 AWG. 247
746512 - CABLES, 1/#6 AWG. 247
746513 - CABLES, 1/#8 AWG. 247
746514 - CABLES, 1/#10 AWG. 247
746527 - CABLES, 1/#2 AWG. 247
746598 - INSULATED GROUND CABLE, 1/#2. 247
746817 - CABLES, 1/#2/0 AWG. 247
746525 - ALUMINUM LIGHTING STANDARD 249
746594 - LUMINAIRE (HPS) 250 WATT. 250
746693 - SUPPLY OF WOODEN ELECTRICAL POLE, CLASS II, 45'. 251
746697 - INSTALLATION OF WOOD POLE.. 255
746698 - REMOVAL OF WOOD POLE. 255
746717 - ELECTRIC SERVICE ON PEDESTAL WITH SERVICE RISER.. 257
746774 - SUPPLY AND INSTALLATION OF LOOP DETECTOR WIRE. 260
746779 - SPLICING OF ELECTRICAL CABLE, UNDERGROUND. 262

746830 - REMOVAL OF CONCRETE POLE BASES AND CABINET FOUNDATIONS. 265
746847 - POLE BASE TYPE 3. 266
746852 - POLE BASE TYPE 6. 266
747506 - CABINET BASE. 268
747508 - LIGHTING CONTROL CENTER – 100A. 269
748502 - RAISED/RECESSED PAVEMENT MARKER. 272
748506 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 4" 273
748507 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 6" 273
748509 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 12" 273
748535 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 4". 273
748536 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 6". 273
748537 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 8". 273
748538 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 10". 273
748539 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 12". 273
748540 - PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK 16". 273
748530 - REMOVAL OF PAVEMENT STRIPING. 283
749500 – SIGN PANEL. 284
749502 - SIGN PANEL OVERLAYS ON EXISTING SIGN. 289
749504 - INSTALLATION OR REMOVAL OF BREAKAWAY I BEAM SIGN MOUNTS. . . . 291
749510 - INSTALLATION OR REMOVAL OF SIGN ON OVER HIGHWAY STRUCTURE. . 292
749511 - INSTALLATION OR REMOVAL OF SIGN ON ROADSIDE I-BEAM STRUCTURE 292
749516 – REINFORCED CONCRETE SIGN FOUNDATION, W-6. 293
749517 – REINFORCED CONCRETE SIGN FOUNDATION, W-8. 293
749518 – REINFORCED CONCRETE SIGN FOUNDATION, W-10. 293
749519 – REINFORCED CONCRETE SIGN FOUNDATION, W-12. 293
749521 - SUPPLY OF BREAKAWAY I-BEAM SIGN POSTS, W-6. 294
749522 - SUPPLY OF BREAKAWAY I-BEAM SIGN POSTS, W-8. 294
749523 - SUPPLY OF BREAKAWAY I-BEAM SIGN POSTS, W-10. 294
749524 - SUPPLY OF BREAKAWAY I-BEAM SIGN POSTS, W-12. 294
749535 - SUPPLY AND INSTALLATION OF BOLT KIT FOR BREAK AWAY COUPLING 296
749536 - SUPPLY AND INSTALLATION OF HINGE PLATE FOR BREAK AWAY COUPLING 296
749537 - SUPPLY AND INSTALLATION OF BREAK AWAY COUPLING SYSTEM. 296
749540 - REMOVAL OF OVERHEAD I-BEAM. 298
749550 - INSTALLATION OF BREAKAWAY I-BEAM SIGN POSTS. 299
749687 – INSTALLATION OR REMOVAL OF TRAFFIC SIGN ON SINGLE SIGN POST. . . . 300
749688 - INSTALLATION OF 4” DIAMETER HOLE, LESS THAN OR EQUAL TO 6” IN DEPTH 301
749690 - INSTALLATION OR REMOVAL OF TRAFFIC SIGN ON MULTIPLE SIGN POSTS 302
759502 - FIELD OFFICE, SPECIAL I. 303
760504 - RUMBLE STRIPS, HOT MIX. 310
760506 - RUMBLE STRIPS, CONCRETE. 310
760507 - PROFILE MILLING, HOT-MIX. 311
763500 - MAINTENANCE OF TRAFFIC. 313
763501 - CONSTRUCTION ENGINEERING. 319
763503 - TRAINEE. 323
763508 - PROJECT CONTROL SYSTEM DEVELOPMENT PLAN. 324
763509 - CPM SCHEDULE UPDATES AND/OR REVISED UPDATES. 324
763626 - DIESEL FUEL COST PRICE ADJUSTMENT. 337
763632 – REMOVAL OF RAISED PAVEMENT MARKER. 341
763655 - STEEL COST PRICE ADJUSTMENT. 342
UTILITY STATEMENT. 347
CERTIFICATE OF RIGHT-OF-WAY STATUS. 355
ENVIRONMENTAL REQUIREMENTS. 357

BID PROPOSAL FORMS. 361
BREAKOUT SHEETS. 421

GENERAL NOTICES

Road Closures, Detours, Interim Milestones, and Road User Costs

The contract drawings and notes on plan sheets 266 through 419 provide a sequence of construction for this contract. There are road closures, detours, and tie-ins with limited time frames that will require the full attention of the successful bidder.

A. Interim Milestone 1 - Bridge 1-763 Work, Road User Costs

As detailed in the construction phasing plans, certain construction activities on Bridge 1-763 will require simultaneous closures of the following roads/ramps:

Northbound I-95 at the Ramp 2/5 exit
Southbound I-95 at the Ramp 4 exit
Ramp 5 from northbound I-95 to northbound US Route 202
Ramp 6 from southbound US Route 202 to northbound I-95
Ramp 7 from southbound I-95 to southbound SR 202

The detours for the simultaneous closures will be posted as shown on the "Detour Plan Structure No. 763" (Sheet 415) and "Detour Plan I-95 to I-495" (Sheet 416). The simultaneous closures for this work will be limited to weekends, from 9 PM Friday to 5 AM Monday. It is expected to take two weekends for beam placement on the new structure and two weekends for removal of beams on the existing structure, requiring closures for a total of four weekends. This work can not begin prior to 9:00 PM on Friday and must be substantially complete by 5:00 AM the following Monday. The closures shall not begin without the prior written approval of the Engineer. The Contractor shall notify the Engineer in writing, a minimum of two weeks in advance, of his intent to begin the closures. Should the Contractor fail to substantially complete all work and traffic has been restored to regular operation by 5:00 AM the following Monday morning, the Department will assess the Contractor a Road Users Cost as follows:

5:00 AM through 5:59 AM: $ 150.00 for each 15-minute period
6:00 AM through 6:59 AM: $ 800.00 for each 15-minute period
7:00 AM through 7:59 AM: $ 2,650.00 for each 15-minute period
8:00 AM through 8:59 AM: $ 2,300.00 for each 15-minute period
After 9:00 AM: $2,000 for each 15-minute period

Maximum Daily Cost: $80,000

The 15-minute periods shall be measured as follows:
From minute 0 up through minute 14;
From minute 15 up through minute 29;
From minute 30 up through minute 44;
From minute 45 up through minute 59 or portion thereof until all work is complete and all affected roads are fully open to unrestricted traffic. See example below.

Official time will be indicated by Verizon.

B. Interim Milestone 2 - Bridge 1-762 Work, Road User Costs

As detailed in the construction phasing plans, certain construction activities on Bridge 1-762 will require simultaneous closures of the following roads/ramps:
" Northbound US Route 202 at the Ramp 1 exit
Southbound US Route 202 at the Ramp 6 exit
Ramp 5 from northbound I-95 to northbound US Route 202

The detours for the simultaneous closures will be posted as shown on the "Detour Plan Structure No. 762" (Sheet 414). The simultaneous closures for this work will be limited to weekends, from 8 PM Saturday to 5 AM Monday. Ideally, the Bridge 1-762 work requiring these road closures can be completed in one weekend, but ultimately it may take multiple weekends. This work can not begin prior to 8:00 PM on Saturday and must be substantially complete by 5:00 AM the following Monday. The closures shall not begin without the prior written approval of the Engineer. The Contractor shall notify the Engineer in writing, a minimum of two

weeks in advance, of his intent to begin the closures. Should the Contractor fail to substantially complete all work and traffic has been restored to regular operation by 5:00 AM the following Monday morning, the Department will assess the Contractor a Road Users Cost as follows:

5:00 AM through 5:59 AM: $ 350.00 for each 15-minute period
6:00 AM through 6:59 AM: $ 1,075.00 for each 15-minute period
7:00 AM through 7:59 AM: $ 1,825.00 for each 15-minute period
8:00 AM through 8:59 AM: $ 1,875.00 for each 15-minute period
After 9:00 AM: $1,500 for each 15-minute period

Maximum Daily Cost: $60,000

The 15-minute periods shall be measured as follows:
From minute 0 up through minute 14;
From minute 15 up through minute 29;
From minute 30 up through minute 44;
From minute 45 up through minute 59 or portion thereof until all work is complete and all affected roads are fully open to unrestricted traffic. See example below.

Official time will be indicated by Verizon.

C. Interim Milestone 3 - Bridge 1-764 Work, Options 1 & 2, Road User Costs

As detailed in the construction phasing plans, certain construction activities on Bridge 1-764 will require the closure of Ramp 5. The detour will be posted as shown in the plans, and the particular detour route will depend on the timing of this work. The closure for this work will be limited to weekends, from 8 PM Saturday to 5 AM Monday. It is anticipated that the Bridge 1-764 work requiring the Ramp 5 closure can be completed in one weekend.

The closure of Ramp 5 for Bridge 1-764 work should occur on a weekend immediately before or after the closure of Ramp 5 for Bridge 1-763 work. A detour should be implemented, corresponding with "Detour Plan Structure No. 764" (Sheet 418). This is also known as the Option 1 Detour as described in the Transportation Management Plan (TMP).

However, if a significant amount of time (to be determined by DelDOT) passes between the closure of Ramp 5 for the Bridge 1-763 work and the closure of Ramp 5 for the Bridge 1-764 work, a different detour should be implemented, corresponding with "Detour Plan Ramp #6172" (Sheet 410). This is also known as the Option 2 Detour as described in the TMP.

In either option, work can not begin prior to 8:00 PM on Saturday and must be substantially complete by 5:00 AM the following Monday. The closure shall not begin without the prior written approval of the Engineer. The Contractor shall notify the Engineer in writing, a minimum of two weeks in advance, of his intent to begin the closure. Should the Contractor fail to substantially complete all work and traffic has been restored to regular operation by 5:00 AM the following Monday morning, the Department will assess the Contractor a Road Users Cost as follows:

If the Option 1 Detour is used (corresponding with "Detour Plan Structure No. 764"):
5:00 AM through 5:59 AM: $ 25.00 for each 15-minute period
6:00 AM through 6:59 AM: $ 225.00 for each 15-minute period
7:00 AM through 7:59 AM: $ 1,200.00 for each 15-minute period
8:00 AM through 8:59 AM: $ 1,075.00 for each 15-minute period
After 9:00 AM: $1,000 for each 15-minute period

Maximum Daily Cost: $40,000

If the Option 2 Detour is used (corresponding with "Detour Plan Ramp #6172"):
5:00 AM through 5:59 AM: $ 350.00 for each 15-minute period
6:00 AM through 6:59 AM: $ 1,075.00 for each 15-minute period
7:00 AM through 7:59 AM: $ 1,825.00 for each 15-minute period
8:00 AM through 8:59 AM: $ 1,875.00 for each 15-minute period
After 9:00 AM: $1,500 for each 15-minute period

Maximum Daily Cost: $60,000

The 15-minute periods shall be measured as follows:
From minute 0 up through minute 14;
From minute 15 up through minute 29;
From minute 30 up through minute 44;
From minute 45 up through minute 59 or portion thereof until all work is complete and all affected roads are fully open to unrestricted traffic. See example below.

Official time will be indicated by Verizon.

D. Interim Milestone 4 - Bridge 1-570 Work, Road User Costs

As detailed in the construction phasing plans, certain construction activities on Bridge 1-570 will require simultaneous closures of the following roads/ramps:

Northbound I-95 at the Ramp 2/5 exit
Southbound I-95 at the Ramp 4 exit
Ramp 6 from southbound US Route 202 to northbound I-95
Ramp 8 from northbound US Route 202 to southbound I-95

The detours for the simultaneous closures will be posted as shown in the "Detour Plan Structure No. 570" (Sheet 419) and "Detour Plan I-95 to I-495" (Sheet 416). The simultaneous closures for this work will be limited to weeknights from 10 PM to 5 AM. It is expected to take six nights for the replacement of each fascia beam (3 nights for removal of existing and 3 nights for installation of new), and there are two beams, requiring closures for a total of 12 weeknights. This work can not begin prior to 10:00 PM and must be substantially complete by 5:00 AM the following morning. The closures shall not begin without the prior written approval of the Engineer. The Contractor shall notify the Engineer in writing, a minimum of two weeks in advance, of his intent to begin the closures. Should the Contractor fail to substantially complete all work and traffic has been restored to regular operation by 5:00 AM the following morning, the Department will assess the Contractor a Road Users Cost as follows:

5:00 AM through 5:59 AM: $ 125.00 for each 15-minute period
6:00 AM through 6:59 AM: $ 575.00 for each 15-minute period
7:00 AM through 7:59 AM: $ 1,450.00 for each 15-minute period
8:00 AM through 8:59 AM: $ 1,225.00 for each 15-minute period
After 9:00 AM: $1,000 for each 15-minute period

Maximum Daily Cost: $40,000

The 15-minute periods shall be measured as follows:
From minute 0 up through minute 14;
From minute 15 up through minute 29;
From minute 30 up through minute 44;
From minute 45 up through minute 59 or portion thereof until all work is complete and all affected roads are fully open to unrestricted traffic. See example below.

Official time will be indicated by Verizon.

E. Interim Milestone 5 - Ramp 8 Long-Term Closure, Road User Costs

As detailed in the construction phasing plans, certain construction activities on southbound I-95 and Ramp 8 will require the closure of Ramp 8. The detour will be posted as shown in the "Detour Plan Ramp #6178" (Sheet 412). This will be a continuous closure, and Ramp 8 must not be closed for more than 20 calendar days from the time the closure is initiated. The closures shall not begin without the prior written approval of the Engineer. The Contractor shall notify the Engineer in writing, a minimum of two weeks in advance, of his intent to begin the closures. Should the Contractor fail to complete all work and have Ramp 8 fully open to traffic by the end of Calendar Day 20 of the closure, beginning of Calendar Day 21, the Department will assess Road Users Cost at the rate of $ 30,500.00 per day. Road User Costs will be assessed until such time as Ramp 8 is fully open to traffic. Additionally, if all contract time has been expended, liquidated damages will also be assessed on the contract as a whole.

F. Liquidated Damages

Liquidates damages will only be assessed for each Calendar Day over the established Calendar Days in the Contract.

G. CPM Schedule, Updates and Other General Conditions

1. In order to minimize disruption and cost to the traveling public, the Contractor shall give his/her full attention to this project, such that all work will be completed as soon as possible after "Notice to Proceed".

2. CPM Schedule and Updates for this contract shall be required as specified in special provision 763508 Project Control System Development Plan and 763509 CPM Schedule Updates and/or Revisions.

All interim milestones shall be identified and labeled as activities by the Contractor in the project's approved CPM Schedule as well as all subsequent updates and/or revisions. Project Changes, which are the responsibility of DelDOT, such as, plan revisions, change order additions, delays, etc. that cause a milestone to shift to a later time, as documented by the most current approved CPM Schedule, will allow the establishment of a revised interim milestone. Circumstances that shall not cause an interim milestone to change include, but are not limited to, subcontractor non-performance, inability to meet schedule activity durations, lack of manpower and/or equipment, late material deliveries.

3. DelDOT calculates that for the Contractor to meet the stated phase completion times and the overall project completion time, multiple crews will be needed for the duration of the project. The Contractor shall observe road/ramp closure restrictions, work time restrictions, and areas within the project limits requiring daytime and/or nighttime operations as noted in the Plans.

4. The substantial completion of the project or an interim milestone shall be determined solely by the Engineer.

5. Calendar day shall be as defined in Standard Specification Section 101.13, Calendar Day.

6. As used herein:

(a) "substantially complete" is as defined in Standard Specification Section 101.79, Substantial Completion, as applied to this project and the interim milestones, and the interim milestones, and
(b) "fully open to traffic" shall mean that all travel lanes, turn lanes and shoulders are available at all times for the unrestricted flow of traffic. Short-term shoulder closures will be permitted to conduct seeding operations and to complete punch list items. Any punch list item requiring a lane closure or disruption of the flow of traffic does not constitute "substantial completion" and will result in time charges and/or liquidated damages to be assessed, unless otherwise directed and approved by the Engineer.

7. Example calculation for assessment of Road User Costs in 15 minute periods:
Interim Milestone 1, Failure to have traffic restored to regular operation until 8:17 AM, local time:
5:00 AM through 5:59 AM 4 x $150.00 = $600.00;
6:00 AM through 6:59 AM 4 x $800.00 = $3,200.00;
7:00 AM through 7:59 AM 4 x $2,650.00 = $10,600.00;
8:00 AM through 8:17 AM 2 x $2,300.00 = $4,600.00;
for a total of $19,000.00. ($600.00 + $3,200.00 + $10,600.00 + $4,600.00)

SPECIFICATIONS:

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

CLARIFICATIONS:

Under any Section or Item included in the Contract, the Contractor shall be aware that when requirements, responsibilities, and furnishing of materials are outlined in the details and notes on the Plans and in the paragraphs preceding the " Basis of Payment" paragraph in the Standard Specifications or Special Provisions,

no interpretation shall be made that such stipulations are excluded because reiteration is not made in the "Basis of Payment" paragraph.

ATTESTING TO NON-COLLUSION:

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

QUANTITIES:

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

REQUIREMENT BY DEPARTMENT OF LABOR FOR SWORN PAYROLL INFORMATION

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

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

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

Contractor may contact:

Department of Labor
Division of Industrial Affairs
4425 No. Market Street
Wilmington, DE 19802

Telephone (302) 761-8200

PREFERENCE FOR DELAWARE LABOR:

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

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

CONFLICT WITH FEDERAL STATUTES OR REGULATIONS:

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

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

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

FEDERAL LABOR AND EMPLOYMENT REQUIREMENTS

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

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

EQUALITY OF EMPLOYMENT OPPORTUNITY ON PUBLIC WORKS:

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

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

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

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

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

TAX CLEARANCE:

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

LICENSE:

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

TO REPORT BID RIGGING ACTIVITIES:

CALL 1-800-424-9071

The U. S. Department of Transportation (DOT) operates the above toll-free "hotline" Monday through Friday,

8:00 a.m. to 5:00 p.m. eastern time. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should use the "hotline" to report such activities.

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

CONVICT PRODUCED MATERIALS:

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

(1) Produced by convicts who are on parole, supervised release, or probation from a prison or
(2) Produced in a qualified prison facility and the cumulative annual production amount of such materials for use in Federal-aid highway construction does not exceed the amount of such materials produced in such facility for use in Federal-aid highway construction during the 12-month period ending July 1, 1987.

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

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

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

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

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

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

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

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

4. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is 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).

* * * * *

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 SIX (6) .** In the event the contractor subcontracts a portion of the contract work, he shall determine how many, if any, of the trainees are to be trained by the subcontractor, provided however, that the contractor shall retain the primary responsibility for meeting the training requirements imposed by this special provision. The contractor shall also insure that this Training Special Provision is made applicable to such subcontract. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year apprenticeship or training.

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

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

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

The minimum length and type of training for each classification will be as established in the training program selected by the contractor and approved by the Department of Highways and Transportation and the Federal Highway Administration. The Department of Highways and Transportation and the Federal Highway Administration shall approve a program if it is reasonably calculated to meet the equal employment opportunity obligations of the contractor and to qualify the average trainee for journeyman status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau and training programs approved but not necessarily sponsored by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training shall also be considered acceptable provided it is being administered in a manner consistent with the equal employment obligations of Federal-aid highway construction contracts. Approval or acceptance of a training program shall be obtained from the State prior to commencing work the classification covered by the program. It is the intention of these provisions that the training is to be provided in the construction crafts rather than clerk-typists or secretarial-type positions. Training is permissible in lower level management positions such as

office engineers, estimators, timekeepers, etc., where the training is oriented toward construction applications. Training in the laborer classification may be permitted provided that significant and meaningful training is provided and approved by the division office. Some off-site training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

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

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

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

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

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

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

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INTERMODAL SURFACE TRANSPORTATION EFFICIENCY ACT & TRANSPORTATION EQUITY ACT

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

* * * * *

DISADVANTAGED BUSINESS ENTERPRISE (DBE) PROGRAM SPECIFICATION

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

The following definitions apply to this subpart:

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

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

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

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

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

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

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

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

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

(v) Subcontinent Asian Americans which includes persons whose origins are from India, Pakistan, Bangladesh, Bhutan, the Maldives Islands, Nepal or Sri Lanka;
(vi) Women;
(vii) Any additional groups whose members are designated as socially and economically disadvantaged by the SBA, at such time as the SBA designation becomes effective.

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

The specific contract goals for this contract are:

Disadvantaged Business Enterprise 11 % Percent

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

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

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

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

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

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CRITICAL DBE REQUIREMENTS

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

1. In the event that the bidder cannot meet the DBE goal as set forth in this specification, he/she shall at the time of bid submit to the Department that percentage of the DBE Goal that will be met, if any, on the written and notarized assurance made a part of this contract. The contractor shall also at the time of bid submit all documentation that the contractor wishes to have the Department consider in determining that the contractor made a Good Faith Effort to meet contract DBE Goals. The Department will not accept Good Faith Effort documentation other than on the scheduled date and time of the bid opening. However, the Department may ask for clarification of information submitted should the need arise.

2. A bid which does not contain either a completely executed DBE Program Assurance and/or Good Faith Effort documentation, where appropriate, shall be declared non-responsive and shall not be considered by the Department.

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

4. Failure of the apparent low bidder to present originals of all DBE subcontracts to substantiate the volume of work to be performed by DBE's as indicated in the bid within ten (10) calendar days after the bid opening shall create a rebuttable presumption that the bid is not responsive.

5. Bidders are advised that failure to meet DBE Goals during the term of the contract may subject them to Department sanctions as identified in the DBE Program Plan.

6. In the execution of this contract, the successful bidder agrees to comply with the following contract clauses:

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

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

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

"The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such remedy as the recipient deems appropriate." 49 CFR Section 26.13

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

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GUIDANCE FOR GOOD FAITH EFFORT

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

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

1. Efforts made to select portions of the work proposed to be performed by DBEs in order to increase the likelihood of achieving the stated goal. Selection of portions of work are required to at least equal the goal for DBE utilization specified in this contract.

2. Written notification at least ten (10) calendar days prior to the opening of a bid soliciting DBE interest in participating in the contract as a subcontractor or supplier and for specific items of work.

3. Efforts made to obtain and negotiate with DBE firms for specific items of work:
   a. Description of the means by which firms were solicited (i.e. by telephone, e-mail, written notice, advertisement).
   b. The names, addresses, telephone numbers of DBE's contacted, the dates of initial contact; and whether initial solicitations of interest were followed-up by contacting the DBEs to determine with certainty whether the DBEs were interested.
   c. A description of the information provided to DBE firms regarding the plans,

specifications and estimated quantities for portions of the work to be performed.

d. A statement of why additional agreements with DBE's were not reached in order to meet the projected goal.

e. Listing of each DBE contacted but not contracted and the reasons for not entering a contract.

4. Efforts made to assist DBEs that need assistance in obtaining bonding, insurance, or lines of credit required by the contractor.

5. Reasons why certified DBEs are not available or not interested.

6. Efforts to effectively use the services of available disadvantaged community organizations; disadvantaged contractor's groups; local, state and federal DBE assistance offices; and other organizations that provide assistance in recruitment and placement of DBEs.

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

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

Administrative reconsideration:

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

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

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REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS

(Exclusive of Appalachian Contracts)

I. GENERAL

1. These contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

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

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

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

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

5. Disputes arising out of the labor standards provisions of Section IV (except paragraph 5) and Section V of these Required Contract Provisions shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the U.S. Department of Labor (DOL) as set forth in 29 CFR 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the DOL, or the contractor's employees or their representatives.

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

a. discriminate against labor from any other State, possession, or territory of the United States (except for employment preference for Appalachian contracts, when applicable, as specified in Attachment A), or

b. employ convict labor for any purpose within the limits of the project unless it is labor performed by convicts who are on parole, supervised release, or probation.

II. NONDISCRIMINATION

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

1. **Equal Employment Opportunity:** Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630 and 41 CFR 60) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The Equal Opportunity Construction Contract Specifications set forth under 41 CFR 60-4.3 and the provisions of the American Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the State highway agency (SHA) and the Federal Government in carrying out EEO obligations and in their review of his/her activities under the contract.

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

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

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

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

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

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

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

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

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

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

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

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, he is expected to observe the provisions of that agreement to the extent that the system permits the contractor's compliance with EEO contract provisions. (The DOL has held that where implementation of such agreements have the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Executive Order 11246, as amended.)

c. The contractor will encourage his present employees to refer minority group applicants for employment. Information and procedures with regard to referring minority group applicants will be discussed with employees.

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

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

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

c. The contractor will periodically review selected personnel actions in depth to determine

whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

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

6. **Training and Promotion:**

a. The contractor will assist in locating, qualifying, and increasing the skills of minority group and women employees, and applicants for employment.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision.

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

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

7. **Unions:** If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use his/her best efforts to obtain the cooperation of such unions to increase opportunities for minority groups and women within the unions, and to effect referrals by such unions of minority and female employees. Actions by the contractor either directly or through a contractor's association acting as agent will include the procedures set forth below:

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

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

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

d. In the event the union is unable to provide the contractor with a reasonable flow of minority and women referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minority group persons and women. (The DOL has held that it shall be no excuse that the union with which the contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees.) In the event the union referral practice prevents the contractor from meeting

the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the SHA.

8. **Selection of Subcontractors, Procurement of Materials and Leasing of Equipment:** The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment.

a. The contractor shall notify all potential subcontractors and suppliers of his/her EEO obligations under this contract.

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

c. The contractor will use his best efforts to ensure subcontractor compliance with their EEO obligations.

9. **Records and Reports:** The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the SHA and the FHWA.

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

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

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

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees; and

(4) The progress and efforts being made in securing the services of DBE subcontractors or subcontractors with meaningful minority and female representation among their employees.

b. The contractors will submit an annual report to the SHA each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. If on-the job training is being required by special provision, the contractor will be required to collect and report training data.

III. NONSEGREGATED FACILITIES

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

a. By submission of this bid, the execution of this contract or subcontract, or the consummation of this material supply agreement or purchase order, as appropriate, the bidder, Federal-aid construction contractor, subcontractor, material supplier, or vendor, as appropriate, certifies that the firm does not maintain or provide for its employees any segregated facilities at any of its establishments, and that the firm does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The firm agrees that a breach of this certification is a violation of the EEO provisions of this contract. The firm further certifies that no employee will be denied access to adequate facilities on the basis of sex or disability.

b. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, timeclocks, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive, or are, in fact, segregated on the basis of race, color, religion, national origin, age or disability, because of habit, local custom, or otherwise. The only exception will be for the disabled when the demands for accessibility override (e.g. disabled parking).

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

IV. PAYMENT OF PREDETERMINED MINIMUM WAGE

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

1. **General:**

a. All mechanics and laborers employed or working upon the site of the work will be paid unconditionally and not less often than once a week and without subsequent deduction or rebate on any account [except such payroll deductions as are permitted by regulations (29 CFR 3) issued by the Secretary of Labor under the Copeland Act (40 U.S.C. 276c)] the full amounts of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment. The payment shall be computed at wage rates not less than those contained in the wage determination of the Secretary of Labor (hereinafter "the wage determination") which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor or its subcontractors and such laborers and mechanics. The wage determination (including any additional classifications and wage rates conformed under paragraph 2 of this Section IV and the DOL poster (WH-1321) or Form FHWA-1495) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers. For the purpose of this Section, contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act (40 U.S.C. 276a) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of Section IV, paragraph 3b, hereof. Also, for the purpose of this Section, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in paragraphs 4 and 5 of this Section IV.

b. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein, provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed.

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

2. **Classification:**

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

b. The contracting officer shall approve an additional classification, wage rate and fringe

benefits only when the following criteria have been met:

(1) the work to be performed by the additional classification requested is not performed by a classification in the wage determination;

(2) the additional classification is utilized in the area by the construction industry;

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

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

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

d. In the event the contractor or subcontractors, as appropriate, the laborers or mechanics to be employed in the additional classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. Said Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary

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

3. **Payment of Fringe Benefits:**

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

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

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

a. Apprentices:

(1) Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and

individually registered in a bona fide apprenticeship program registered with the DOL, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau, or if a person is employed in his/her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State apprenticeship agency (where appropriate) to be eligible for probationary employment as an apprentice.

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

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

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

b. Trainees:

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

(2) The ratio of trainees to journeyman-level employees on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the

registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

(3) Every trainee must be paid at not less than the rate specified in the approved program for his/her level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman-level wage rate on the wage determination which provides for less than full fringe benefits for apprentices, in which case such trainees shall receive the same fringe benefits as apprentices.

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

c. Helpers:

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

5. **Apprentices and Trainees (Programs of the U.S. DOT):**

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

6. **Withholding:**

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

7. **Overtime Requirements:**

No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers, mechanics, watchmen, or guards (including apprentices, trainees, and helpers described in paragraphs 4 and 5 above) shall require or

permit any laborer, mechanic, watchman, or guard in any workweek in which he/she is employed on such work, to work in excess of 40 hours in such workweek unless such laborer, mechanic, watchman, or guard receives compensation at a rate not less than one-and-one-half times his/her basic rate of pay for all hours worked in excess of 40 hours in such workweek.

8. **Violation:**

Liability for Unpaid Wages; Liquidated Damages: In the event of any violation of the clause set forth in paragraph 7 above, the contractor and any subcontractor responsible thereof shall be liable to the affected employee for his/her unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory) for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer, mechanic, watchman, or guard employed in violation of the clause set forth in paragraph 7, in the sum of $10 for each calendar day on which such employee was required or permitted to work in excess of the standard work week of 40 hours without payment of the overtime wages required by the clause set forth in paragraph 7.

9. **Withholding for Unpaid Wages and Liquidated Damages:**

The SHA shall upon its own action or upon written request of any authorized representative of the DOL withhold, or cause to be withheld, from any monies payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 8 above.

V. STATEMENTS AND PAYROLLS

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

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

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

2. **Payrolls and Payroll Records:**

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

b. The payroll records shall contain the name, social security number, and address of each such employee; his or her correct classification; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalent thereof the types described in Section 1(b)(2)(B) of the Davis Bacon Act); daily and weekly number of hours worked; deductions made; and actual wages paid. In addition, for Appalachian contracts, the payroll records shall contain a notation indicating whether the employee does, or does not, normally reside in the labor area as defined in Attachment A, paragraph 1. Whenever the Secretary of Labor, pursuant to Section IV, paragraph 3b, has found that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis Bacon Act, the contractor and each subcontractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, that the plan or program has been communicated in writing to the

laborers or mechanics affected, and show the cost anticipated or the actual cost incurred in providing benefits. Contractors or subcontractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprentices and trainees, and ratios and wage rates prescribed in the applicable programs.

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

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

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

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

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

e. The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 2d of this Section V.

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

g. The contractor or subcontractor shall make the records required under paragraph 2b of this Section V available for inspection, copying, or transcription by authorized representatives of the SHA, the FHWA, or the DOL, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the SHA, the FHWA, the DOL, or all may, after written notice to the contractor, sponsor, applicant, or owner, take such actions as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

VI. RECORD OF MATERIALS, SUPPLIES, AND LABOR

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

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

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

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

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

VII. SUBLETTING OR ASSIGNING THE CONTRACT

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the State. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635).

a. "Its own organization" shall be construed to include only workers employed and paid directly by the prime contractor and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor, assignee, or agent of the prime contractor.

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

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

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

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

VIII. SAFETY: ACCIDENT PREVENTION

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

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

IX. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

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

NOTICE TO ALL PERSONNEL ENGAGED ON FEDERAL-AID HIGHWAY PROJECTS

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

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

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

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

Shall be fined not more that $10,000 or imprisoned not more than 5 years or both."

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

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

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

1. That any facility that is or will be utilized in the performance of this contract, unless such contract is exempt under the Clean Air Act, as amended (42 U.S.C. 1857 et seq., as amended by Pub.L. 91-604), and under the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., as amended by Pub.L. 92-500), Executive Order 11738, and regulations in implementation thereof (40 CFR 15) is not listed, on the date of contract award, on the U.S. Environmental Protection Agency (EPA) List of Violating Facilities pursuant to 40 CFR 15.20.

2. That the firm agrees to comply and remain in compliance with all the requirements of Section 114 of the Clean Air Act and Section 308 of the Federal Water Pollution Control Act and all regulations and guidelines listed thereunder.

3. That the firm shall promptly notify the SHA of the receipt of any communication from the Director, Office of Federal Activities, EPA, indicating that a facility that is or will be utilized for the contract is under consideration to be listed on the EPA List of Violating Facilities.

4. That the firm agrees to include or cause to be included the requirements of paragraph 1 through 4 of this Section X in every nonexempt subcontract, and further agrees to take such action as the government may direct as a means of enforcing such requirements.

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

1. **Instructions for Certification - Primary Covered Transactions:**

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

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

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

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

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

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

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

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

h. A participant in a covered transaction may rely upon a certification of a prospective

participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the nonprocurement portion of the "Lists of Parties Excluded From Federal Procurement or Nonprocurement Programs" (Nonprocurement List) which is compiled by the General Services Administration.

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

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

* * * * *

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

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

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

b. Have not within a 3-year period preceding this proposal been convicted of or had a civil judgement rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph 1b of this certification; and

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

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

* * * * *

2. **Instructions for Certification - Lower Tier Covered Transactions:**

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

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

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

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

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

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

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

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.

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

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

* * * * *

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

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

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

* * * * *

XII. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

(Applicable to all Federal-aid construction contracts and to all related subcontracts which exceed $100,000 - 49 CFR 20)

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

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

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

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

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

Form FHWA-1273 (Rev. 3-94)

DIFFERING SITE CONDITIONS,

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

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

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

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

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

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

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

his/her determination whether or not an adjustment of the contract is warranted.

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

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

Significant changes in the character of work: The engineer reserves the right to make, in writing, at any time during the work, such changes in quantities and such alterations in the work as are necessary to satisfactorily complete the project. Such changes in quantities and alterations shall not invalidate the contract nor release the surety, and the contractor agrees to perform the work as altered.

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

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

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

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

PREVAILING WAGES

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

Title 29 Del.C. §6960 relating to wages further stipulates "that the employer shall pay all mechanics and laborers employed directly upon the site of the work, unconditionally and not less often than once a week and without subsequent deduction or rebate on any account, the full amounts accrued at time of payment, computed at wage rates not less than those stated in the specifications, regardless of any contractual relationship which may be alleged to exist between the employer and such laborers and mechanics", and ... "that the scale of wages to be paid shall be posted by the employer in a prominent and easily accessible place at the site of the work, and that there may be withheld from the employer so much of accrued payments as may be considered necessary by the Department of Labor to pay to laborers and mechanics employed by the employer the difference between the rates of wages required by the contract to be paid laborers and mechanics on the work and rates of wages received by such laborers and mechanics to be remitted to the Department of Labor for distribution upon resolution of any claims."

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

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

PREVAILING WAGE REQUIREMENTS

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

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

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

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

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

PREVAILING WAGES FOR **HIGHWAY CONSTRUCTION** EFFECTIVE MARCH 15, 2011

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

CERTIFIED: 4/4/11

BY: _____
ADMINISTRATOR, OFFICE OF LABOR LAW ENFORCEMENT

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

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

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

PROJECT: T200510602.01 I-95 and US 202 Interchange, New Castle County

GENERAL DECISION: DE100013 5/21/2010 DE13

General Decision Number: DE100013

State: DELAWARE
Construction Type: HIGHWAY
COUNTY: New Castle County in Delaware

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

Modification Number	Publication Date
0	05/21/2010

SUDE2010-001 05/01/2009

	Rates	Fringes
Bricklayer	43.48	
Carpenter	40.35	
Cement Mason/Concrete Finisher	31.04	
ELECTRICIAN		
Electrician	55.35	
Line Worker	34.29	
Ironworker	42.20	
Laborer	23.81	
Millwright	16.11	
Painter	51.47	
Piledriverman	59.23	
Power Equipment Operation	33.37	
Truck Driver	26.19	

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

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

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

WAGE DETERMINATION APPEALS PROCESS

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

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

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

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

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

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

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

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

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

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

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

END OF GENERAL DECISION

APPLICABILITY OF DAVIS-BACON LABOR STANDARD PROVISIONS TO FLAGGERS

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

* * * * *

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

GUIDELINES

HIGHWAY CONSTRUCTION

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

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

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

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

SUPPLEMENTAL SPECIFICATIONS TO THE AUGUST 2001 STANDARD SPECIFICATIONS

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

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

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

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

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

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

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

CHANGES TO PROJECT DOCUMENTS DURING ADVERTISEMENT

1. PRINTED PLANS AND SPECIFICATIONS NOT AVAILABLE FROM DELDOT.

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

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

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

2. QUESTIONS AND ANSWERS

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

dot-ask@state.de.us

Questions and Answers will be dated and posted periodically at the following Website:

http://www.bids.delaware.gov/

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

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

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

NOTE: There is space provided on the CERTIFICATION page to insert the Posted Date of the final Questions and Answers. The Final Posted Date is the latest Posted Date of the Questions and Answers one day prior to Bid Date. This final Posted Date must be submitted on the Certification page or your bid will be considered **Non-responsive** and not considered for award.

3. ADDENDA

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

NOTE: There is space provided on the CERTIFICATION page to insert each issued Addendum and the date you acknowledge receipt of the addendum. Each Addendum number and date acknowledged must be submitted on the Certification page or your bid will be considered **Non-responsive** and not considered for award.

MODIFICATIONS TO REQUIRED FEDERAL CONTRACT PROVISIONS

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

V. STATEMENTS AND PAYROLLS

2. **Payrolls and Payroll Records:**

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

c. Each contractor and subcontractor shall furnish, each week in which any contract work is performed, to the SHA resident engineer a payroll of wages paid each of its employees (including apprentices, trainees, and helpers, described in Section IV, paragraphs 4 and 5, and watchmen and guards engaged on work during the preceding weekly payroll period). The payroll submitted shall set out accurately and completely all of the information required to be maintained under ~~paragraph 2b of this Section V.~~ 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). ~~This~~ The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose ~~and may be purchased from the Superintendent of Documents (Federal stock number 029-005-0014-1), U.S. Government Printing Office, Washington, D.C. 20402.~~ from the Wage and Hour Division Web site at http://www.dol.gov/esa/whd/forms/wh347instr.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the FHWA, if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit them to the applicant, sponsor, or owner, as the case may be, for transmission to the FHWA the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the sponsoring government agency (or the applicant, sponsor, or owner).

d.

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

- end -

401502 - ASPHALT CEMENT COST ADJUSTMENT

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

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

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

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

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

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

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

The Asphalt cement cost adjustment will be calculated on grade PG 64-22 asphalt regardless of the actual grade of asphalt used. The Project Asphalt Cement Base Price for the project will be $635.00 per ton ($699.97 per metric ton).

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

NOTE

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

202505 – SETTLEMENT PLATFORM
202518 – SETTLEMENT MONUMENT

Description:

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

Submittals:

1. Qualifying Experience

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

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

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

3. Description of the surveying equipment to be used.

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

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

Schedule for Settlement Platform Installations and Readings:

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

settlement as indicated on the plans.

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

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

Protection of Instrumentation and Repair of Damage

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

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

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

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

Materials:

Settlement Plates

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

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

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

Settlement Monuments

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

b. The Reinforcement Bar shall conform to Section 824 of the Standard Specifications.

Construction Methods:

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

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

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

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

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

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

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

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

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

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

11. For vertical deformation monitoring, runs shall be performed by a single run beginning and ending on two different benchmarks installed in accordance with NGS standards. Settlement monitoring points shall be used as turning points or as intermediate foresights from two different turning points, allowing elevations to be adjusted and eliminating significant observational errors. The maximum length of line of sight shall be 150 feet, and the imbalance between backsight and foresight shall not exceed 30 feet. Allowable level loop misclosure shall not exceed ±0.033 times the square root of M feet (where M is the distance of the level run in miles) for a single run between two benchmarks. A formal initial reading on a settlement monitoring point will consist of the average of three elevations, from three independent level runs, which meet the closure specified herein. Elevations established subsequent to a formal initial reading shall be determined by a single run as specified herein. The least count (without estimation) of the rod and level combination shall read to 0.003 foot or less, such that the accuracy of an elevation measurement shall be ±0.01 foot (at 95 percent level of confidence).

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

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

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

Method of Measurement:

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

Basis of Payment:

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

10/16/10

205500 - ROCK EXCAVATION FOR ROADWAY

Description:

All conditions of Section 205 of the Standard Specifications shall be applicable to this item except as modified herein.

Subsection 205.01 Description:

Add the following:

This work includes the submission of a control blasting plan, the performance of blasting in accordance with an approved plan, the submission of post-blasting information, and the monitoring of blasting for excavation of rock not removable by other non-explosive excavating methods.

Subsection 205.04 Blasting:

Add the following:

1. Conduct all blasting, explosive handling, and monitoring operations in accordance with latest Occupational Safety and Health Administration (OSHA) standards, 29 CFR Part 1926.914 and any pertinent Delaware Regulations. Also, conduct blasting in compliance with all local requirements. Maintain a copy of these standards on site and make available to the inspector upon request.

2. Perform pre-blasting surveys on the Wilmington Reservoir Property and the Richard S. and Anna T. Gebelein property and all properties within 1000' of blasting locations. Conduct the survey in the presence of a representative of the Department, and a representative of the owners (s) of the structure, dwelling and utilities being surveyed. Submit the duly witnessed pre-blast survey report to the Department. Include in the report any diagrams or photographs of rooms or structures indicating size and location of cracks or separations in foundations, walls, ceilings, floors, etc.

3. Perform pre-blast water supply sampling and testing, Identify, sample, and test water wells and springs within 1,000 feet of excavations requiring blasting. The number of wells requiring testing will be dependent on the number of areas where blasting will be utilized.

   Perform the following work:

   a. Identify additional wells within 1000 feet of blasting locations.
   b. Identify ownership of possibly affected properties.
   c. Send letters to these property owners.
   d. Conduct interviews with property owners to obtain information related to the source and yield of their water supply.
   e. Collect water samples from each well and perform the following tests: total dissolved solids, coliform, turbidity, pH, and conductivity. Quality tests will be conducted by an approved environmental laboratory.

4. Fourteen (14) days before blasting, submit a control blasting plan for review. This plan should approximate anticipated blast on the project. Do not begin blasting until the control blasting plan has been reviewed for general compliance and approved by the Engineer. This plan submittal is for quality control and record-keeping purposed and concurrence by the Engineer does not relieve the Contractor of his responsibility for the accuracy and adequacy of the plan. Include the following information in the plan:

   a. General Information:
      -Signature and license number of the licensed blaster responsible for the control blasting plan
      -Company name

-Route number
-County and township or borough
-Plan location and approximate elevation of proposed blast

b. Dwelling, Structures, and Utilities (including existing reservoir):
-Distance to all dwelling, utility, and structures from the area where blasting will occur, as identified in the pre-blast survey.
-Maximum anticipated peak particle velocity (ips).
-Maximum anticipated air blast (dB).

c. Describe any precautionary measures that will be taken to protect against damage to work or property caused by the blasting operation (i.e., blasting mats, cover, warning signals, etc.). Special attention must be given to protecting the existing I-95 and US 202 roadways in addition to the existing reservoir and Gebeleine property.

d. Blasting Loading Data:
-Plan and section views of proposed drill pattern
-Number of holes per pattern
-Spacing and burden of holes
-Diameter of holes
-Depth of holes
-Location and length of stemming
-Type and maximum amount of explosives, primers, and initiators per delay interval.
-Number of holes or decks per delay to be determined by W=(D/50)
-Maximum number of delay intervals to be used
-Scale distance
-Number of decks per hole to be determined by $W = (D/50)^2$
-Method of blast initiation
-Manufacturer's data sheets for all explosives, primers, and initiators employed

e. Blasting Monitoring Information:
-Equipment to be used and location of equipment
-Names, experiences, and qualifications of the specific personnel responsible for the actual monitoring

f. Revisions
-Any and all changes to the control blasting plan must be described in a letter signed by a representative of the permittee and will become part of the permit

5. Use data available from previous blast to modify blasting plan and procedure for subsequent blasts as required and as appropriate. The $W = (D/50)^2$ equation may be modified depending upon the results of the continued seismographic monitoring program.

6. The air blast is not to exceed the maximum limits listed in the following table at the location of any dwelling, public building, school, church, or community or institutional building:

Lower Frequency Limit of Measuring System in Hz (+dB)	Maximum Level (dB)
0.1 Hz or lower – flat response	129 peak
2 Hz or lower – flat response	128 peak
6 Hz or lower – flat response	125 peak

7. Maximum Peak Particle Velocities:

a. Limit the maximum peak particle velocities at any dwelling, structures, or overhead utility in accordance with the Alternative Blasting Level Criteria as published in the United States Department of the Interior, Bureau of

Mines, Report of Investigation 8507. Maximum peak particle velocities measured at underground utilities are not to exceed a peak particle velocity of 2.0 inches per second (ips) in any of the three measured components. All damage to structures must be repaired by the Contractor at no cost to the Department.

8. Prepare a record of each blast sequentially numbered to include annotated seismograph records and all information required by the State of Delaware Regulations. Provide seismograph analyses and noise level reports of each blast. Make records available for inspection by the Engineer within 24 hours following a given blast. Submit a copy of the certified records within ten days after blasting. Have field records of blasting activities available for inspection on the job site.

9. Provide a minimum of three currently calibrated portable seismographs for each blast. Monitor and record peak particle velocity, frequency, air blast pressure, and sound level at the structure closest as necessary to establish control boundaries in all directions from blasting operations. In addition monitor the existing reservoir and the Gebeleine property.

10. Monitoring, recording, and interpreting of vibration shall be by approved personnel provided by the Contractor with oversight by the Engineer.

11. Subsequent to the completion of blasting operations, perform a post-blasting survey of all the dwellings, structures, and utilities included within the pre-blast survey. Follow the procedures described under the pre-blast survey. The purpose of the post-blast survey report is to document and damage or injury that may have resulted from the blasting activities. Determination of the cause of damage or injury should include a correlation of the monitoring data and other pertinent facts.

Traffic Control and Signage:

1. Stop all traffic during the blasting operation with the use of flaggers.
2. Only 15 minute maximum duration of stopped traffic is permitted for each blasting operation.
3. Blasting operations are limited to the hours between 9:00 A.M. and 3:00 P.M., Monday through Friday. Notify the Engineer and the Police of intent to stop traffic at least twenty-four (24) hours in advance of the scheduled work.
4. Provide the minimum required signage in accordance with the "Delaware Manual on Uniform Traffic Control Devices", or as required by the Department, on all approached to blasting zone.
5. Closure of the highway for periods longer than 15 minutes will result in liquidated damages of $1,000 per hour for each roadway direction closed.
6. As directed by the Department, the Contractor must repair all damage to the existing buildings, roadways and utilities, including the reservoir, due to blasting, at no cost to the Department.

Subsection 205.05 Method of Measurement:

Add the following:

The preparation of the blasting control plan, pre-blasting and post blasting information, monitoring of the blasting for rock excavation, and all other monitoring required will not be measured but will be considered incidental to Item 205000 – Rock Excavation for Roadway and Item 206500 – Rock Excavation for Structures and Trenches.

Subsection 205.06 Basis of Payment:

Add the following:

Traffic control and signage required for this work will be considered incidental to Item 763500 – Maintenance of Traffic.

206500 - ROCK EXCAVATION FOR STRUCTURES AND TRENCHES

Description:

All conditions of Section 206 of the Standard Specifications shall be applicable to this item except as modified herein.

Subsection 206.01 Description:

Add the following:

This work includes the submission of a control blasting plan, the performance of blasting in accordance with an approved plan, the submission of post-blasting information, and the monitoring of blasting for excavation of rock not removable by other non-explosive excavating methods.

Subsection 206.03 Excavation and Backfilling:

Add the following:

Any blasting shall conform to the requirements of Subsection 205.04, as amended in Special Provision item 205500.

Subsection 206.04 Method of Measurement:

Add the following:

The preparation of the blasting control plan, pre-blasting and post blasting information, monitoring of the blasting for rock excavation, and all other monitoring required will not be measured but will be considered incidental to Item 205000 – Rock Excavation for Roadway and Item 206500 – Rock Excavation for Structures and Trenches.

Subsection 206.05 Basis of Payment:

Add the following:

Traffic control and signage required for this work will be considered incidental to Item 763500 – Maintenance of Traffic.

4/5/11

207501 - SHEETING AND SHORING

Description:

This work consists of furnishing all materials, designing and constructing sheeting and shoring in accordance with the notes on the Plans, this Special Provision and as directed by the Engineer.

Materials:

The type of sheeting and shoring to be constructed shall be selected by the Contractor, however, the design and construction shall be in accordance with the applicable requirements of Section 207 of the Standard Specifications.

Construction Methods:

The Contractor shall submit to the Department for approval, the sheeting and shoring design calculations, detailed layout, working drawings and construction methods, at least thirty (30) calendar days prior to initiating its construction. The entire submission shall be signed and sealed by a Professional Engineer registered in the State of Delaware prior to submitting to the Department.

Method of Measurement:

The quantity of sheeting and shoring will not be measured.

Basis of Payment:

The quantity of sheeting and shoring will be paid for at the Contract lump sum. Price and payment will constitute full compensation for furnishing and placing all materials, for design, submission of signed and sealed drawings, installation and removal of sheeting and shoring materials, any excavation in excess of that required for the structure as defined under Subsection 207 of the Standard Specifications, bailing, pumping and draining, for all labor, equipment, tools and incidentals required to complete the work.

NOTE:

A breakout sheet attached to the Proposal list the bridges under this item. The Contractor shall fill in a unit price for each item and the cost (unit price times the proposed quantity). The lump sum bid for Item 207501 - Sheeting and Shoring shall be the sum of the cost for all items listed. The breakout sheet shall be attached to the Bid Proposal. Failure to submit the breakout sheet with the Bid Proposal will result in the Bid Proposal being declared non-responsive and rejected.

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

10/29/02

211509 - REMOVAL OF SIGN STRUCTURES

Description:

The Contractor shall furnish all labor, materials and equipment necessary for and incidental to the complete demolition and removal of the sign structure as indicated on the Contract Drawings and in accordance technical specifications.

Materials and Construction Methods:

All materials and construction shall conform to the requirements of the contract drawings and the specifications.

Method of Measurement:

Payment for this item will be made on a lump sum basis wherein no measurement will be made.

Basis of Payment:

Payment will be made at the lump sum price bid for this item. The price shall include the cost for performing the work specified and furnishing all labor, materials, tools, equipment and incidentals necessary demolition of the existing sign and sign structure acceptable to the Engineer.

10/10/07

272503 – TRASH RACK

Description:

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

Materials:

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

Working drawings shall be submitted in accordance with Subsection 105.04.

Construction Methods:

Trash Racks for drainage inlets shall be constructed based on the details shown on the Plans and at the size and locations shown on the Plans.

Basis of Payment:

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

10/23/07

401517 - STONE MATRIX ASPHALT (SMA) WEARING SURFACE

Description:

This work shall consist of mixing and placement of SMA pavement on a prepared foundation in accordance with these specifications. The requirements of Section 401 Hot-Mix, Hot-Laid Bituminous Concrete shall apply except as modified by this section.

Materials:

Materials shall conform to the applicable requirements of Section 800 with the following modifications.

Coarse Aggregate. Coarse aggregate for SMA shall conform to Section 805 with the following modifications:

Test Property	Test Method	Specification Limits
Sodium Sulfate Soundness Loss,% Max. (5 cycles)	AASHTO T104	12
Absorption, % Max.	AASHTO T85	2.0
LA Abrasion Loss, % Max.	AASHTO T96	30
Flat and Elongated Particles: Retained on #4 Sieve, % Max. (Length to Thickness) 5:1 3:1	ASTM D4791	 5 20

No gravel or slag shall be used in SMA mixes. A maximum of 10% RAP may be used. Aggregates used in SMA shall be non-carbonate and shall be previously qualified by the Materials & Research Section.

Fine Aggregate. Fine aggregate shall consist of 100 % crushed aggregate and shall conform to the following:

Test Property	Test Method	Specification Limits
Sodium Sulfate Soundness Loss, % Max (5 cycles)	AASHTO T104	12
Sand Equivalent Value, % Min.	AASHTO T176	45
Uncompacted Void Content, % Min.	AASHTO T304	45
Liquid Limit, % Max.	AASHTO T89	25
Plasticity Index, %	AASHTO T90	Non-Plastic

Mineral Filler. Mineral filler shall conform to AASHTO M17 and shall be rock dust or crushed limestone free of organic impurities conforming to the following:

Test Property	Test Method	Specification Limits
Plasticity Index, % Max.	AASHTO T90	4

A sample of mineral filler shall be submitted to Materials & Research for hydrometer analysis performed as specified in AASHTO T88 for mineral filler.

Asphalt Cements. The asphalt cement shall be Superpave PG 76-22 Performance Grade Asphalt according to AASHTO M320, Table 1 and tested according to AASHTO R29.

Stabilizers. Stabilizers have been used to ensure the draindown requirements below are met (<0.3% draindown). Other technologies, in addition to various types of fibers, may be used in this item if test data and field performance demonstrate these specifications are met.

If cellulose fiber or mineral fiber stabilizers are chosen by the producer, they shall meet the requirements below and be specifically designed for use in hot-mix asphalt paving mixtures. The producer shall supply the Engineer with certified test results showing the stabilizers are specifically designed for hot-mix asphalt paving mixtures. A representative of the manufacturer of the stabilizers shall be present at initial production to provide technical assistance.

Cellulose Fibers. Cellulose fibers shall conform to the following requirements:

Test Property	Test Method	Specification Limits
Ash Content, % Non-Volatiles Max.	ASTM D128	23
pH	AASHTO MP8	6.5 to 8.5
Moisture Content, % Max by Mass	AASHTO MP8	5.0
Fiber Length, Max inches	AASHTO MP8	0.25

Mineral Fibers. Mineral fibers shall be made from virgin basalt, diabase, slag, or other silicious rock and shall conform to the following requirements:

Test Property	Test Method	Specification Limits
Fiber Length, Max inches	AASHTO MP8	0.25
Fiber Thickness, Max inches	AASHTO MP8	0.0002
Shot Content No. 60 Sieve No. 230 Sieve	ASTM C612	 85 – 95 60 - 80

Antistripping Additives. An approved heat stable anti-stripping additive shall be added to the asphalt cement used for SMA if the TSR value dictates the need.

MIX DESIGN:

Aggregates. The washed gradation (AASHTO T11) of the final mixture for the SMA shall conform to the following gradation:

Sieve	% Passing
12.5 mm (1/2")	100
9.5 mm (3/8")	70 - 95
4.75 mm (#4)	30 - 50
2.36 mm (#8)	20 - 30
1.18 mm (#16)	0 - 21
0.60 mm (#30)	0 - 18
0.30 mm (#50)	0 - 15
0.075 mm (#200)	8.0 – 12.0

Mix Design. The SMA shall meet the following mix design parameters at 100 design gyrations (N_d=100) in the Superpave Gyratory Compactor:

Property	Requirement
Air Voids, %	4.0
VMA, % Min.	18.0
Draindown at production temperature (AASHTO T305), % Max at 1 hour	0.30
Target Asphalt Content, % Min	6.0

Anti-Strip Additives. Tensile Strength Ratio (TSR) values, as determined by the AASHTO T283 Test Method, shall be a minimum of 80. If an anti-strip additive is required, the amount of the additive used shall be 0.25 to 1.0 % by weight of the asphalt cement as determined by the TSR testing, recommended by the additive manufacturer, and approved by the Engineer.

Stabilizer Content. The dosage rates of any stabilizing agent shall be determined by the Contractor to meet these specifications.

Plant Control:

Mineral Filler Supply. Mineral filler dust shall be added to the mixture in a consistent manner to ensure the job mix formula requirements are met. The mineral filler supply system shall be submitted to the Engineer for review and the approval of the submitted system will be at the discretion of the Engineer.

Stabilizer Supply System. When stabilizing additives are required in the mixture, a separate system for feeding shall be used to proportion the required amount into the mixture so that uniform distribution is obtained. The feeding system shall be interlocked into the production plant to ensure correct proportioning.

When a batch plant is used, the stabilizer shall be added through a separate inlet directly into the weigh hopper above the pugmill. The addition of the stabilizer shall be timed to occur during the hot aggregate charging of the hopper. Adequate dry mixing time is required to ensure proper blending of the aggregate and the stabilizer. Dry mixing time shall be increased 5 to 15 seconds. Wet mixing time shall be increased at least 5 seconds for the stabilizer to ensure adequate blending with asphalt cement.

When a drum plant is used, the stabilizer shall be added into the drum mixer to ensure complete blending of the stabilizer into the mix. For this purpose, when adding loose fiber, a separate fiber feeding system shall be utilized that can accurately and uniformly introduce fiber into the drum at such a rate as not to limit the normal production of mix through the drum. An in-line no-flow detector shall be installed in the output side of the fiber blower to ensure that a flow of fiber is entering the drum. It shall be connected to an approved alarm system which will indicate when fiber is not entering the drum. Also, an easily visible portion of the fiber feed tube shall be clear to allow the Engineer to ensure that fiber is flowing into the drum. At no time shall there be any evidence of fiber in the baghouse or returned/wasted baghouse fines.

All stabilizer addition systems shall be approved by the Engineer prior to start-up of the contract.

Construction Methods:

Demonstration:

Before proceeding with the actual production paving work, the Contractor shall demonstrate that an acceptable mix can be produced, placed, and compacted to these Specifications. A minimum of 100 tons of acceptable SMA material shall be produced, placed, and compacted utilizing all paving equipment that will be used on the mainline paving, over a suitable and representative hot-mix base, approved by the Engineer, outside the project limits.

Weather Restrictions:

Placement of SMA will be permitted only when the ambient and surface temperatures are at least 50 F

and rising.

Hauling Units:

Hauling units shall be as specified in Section 401.31 and the following:

The time between plant mixing and shipment shall not exceed one half hour, i.e. the SMA shall not be stored in the silo for more than one half hour.

The haul trucks shall deliver the SMA to a material transfer device capable of continuously re-mixing and/or re-blending the material internally to ensure that the SMA is free from physical and thermal segregation. The material transfer device shall be self-propelled and capable to move freely between delivery trucks and the asphalt paver, equipped with a hopper insert, without requiring additional equipment.

The Engineer will evaluate the performance of the paving operation by measuring the temperature of the mat surface immediately behind the screed of the paver during placement to develop a temperature profile. Surface temperature profile measurements shall be taken transversely across the mat, at any time during the project, to determine if the equipment is working properly.

Each temperature profile will consist of three surface temperature measurements; the location of the temperature measurements will be at the approximate center and one foot to three feet from the edge of each side of the mat parallel to the paver screed. The difference between the maximum and minimum temperature within each temperature profile shall not be more than 25°F.

If the difference between any two temperatures taken in a single profile exceeds 25ºF, the paving operation shall be halted and adjustments made to ensure that the hot-mix placed is within the temperature profile requirements. Once adjustments are made, the Engineer will take measurements for an additional temperature profile to verify that corrective actions taken resulted in the mix placed meeting temperature differential requirements.

Mix Placement Temperature:

The temperature of the mixture at the time of placement shall not be less than 290 F.

Compaction:

The pavement shall be compacted to 94% of maximum theoretical density or 6% air voids. Item 401699 will be used by the Engineer to calculate payment for this item; Table 5 is modified as referenced below for this item:

Table 5: Compaction Price Adjustment Highway Locations	
Degree of Compaction (%)	**Pay Adjustment Factor (%)**
>97	-100*
96	-10
95	0
94	+5
93	0
92	-10
91	-15
90	-25
89	-30
88	-100*

*or remove and replace at Engineer's discretion.

Opening to Traffic:

Traffic shall not be allowed on the finished roadway until the roadway temperature cools to at least 140°F.

Method of Measurement and Basis of Payment:

This work will be measured and paid for at the Contract unit price bid per ton for Stone Matrix Asphalt complete, in place, and accepted, which price and payment will be full compensation for furnishing, hauling, preparing and placing all materials; for labor, equipment, tools; and incidentals necessary to complete this item.

Materials produced and striping used for the demonstration will not be paid for but will be considered incidental to the item Stone Matrix Asphalt.

9/2/10

401577 - PAVER-LAID ULTRATHIN HOT MIX

Description:

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

Materials:

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

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

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

Asphalt Cement. The asphalt binder shall meet the requirements of Superpave PG 64-22, PG 70-22, or PG 76-22 performance grade asphalt, as referenced in the Plans, Specifications, and/or Notes, according to AASHTO M320, Table 1 and tested according to AASHTO R29 with the following test ranges:

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

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

TEST (AASHTO TEST METHOD)	RESULT
L.A. Abrasion (T 96)	30 % maximum
Soundness, sodium sulfate, % loss (T104)	15% maximum
Flat & Elongated, 5:1, +4.75 mm (ASTM	10% maximum

D4791)	
Water Absorption (T 85)	2 % maximum
Clay Lumps and Friable Particles (T 112)	2 % maximum
Micro Deval, % loss (T327)	18% Maximum

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

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

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

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

Bituminous Concrete Wearing Surface:

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

Master Band Gradation Limits

SIEVE SIZE	PERCENT PASSING BY WEIGHT		
	TYPE A	TYPE B	TYPE C
3/4" (19.0 mm)			100
½"(12.5 mm)		100	85 – 100
3/8"(9.5 mm)	100	85 - 100	60 – 80
#4 (4.75 mm)	40 – 55	28 – 42	28 – 38
#8 (2.36 mm)	22 – 32	19 – 32	19 – 32
#16 (1.18 mm)	15 – 25	15 – 23	15 – 23
#30 (0.6 mm)	10 – 18	10 – 18	10 – 18
#50 (0.3 mm)	8 – 13	8 – 13	8 – 13
#100 (0.15 mm)	6 – 10	6 – 10	6 – 10
#200 (0.075 mm)	4.0 – 5.5	4.0 – 5.5	4.0 – 5.5

Hot-Mix Design Criteria

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

[1] Follow AASHTO T283 with the following exceptions:

a. Condition the mixture for 2 hours in accordance with AASHTO R30, Section 7.1.
b. Compact the SGC specimens to 100 gyrations.
c. Extrude the samples as soon as possible without damage to the sample.
d. Use AASHTO T269 to determine the void content.

e. Record the void content of the specimens (for reference only)

f. If less than 55% saturation is achieved, the procedure does not need to be repeated unless the difference in tensile strength between duplicate specimens is greater than 25 pounds per square inch.

(2) Application rates outside of these ranges must be approved by the Engineer.

Construction Methods:

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

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

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

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

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

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

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

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

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

Method of Measurement:

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

Basis of Payment:

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

7/21/08

401644 - SUPERPAVE, TYPE C HOT-MIX, 115 GYRATIONS, PG 64-22 (CARBONATE STONE)
401645 - SUPERPAVE, TYPE C HOT-MIX, 160 GYRATIONS, PG 64-22 (CARBONATE STONE)
401646 - SUPERPAVE, TYPE C HOT-MIX, 205 GYRATIONS, PG 64-22 (CARBONATE STONE)

401647 - SUPERPAVE, TYPE B HOT-MIX, 115 GYRATIONS, PG 64-22
401648 - SUPERPAVE, TYPE B HOT-MIX, 160 GYRATIONS, PG 64-22
401649 - SUPERPAVE, TYPE B HOT-MIX, 205 GYRATIONS, PG 64-22

401650 - SUPERPAVE, TYPE C HOT-MIX, 115 GYRATIONS, PG 70-22 (CARBONATE STONE)
401651 - SUPERPAVE, TYPE C HOT-MIX, 160 GYRATIONS, PG 70-22 (CARBONATE STONE)
401652 - SUPERPAVE, TYPE C HOT-MIX, 205 GYRATIONS, PG 70-22 (CARBONATE STONE)

401653 - SUPERPAVE, TYPE B HOT-MIX, 115 GYRATIONS, PG 70-22
401654 - SUPERPAVE, TYPE B HOT-MIX, 160 GYRATIONS, PG 70-22
401655 - SUPERPAVE, TYPE B HOT-MIX, 205 GYRATIONS, PG 70-22

401656 - SUPERPAVE, TYPE C HOT-MIX, 115 GYRATIONS, PG 76-22 (CARBONATE STONE)
401657 - SUPERPAVE, TYPE C HOT-MIX, 160 GYRATIONS, PG 76-22 (CARBONATE STONE)
401658 - SUPERPAVE, TYPE C HOT-MIX, 205 GYRATIONS, PG 76-22 (CARBONATE STONE)

401659 - SUPERPAVE, TYPE B HOT-MIX, 115 GYRATIONS, PG 76-22
401660 - SUPERPAVE, TYPE B HOT-MIX, 160 GYRATIONS, PG 76-22
401661 - SUPERPAVE, TYPE B HOT-MIX, 205 GYRATIONS, PG 76-22

401662 - SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 115 GYRATIONS, PG 64-22
401663 - SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 160 GYRATIONS, PG 64-22
401664 - SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 205 GYRATIONS, PG 64-22

401665 - SUPERPAVE, TYPE C HOT-MIX, 160 GYRATIONS, PG 64-22, PATCHING
401666 - SUPERPAVE, TYPE B HOT-MIX, 160 GYRATIONS, PG 64-22, PATCHING
401667 - SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 160 GYRATIONS, PG-64-22, PATCHING

401668 - SUPERPAVE, TYPE C HOT-MIX, 160 GYRATIONS, PG-64-22, WEDGE
401669 - SUPERPAVE, TYPE B HOT-MIX, 160 GYRATIONS, PG-64-22, WEDGE

401704 - SUPERPAVE, TYPE C HOT-MIX, 115 GYRATIONS, PG 64-22, (NON-CARBONATE STONE)
401705 - SUPERPAVE, TYPE C HOT-MIX, 160 GYRATIONS, PG 64-22, (NON-CARBONATE STONE)
401706 - SUPERPAVE, TYPE C HOT-MIX, 205 GYRATIONS, PG 64-22, (NON-CARBONATE STONE)

401707 - SUPERPAVE, TYPE C HOT-MIX, 115 GYRATIONS, PG 70-22, (NON-CARBONATE STONE)
401708 - SUPERPAVE, TYPE C HOT-MIX, 160 GYRATIONS, PG 70-22, (NON-CARBONATE STONE)
401709 - SUPERPAVE, TYPE C HOT-MIX, 205 GYRATIONS, PG 70-22, (NON-CARBONATE STONE)

401710 - SUPERPAVE, TYPE C HOT-MIX, 115 GYRATIONS, PG 76-22, (NON-CARBONATE STONE)
401711 - SUPERPAVE, TYPE C HOT-MIX, 160 GYRATIONS, PG 76-22, (NON-CARBONATE STONE)
401712 - SUPERPAVE, TYPE C HOT-MIX, 205 GYRATIONS, PG 76-22, (NON-CARBONATE STONE)

Description:

The following Subsections of the Standard Specifications shall be applicable: 401.01, 401.03 - 401.10, 401.12, and 401.13. All other subsections have been modified herein.

The Contractor shall read and thoroughly understand the requirements of the QA/QC specification as defined in item 401699. It is the responsibility of the Contractor to determine all costs associated with meeting these requirements and to include them in the per ton bids for the various Superpave bituminous concrete items. The Contractor shall also be aware that the pay adjustment factors in item 401699 will be applied to the Superpave bituminous concrete payments to determine the bonus or penalty for the item.

Materials:

Materials for hot-mix, hot-laid 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.

Asphalt Binder:

The asphalt binder shall meet the requirements of Superpave PG 64-22, PG 70-22, or PG 76-22 performance grade asphalt, as referenced in the Plans, according to M-320, Table 1 and tested according to AASHTO PP6 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 - 2.00 kPa
RTFO DSR, G*/sin (δ)	T-315	2.20 - 5.00 kPa
PAV DSR, G*/sin (δ)	T-315	1400 - 5000 kPa
BBR Creep Stiffness	T-313	90.0 - 300.0 kPa
BBR — value	T-313	0.300 - 0.440

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

Recycled Materials:

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.

Shingles:

Only shingles reclaimed from shingle manufacturers such as tabs, punch-outs, and damaged new shingles shall be allowed in the mixture. Post-consumer shingles or used shingles shall not be permitted in the mixture and all shingles shall be free of all foreign material and moisture. Fiberglass-backed and organic felt-backed shingles shall be kept separately and both materials shall not be used in the same mixture at the same time. The shingles shall be broken down in the mixing process with 100% passing the ½ in (12.5 mm) sieve. Shipping, handling, and shredding costs are incidental to the price of Superpave item.

Mineral Aggregate:

The mineral aggregate employed in the target gradation of the job mix formula (JMF) shall conform to Section 805 and the following criteria. These criteria apply to the combined aggregate blend.

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

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

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

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

For any roadway with a minimum average daily traffic volume (ADT) of 8000 vehicles and a posted speed of 35 mph (60 kph) or greater, the polish value of the composite aggregate blend shall be greater than 8.0 when tested according to Maryland State Highway Administration MSMT 411 – "Laboratory Method of Predicting Frictional Resistance of Polished Aggregates and Pavement Surfaces." RAP shall be assigned a value of 4.0. The Contractor shall supply all polish values to the Engineer upon request.

Mineral Filler:

The mineral filler shall conform to AASHTO M17.

Mixture Requirements:

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.

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

restricted zone. Percentages shall be based on the washed gradation of the aggregate according to 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 (% - MINIMUM)
	$N_{INITIAL}$	N_{DESIGN}	N_{MAX}	25.0	19.0	9.5	12.5	4.75	
0.3 to < 3	90.5	96.0	98.0	12.5	13.5	15.5	14.5	16.5	65.0 - 78.0
3 to < 10	89.0								65.0 - 75.0[1]
10 < 30									
30									

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.

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

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

Gradation Classification:

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

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

Plant Production Tolerances:

Volumeric Property	Superpave Criteria
Air Voids (V_a) at (%) N_m Air Voids (V_a) at N_{design} (%)	2.0 (min) 5.5 (max)
Voids in Mineral Aggregate (VMA) at N_{design} 25.0 mm Bituminous Concrete Base Course 19.0 mm Type B Hot-Mix 12.5 mm Type C Hot-Mix 9.5 mm Type C Hot-Mix 4.5 mm Type C Hot-Mix	 -1.2 +2.0

Design Evaluation:

The contractor shall furnish a Job Mix Formula (JMF) for review and approval. The Engineer may elect to evaluate the proposed JMF and suitability of all materials. All materials requested by the Engineer shall be provided at the contractor's expense to the Central Laboratory in Dover in a timely manner upon request.

To verify the complete mixture design and evaluate the suitability of all materials, the following approximate quantities are required:

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

The proposed JMF shall include the following:

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

Plot of the three trial asphalt binder contents at +/- 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.

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

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

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.

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

Construction.

Production Plants. The Contractor shall modify their production plant as required by the manufacturer to introduce the WMA technology. Plant modifications may include additional plant instrumentation, the installation of asphalt binder foaming systems and/or WMA technology delivery systems, tuning the plant burner and adjusting the flights in order to operate at lower production temperatures and/or reduced tonnage.

Weather Limitations. Place WMA only on dry, unfrozen surfaces and only when weather conditions allow for proper production, placement, handling, and compacting. Even with WMA technologies, the ambient paving temperature shall be above freezing.

Compaction:

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

Method of Measurement and Basis of Payment:

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

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

11/4/09

401699 - QUALITY CONTROL/QUALITY ASSURANCE OF BITUMINOUS CONCRETE

.01 Description.

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

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

.02 Definitions.

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

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

.03 Equipment.

(a) Material Production Test Equipment.

The Contractor shall establish, maintain, and operate a qualified testing laboratory at the production plant site of sufficient size and layout that will accommodate the testing operations of both the Contractor and the Engineer. The Contractor shall maintain all the equipment used for handling, preparing, and testing materials in proper operating condition. For any laboratory equipment malfunction, the Contractor shall remedy the situation within one working day or the Engineer may reject production. In the case of an equipment malfunction, and while waiting for repairs to equipment, the Engineer may elect to test the material at either another production facility or the Engineer's laboratory to obtain payment factors.

The following shall be the minimum calibrations for the referenced equipment:

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

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

(b) Pavement Construction Test Equipment.

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

.04 Quality Control (QC) Plan.

(a) Material Production QC.

(1) Job Mix Formula – Material Production.

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

The component materials design shall include designating the source and the expected proportion (within 1 percent for the aggregate components, and within 0.1 percent for the other components) of each component to be used in order to produce workable hot-mix asphalt having the specified properties. For plant component

feed adjustments, RAP can be considered in the same manner as an individual aggregate component. The JMF target characteristic values include the mixing temperature range, core temperature range for gyration, the percentage of the asphalt cement component (both total and virgin), and the percentages of the aggregate amounts retained on the sieves to be addressed by the JMF as shown in Table 1.

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

Prior to starting production of a new mixture, the Contractor shall submit a JMF. For any mixture that has a 20% or greater failure rate on any combined volumetric criteria, the JMF will not be approved for use on Department contracts. In order to be approved, a re-design of the mixture will have to be completed by the Contractor for review and approval by the Engineer. The Contractor shall uniquely title each JMF. The Contractor shall submit test data with each JMF and tests performed by a Qualified Laboratory on representative materials, verifying the adequacy of the design. Refer to the specifications for each mix type in order to determine the design requirements. The JMF sieve percentage values shall conform to the ranges shown in Table 1.

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

According to the Contractor's QC Plan, the Contractor shall inform the Engineer of any proposed changes to an existing JMF. The Contractor shall notify the Engineer by electronic mail of the proposed changes. The Engineer will reply to the proposed changes within one operational day and notify the Contractor of the effective date of the changes.

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

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

Table 1 - Aggregate Gradation - JMF and Control Point Information

Sieves to be addressed by JMF/Range values are percentages passing by weight

Sieve Size mm (inch)	4.75 mm	4.75mm Range	9.5 mm	9.5mm Range	12.5 mm	12.5mm Range	19.0 mm	19.0mm Range	25.0 mm	25.0mm Range
37.5(1.5)	No		No		No		No		Yes	100
25.0(1.0)	No		No		No		Yes	100	Yes	90-100
19.0 (3/4)	No		No		Yes	100	Yes	90-100	Yes	20-90
12.5(1/2)	Yes	100	Yes	100	Yes	90-100	Yes	23-90	Yes	
9.5 (3/8)	Yes	95-100	Yes	90-100	Yes	28-90	Yes		Yes	
4.75(#4)	Yes	90-100	Yes	32-90	Yes		Yes		Yes	
2.36(#8)	Yes		Yes	32-67	Yes	28-58	Yes	23-49	Yes	19-45
(#16)	Yes	30-60	Yes		Yes		Yes		Yes	
(#30)	Yes		Yes		Yes		Yes		Yes	

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

(2) Process Control – Material Production.

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

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

Using testing equipment that is knowingly out of calibration or is not working properly.
Reporting false information such as test data, JMF information, or any info requested by DelDOT
When the Contractor fails to comply to their approved QC Plan in reference to materials testing
Substantial deviations to AASHTO or DelDOT procedures when running tests, sampling stockpiles, or testing hot mix.
The use of any material not listed in the JMF.
The use of the wrong PG graded asphalt.
If samples fall within the Contractors action points in the QC Plan but the Contractor fails to take the corrective action in the approved QC Plan

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

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

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

Production Plant – make, type, capacity, and location.
Production Plant Calibration – components and schedule; address documentation.
Personnel – include name and telephone number for the following individuals:

Person responsible for quality control.
Qualified technician(s) responsible for performing the inspection, sampling, and testing.
Person who has the authority to make corrective actions on behalf of the Contractor.

Testing Laboratory – state the frequency of accuracy checks and calibrations of the equipment used for testing; address documentation.
Locations where samples will be obtained and the sampling techniques for each test
Load number of QC samples (1-10 if QA sample is not within trucks 1-10)
Tests to be performed and their normal frequency; the following, at a minimum, shall be conducted:

Mixture Temperature: each of the first five trucks, and each load that is sampled for QC or acceptance testing.
Gradation analysis of aggregate (and RAP) stockpiles – one washed gradations per week for each aggregate stockpile; RAP: five gradations and asphalt cement contents for dedicated stockpiles where new material is not being added; one gradation and asphalt cement content test per week for stockpiles where material is continually being added to the stockpile.
Gradation analysis of non-payment sieves
Dust to effective asphalt calculation
Moisture content analysis of aggregates – daily.
Gradation analysis of the combined aggregate cold feed – one per year per mixture.
Bulk specific gravity and absorption of blended material – one per year per mixture.
Ignition Oven calibration – one per year per mixture.
Hot-Bins: one per year per mixture.
Others, as appropriate.

Procedures for reporting the results of inspection and tests (include schedule).
Procedures for dealing with non-compliant material or work.
Presentation of control charts. The Contractor shall plot the results of testing on individual control charts for each characteristic. The control charts shall be updated within one working day as test results for each sublot become available. The control charts shall be easily and readily accessible at the plant laboratory. The following parameters shall be plotted from the testing:

Asphalt cement content.
Volumetrics (air voids, voids in mineral aggregates [VMA])
Gradation values for the following sieves:
- 4.75 mm (#4).
- 2.36 mm (#8).
- 0.075 mm (#200).

Operational guidelines (trigger points) to address times when the following actions would be considered:

Increased frequency of sampling and testing.
Plant control/settings/operations change.
JMF adjustment.
JMF change (See Section .04(a)(1)).
Change in the source of the component materials.
Calibration of material production equipment (asphalt pump, belt feeders, etc.).
Rejection of material.

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

(b) Pavement Construction – Process Control.

The Contractor shall perform Quality Control of pavement compaction by testing in-place pavement with a density gauge or by testing cores extracted from the pavement. The use of the nuclear density gauge shall

conform to ASTM D2950; the use of other density gauges shall be as per the manufacturer's recommendations and approved by the Engineer. The Contractor may use any method to select locations for the Quality Control.

.05 Acceptance Plan.

(a) Material Production – Tests and Evaluations.

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

The Contractor shall supply, capture, and mark samples, as directed, from delivery trucks before the trucks leave the production plant. The sample shall represent the material produced by the Contractor, and shall be of sufficient size to allow the Engineer to complete all required acceptance tests. The Engineer will direct the Contractor when to capture these samples, on a statistically random, unbiased basis, established before production begins each day based upon the anticipated production tonnage. The captured sample shall be from the Engineer specified delivery truck; if the Contractor visually observes the specified delivery truck sample and does not want this sample to be sampled and tested for acceptance, that delivery truck will not be sent to a Department project. The next visually acceptable delivery truck to the Contractor shall be sampled for acceptance testing.

The first sample of the production day will be randomly generated by the Engineer between loads 0 and 12 (0-250 tons). Subsequent samples will be randomly generated by the Engineer on 500-ton sub-lots for the production day. Unacceptable samples may be a basis for rejection of material if the QC plan is not followed as approved for sample retrieval. If the Contractor wishes to perform parallel tests with the Engineer, or to capture samples to be retained for possible Dispute Resolution, each of the samples for these purposes shall be obtained at the same time and location as the acceptance test sample. Either splitting a large sample or getting multiple samples that equally represent the material is acceptable. The Engineer will perform all splitting and handling of samples after they are obtained by the Contractor.

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

The target size of sub-lots within each lot, except for the first sample of the production day, is equal-sized 500 ton sub lots and will be based upon anticipated production, however, more or fewer sublots, with differing sizes, may result due to the production schedule and conditions. If the actual production is less than anticipated, and it's determined a sample will not be obtained (based upon the anticipated tonnage), a new sample location will be determined on a statistically random, unbiased basis based upon the new actual production. If the actual production is going to be 50 tons or greater over the anticipated sub lot production, a new sample location will be determined on a statistically random, unbiased basis based upon the new actual production. The Engineer will combine the evaluation and test results for all of the applicable sublots in order to evaluate each individual lot.

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

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

AASHTO T312 – Preparing a mixture samples using a gyratory compactor.
AASHTO T166, Method C (Rapid Method) – Bulk specific gravity of compacted samples.
AASHTO T308 – Asphalt cement content.
AASHTO T30 – Aggregate gradations, using samples from the asphalt cement content test.
AASHTO T209 – Theoretical maximum specific gravity.
ASTM Provisional Test Method – Rapid Drying of Compacted and Loose Bituminous Asphalt Specimens using Vacuum Drying Method

(b) Pavement Construction – Tests and Evaluations.

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

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

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

The Engineer will evaluate and accept the compaction work on a daily basis. Payment for the compaction will be calculated by using the material production lots as referenced in **.05 Acceptance Plan (a) Material Production – Tests and Evaluation** and analyzing the compaction results over the individual days covered in the material production lot. The compaction results will be combined with the material results to obtain a payment for this item.

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

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

Testing locations will be a minimum of 1.5 feet from the newly placed longitudinal joint and 50 feet from a new transverse joint. If the Contractor chooses to cut companion cores, they shall be located within one foot

of the Engineers cores along the longitudinal direction and in-line with the Engineers cores in the longitudinal plane.

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

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

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

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

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

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

AASHTO T166, Method C (Rapid Method) – to determine the bulk specific gravity of the cores.
AASHTO T209 – to calculate the theoretical maximum specific gravity and the density of the non-compacted mixtures.
ASTM Provisional Test Method – Rapid Drying of Compacted and Loose Bituminous Asphalt Specimens using Vacuum Drying Method.

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

.06 Payment and Pay Adjustment Factors.

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

(a) Material Production – Pay Adjustment.

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

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

Using the JMF target value, the single test tolerance (from Table 3), and the test values, the Engineer will use the following steps to determine the material pay adjustment factor for each lot of material:

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

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

In lieu of being assessed a pay adjustment penalty, the Contractor may choose to remove and replace the material at no additional cost to the Department. If the PWL of any single material characteristic is below 60, the Engineer may require the removal and replacement of the material at no additional cost to the Department.

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

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

If, during production, a QA sample test result does not meet the acceptable tolerances and the Contractors QC sample duplicates the QA sample test result, the Contractor can make an appropriate change to the mixture (within the JMF boundaries), and request to have that sample further isolated. If this request is approved, and the Contractor has made a change, the third load after the change will be tested. If that sample test result shows compliance with the specifications, the material that is considered out of the acceptable

tolerance will include the material from the previous acceptable test result to the third load after the initially sampled and tested sample. If the sample does not meet the specification requirements, the Engineer will no longer accept material. Production may resume when changes have been made and an acceptable sample and test result is obtained.

Table 2 – Quality Level Analysis by the Standard Deviation Method

PU or PL	QU and QL for "n" Samples						
	n = 3	n = 4	n = 5	n = 6	n = 7	n = 8	n = 9
100	1.16	1.50	1.79	2.03	2.23	2.39	2.53
99		1.47	1.67	1.80	1.89	1.95	2.00
98	1.15	1.44	1.60	1.70	1.76	1.81	1.84
97		1.41	1.54	1.62	1.67	1.70	1.72
96	1.14	1.38	1.49	1.55	1.59	1.61	1.63
95		1.35	1.44	1.49	1.52	1.54	1.55
94	1.13	1.32	1.39	1.43	1.46	1.47	1.48
93		1.29	1.35	1.38	1.40	1.41	1.42
92	1.12	1.26	1.31	1.33	1.35	1.36	1.36
91	1.11	1.23	1.27	1.29	1.30	1.30	1.31
90	1.10	1.20	1.23	1.24	1.25	1.25	1.26
89	1.09	1.17	1.19	1.20	1.20	1.21	1.21
88	1.07	1.14	1.15	1.16	1.16	1.16	1.17
87	1.06	1.11	1.12	1.12	1.12	1.12	1.12
86	1.04	1.08	1.08	1.08	1.08	1.08	1.08
85	1.03	1.05	1.05	1.04	1.04	1.04	1.04
84	1.01	1.02	1.01	1.01	1.00	1.00	1.00
83	1.00	0.99	0.98	0.97	0.97	0.96	0.96
82	0.97	0.96	0.95	0.94	0.93	0.93	0.93
81	0.96	0.93	0.91	0.90	0.90	0.89	0.89
80	0.93	0.90	0.88	0.87	0.86	0.86	0.86
79	0.91	0.87	0.85	0.84	0.83	0.82	0.82
78	0.89	0.84	0.82	0.80	0.80	0.79	0.79
77	0.87	0.81	0.78	0.77	0.76	0.76	0.76
76	0.84	0.78	0.75	0.74	0.73	0.73	0.72
75	0.82	0.75	0.72	0.71	0.70	0.70	0.69
74	0.79	0.72	0.69	0.68	0.67	0.66	0.66
73	0.75	0.69	0.66	0.65	0.64	0.63	0.63
72	0.74	0.66	0.63	0.62	0.61	0.60	0.60
71	0.71	0.63	0.60	0.59	0.58	0.57	0.57
70	0.68	0.60	0.57	0.56	0.55	0.55	0.54

Table 2 – Quality Level Analysis by the Standard Deviation Method							
PU or PL	QU and QL for "n" Samples						
	n = 3	n = 4	n = 5	n = 6	n = 7	n = 8	n = 9
69	0.65	0.57	0.54	0.53	0.52	0.52	0.51
68	0.62	0.54	0.51	0.50	0.49	0.49	0.48
67	0.59	0.51	0.47	0.47	0.46	0.46	0.46
66	0.56	0.48	0.45	0.44	0.44	0.43	0.43
65	0.52	0.45	0.43	0.41	0.41	0.40	0.40
64	0.49	0.42	0.40	0.39	0.38	0.38	0.37
63	0.46	0.39	0.37	0.36	0.35	0.35	0.35
62	0.43	0.36	0.34	0.33	0.32	0.32	0.32
61	0.39	0.33	0.31	0.30	0.30	0.29	0.29
60	0.36	0.30	0.28	0.27	0.27	0.27	0.26
59	0.32	0.27	0.25	0.25	0.24	0.24	0.24

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

Table 4 - PWL Pay Adjustment Factors	
PWL	Pay Adjustment Factor (%)
100	+5
<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. Note that the material portion of the total pay adjustment is 70 percent and the pavement construction portion is 30 percent.

1. Calculate the average density values from the sublot tests values, to the nearest 0.1 unit.
2. Calculate the Degree of Compaction:
   Degree of Compaction =

((Core Bulk Specific Gravity) / (Theoretical Maximum Specific Gravity)) x 100%.

3. The average compaction for the sublots shall be averaged together for the compaction level of the lot. The lots compaction test level shall be averaged to the whole percent.
4. Locate the value of the Payment Adjustment Factor corresponding to the calculated degree of compaction from Table 5 or Table 5a.
5. Determine the pavement construction price adjustment by using the following formula: Pay adjustment = (Lot Quantity) x (Bid Price) x (Pay Adjustment Factor) x 30%.

Table 5: Compaction Price Adjustment Highway Locations

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

* or remove and replace it at Engineer's discretion

Table 5a: Compaction Price Adjustment Other[1] Locations

Degree of Compaction (%)	Pay Adjustment Factor (%)
>96	-100*
95	-2
94	0
93	+3
92	0
91	0
90	0
89	-1
88	-5
87	-15
86	-25
85	-30
84	-100*

* or remove and replace at Engineer's discretion

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

.07 Dispute Resolution.

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

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

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

When disputes over production testing occur, the samples used for Dispute Resolution testing will be those samples the Contractor properly captured, labeled, and stored, as described in the second paragraph of the section of these specifications titled **.05 Acceptance Plan, (a) Material Production – Tests and Evaluations**. If no samples are available, the original testing results will be used for payment calculations.

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

If there is a discrepancy between the Engineer's acceptance test result and the Contractor's test result, the Contractor may ask for the Dispute Resolution sample to be tested. If the Dispute Resolution sample substantiates the original acceptance test result, the Contractor, after two such Dispute Resolution samples, will be charged a fee of $125 for all further Dispute Resolution cores that substantiate the acceptance test result. If the Dispute Resolution sample substantiates the Contractor's test result, the Contractor will not be charged a fee.

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

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

5/26/11

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

Description.

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

Materials and Equipment.

The following material shall be available to complete this work:

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

The following equipment shall be available to complete this work:

Sponge or other absorbent material – Used to extract water from the hole.
Compaction Hammer – Shall be mechanical, with a flat, circular tamping face smaller than 6 inches in diameter. The tamping head shall be connected to an electrical, pneumatic, or gasoline driven tamping device.

Construction Method.

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

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

Performance Requirements.

The Engineer will judge the patch on the following basis:

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

Basis of Payment.

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

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

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

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

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

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

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

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

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

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

Structural Number Calculations

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

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

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

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

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

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

Example:

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

Calculation:

For the Type B lift the calculation would be:

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

For the Type C lift the calculation would be:

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

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, Advant-Edge 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

Advant-Edge Paving Equipment, LLC
33 Old Niskayuna Road
Loudonville, NY 12211
1-814-422-3343
www.advantedgepaving.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.

1/21/2011

601502 - TEMPORARY PROTECTIVE SHIELD

Description:

This work consists of furnishing all materials and installing a temporary protective shield at the locations described and in conformance with the details and notes on the Plans, as described in these Special Provisions, and/or as directed by the Engineer.

Materials and Construction Methods:

In order to protect vehicular traffic against damage from falling material, debris, and other demolition operations, while superstructure concrete is being removed, the Contractor shall furnish and erect temporary protective structures under the work area and 5' (1.5 m) minimum beyond all sides of full depth concrete deck removed.

The Protective Structures shall meet with the following:

1. The shields shall be supplemented with such additional suitable enclosures of tarpaulins or wire mesh as may be necessary in order to insure against the dropping of materials, tools, equipment, and other objects below the level of the shield.

2. Broken concrete and other debris shall not be allowed to accumulate on the shields, but shall be removed promptly. The shields shall not be used for storing or stockpiling construction materials.

3. Timber shall have an allowable flexure stress of 11 MPa and the shield must be designed for 100 lb/sq. ft. (5 kPa) live load and60 mph (100 km/hr) wind load.

4. All plywood shall be new and shall be not less than 3/4" (19 mm) thick.

5. Bolts, nuts, washers, structural steel, etc. shall conform to Section 601 of the Standard Specifications.

6. The shield shall be assembled by means of bolts and nails, all as approved by the Engineer.

7. The flooring and siding of the shield shall have no cracks or openings through which material particles may fall.

8. The Contractor shall submit shop drawings for the shields, including erection plans, to the Engineer for approval, prior to the start of the work.

9. All connections of the protective structures to the steel work of existing bridge shall be made by means of clamps or other approved devices. The drilling of holes in the existing steel work, or welding thereto, will not be permitted.

10. Unless otherwise noted on the Plans, the minimum underclearance over roadways (pavement and shoulder) shall be as follows:

    14.5' (4.42 m) for interstate and other controlled access highways

    14.0' (4.27 m) for all other roadways

    No portion of the temporary shield (including connection devices) shall encroach on under clearances.

11. A suggested protective shield has been shown on the Plans. The Contractor may submit alternate protective shield system to the Engineer for approval. If the Contractor intends to use temporary protective shield system other than shown in the Plans, for which he/she shall be required to submit the design and sealed by Professional Engineer registered in the State

of Delaware prior to commencing work. No additional payment will be made for this item of work regardless of type of temporary protective shield system used.

12. After protective shield has served its purpose, and approval has been given by the Engineer, the Contractor shall remove and dispose of the temporary protective shield away from the site to the satisfaction of the Engineer.

Method of Measurement:

The quantity of temporary protective shields will not be measured.

Basis of Payment:

The quantity of temporary protective shield will be paid for at the Contract lump sum price. Price and payment will constitute full compensation for furnishing all materials and performing the work as detailed and noted on the Plans, for removal and disposal of the protective shield materials, and for all labor, tools, equipment, and incidentals necessary to complete the work.

NOTE:

A breakout sheet attached to the Proposal list the bridges under this item. The Contractor shall fill in a unit price for each item and the cost (unit price times the proposed quantity). The lump sum bid for Item 601502 - Temporary Protective Shield shall be the sum of the cost for all items listed. The breakout sheet shall be attached to the Bid Proposal. Failure to submit the breakout sheet with the Bid Proposal will result in the Bid Proposal being declared non-responsive and rejected.

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

4/5/04

602553 -MECHANICALLY STABILIZED EARTH WALLS, TYPE 1
602557 -MECHANICALLY STABILIZED EARTH WALLS, TYPE 2
602670 -MECHANICALLY STABILIZED EARTH WALLS, TYPE 3

Description:

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

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

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

Material:

1. Backfill Material
   - A. The material shall have magnesium sulfate soundness loss of less than 30% after 4 cycles as determined by AASHTO T104.
   - B. All backfill material shall be reasonably free from organic and deleterious materials. Do not use metallurgical slag.
   - C. Granular backfill shall meet gradation limits of AASHTO T 27, as outlined below:

Sieve Size	Percent Passing
3 inches	100
3/4 in sieve	20 -100
No. 40 mesh sieve	0 -60
No. 200 mesh sieve	0 -10

   - D. The plasticity index (P.I.) as determined by AASHTO T 90 shall not exceed 6.
   - E. The fraction finer than 15 microns as determined by AASHTO T 88 shall not exceed 10 percent.
   - F. The material shall exhibit an angle of internal friction of not less than 34 degree as determined by the standard direct shear test in accordance with AASHTO T 236, on the portion finer than the #10 sieve and compacted to 95 percent of AASHTO T 99, method C or D (with oversize correction, as outlined in Note 7, AASHTO T 99) at optimum moisture content.
   - G. Resistivity greater than 3000 ohm-cm.
   - H. ph range between 5.0 and 10.0.
   - I. Chlorides less than 200 ppm.
   - J. Sulfates less than 1000 ppm.
   - K. Sulfides less than 300 ppm.

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

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

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

2. Concrete - Concrete shall be in accordance with Section 602 of the Delaware Standard Specifications.
   - A. Cast-in-place concrete above footing -DelDOT Class A (f'c = 4500 psi).
   - B. Leveling pad -DelDOT Class B (f'c = 3000 psi).
   - C. Face panels -DelDOT Class A (f'c = 4500 psi).

3. Reinforcing Mesh -The reinforcing mesh shall meet the requirement of ASTM A185 (AASHTO M55). Galvanization -Galvanization shall meet the requirements of ASTM A123.

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

5. Embed loop -Embed loop shall be fabricated of cold drawn steel wire meeting the requirements of ASTM A82 and welded in accordance with ASTM A185. Loops shall be galvanized in accordance with ASTM A123.

6. Connector Bar -Connector Bar shall be fabricated of cold drawn steel wire meeting the requirements of ASTM A82 and galvanized in accordance with ASTM A123.

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

8. Horizontal Joint -The material to be used in the horizontal joints between facing panels shall be polyethylene pads with a minimum density of 0.946 g/cm^3 in accordance with ASTM D1505.

9. Alignment Pin -5/8" min. diameter, mild steel, round, and smooth bar galvanized to meet the requirements of ASTM A123.

10. Tie Strip -Shop fabricated of hot rolled steel meeting the requirement of ASTM A570, Grade 50. Galvanization shall meet ASTM A123.

11. Reinforcing Strip -Hot rolled from bars to the required shape and dimensions physical and mechanical properties shall meet ASTM A 572, Grade 65. Galvanization shall meet ASTM A123.
12. Fasteners -Bolts and nuts shall be 1/2" diameter hexagonal cap screw, high strength meeting ASTM A325 (AASHTO M164), mechanically galvanized. The coating shall meet the thickness, adherence and quality requirements of ASTM A153 (AASHTO M232).

Concrete Face Panels:

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

2. Casting -The panels shall be cast on a flat area, the front face of the panel at the bottom, the back face at the upper part. Coil loop inserts, rebar, PVC pipe and lifting devices shall be set in place to the dimensions and tolerances shown on the drawings prior to casting. The PVC pipe shall be placed in a manner as to insure that it is not bent or bowed. Coil loop inserts shall be set on the rear face. The concrete in each unit shall be placed without interruption and shall be consolidated by the use of an approved vibrator, supplemented by hand tamping as may be necessary to force the concrete into the corners of the forms and prevent the formation of aggregate pockets, air bubbles or cleavage planes. Clear form oil of the same manufacturer shall be used throughout the casting operation. All coil loop inserts shall be attached to the alignment templates using the bolts provided with the forms. The vertical and horizontal alignment of the coil loop inserts shall be 2 1/4" deep in the finished panel and be free of all concrete or debris, loose or otherwise. No concrete or other debris shall be on the interior surfaces of the coils of the coil loop inserts in the finished panels. Immediately after the alignment template is removed, duct tape shall be placed over the coil loop insert holes in order to prevent debris from entering the holes. This duct tape shall not be removed except by the crew that is assembling the wall. Care shall be taken to insure that the duct tape is not removed during shipping.

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

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

5. Tolerances

A. Panel dimensions shall be within 3/16" except that the lateral position of tie strips shall be within 1".
B. Panel squareness shall not exceed 1/2" as determined by the difference between the two diagonals.
C. Panel surface defects on smooth formed surfaces shall not exceed 1/8" per 5 foot length. Surface defects on textured -finished surfaces shall not exceed 5/16" per 5 foot length.

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

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

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

Acceptance of a production lot will be made if the compressive strength test result is greater than or equal to 4500 pounds per square inch. If the compressive strength test result is less than 4500 pounds per square inch, the acceptance of the production lot will be based on its meeting the following acceptance criteria in its entirety:
a. Ninety (90) percent of the compressive strength test results for the overall production shall exceed 4,670 pounds per square inch.
b. The average of any six (6) consecutive compressive strength test results shall exceed 4,750 pounds per square inch.
c. No individual compressive strength test result shall fall below 4,050 pounds per square inch.

If a production lot fails to meet the specified compressive strength requirements, the production lot shall be rejected. The rejection shall prevail unless the manufacturer, at his own expense, obtains and submits evidence of a type acceptable to the Engineer that the strength and quality of the concrete placed within the panels of the production lot are acceptable. If the evidence consists of tests made on cores taken from the panels within the production lot, the cores shall be obtained and tested in accordance with the requirements of AASHTO T 24.

7. RejectionUnits shall be subject to rejection because of failure to meet any of the requirements specified above. In addition, any or all of the following defects may be sufficient cause for rejection:
A. Defects that indicate imperfect molding.
B. Defects that indicate honeycombed or open texture concrete.
C. Defects in the physical characteristics of the concrete, such as broken or chipped concrete.
D. Stained form face, due to excessive form oil or others.
E. Signs of aggregate segregation.
F. Broken or cracked corners.
G. Tie strips bent or damaged.
H. Lifting inserts not usable.
I. Exposed reinforcing steel
J. Cracks at the PVC pipe or pin.
K. Panel thickness varying in excess of ± 3/16" from that shown on the plans.

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

9. Handling, Storage & Shipping -All units shall be handled, stored and shipped in a manner as to eliminate the danger of chipping, discoloration, cracks, fractures and excessive bending stresses. Panels in storage

shall be supported on firm blocking to protect the exposed exterior finish.

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

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

11. Concrete Finish - Front – Smooth rubbed finish.
Rear - Unformed surface, roughly screeded to eliminate open pockets of aggregate and surface distortions in excess of 1/4".

Construction Requirements:

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

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

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

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

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

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

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

   The moisture content of the backfill material prior to and during compaction shall be uniformly distributed throughout each layer. Backfill material shall have a placement moisture content between optimum moisture content and two percentage points below optimum moisture content. Backfill material with a placement moisture content outside the range shall be removed and reworked until the moisture

content is uniformly acceptable throughout the entire lift. The optimum moisture content shall be determined in accordance with AASHTO T 99 method C or D (with oversize correction, as outlined in Note 7, AASHTO T 99).

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

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

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

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

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

Design Criteria:

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

Method of Measurement:

The area of each type of Mechanically Stabilized Earth Walls to be paid for under these items shall be the number of square feet of wall surface area shown on the plans complete in place and accepted.

Basis of Payment:

The payment for the items shall be made as measured above at the contract unit price per Square Foot bid for the respective item, which price and payment shall constitute full compensation for excavation and for furnishing and fabricating all materials for the walls including concrete facing panels, reinforcing strips or mesh, tie strips, geotextiles, adhesives, fasteners, joint materials and incidentals. Payment shall include furnishing and placement of backfill material, concrete leveling pad and coping, all labor and materials required to prepare wall foundation, place the reinforcing strips or mesh, erect the concrete facing panels and construct the concrete coping to the lines and grades shown on the plans. Type 1, Type 2, and Type 3 walls will be designated on the plans.

11/29/10

602572 - REPAIRING EXISTING P.C.C. STRUCTURES

Description:

This work consists of furnishing all materials, and repairing the existing concrete structure with an approved patch mortar in accordance with notes and details on the Plans, and as directed by the Engineer.

Materials:

The material for the grout shall be MARK 194 PATCH MORTAR manufactured by POLY-CARB, 33095 Bainbridge Road, Cleveland, Ohio 44139, (telephone 1-800-225-5649 or 1-216-248-1223); EMACO R320 CI manufactured by Master Builders, Inc., 23700 Chagrin Boulevard, Cleveland, Ohio 44122 (telephone 1-216-831-5500 or 1-800-227-3350); SIKATOP 123 Plus manufactured by Sika Corporation, P. O. Box 297, Lyndhurst, NJ 07071, telephone 1-201-933-8800; or approved equal.

The patch mortar shall match the color and texture of the existing concrete surface as closely as possible. The Contractor shall submit to the Engineer all technical data relating to the product for approval.

Construction Methods:

All deteriorated, loose and honeycombed concrete as determined by the Engineer shall be removed from the surface areas to be repaired with a pneumatic hammer. Unless specified otherwise on the Plans, the size of the hammer shall be 15 lbs. (7 kg) max. for superstructure repair and 30 lbs. (14 kg) max for substructure repairs.

All prepared surfaces shall be cleaned by shot or grit blasting to remove dust, oil, grease, and other contaminates as determined by the Engineer. The surface areas shall be cleaned with water under high pressure and the excess water shall be removed by high air pressure or high-powered vacuum to render a dry surface area prior to the application of the mortar.

The patch mortar shall be applied in lifts of no more than 2" (50 mm) or as recommended by the manufacturer. After the top application of patch mortar, the material shall be hand troweled to obtain a smooth final surface.

The Contractor shall follow the manufacturer's recommendations for surface preparation, mixing of patch mortar, applications, and time limitations. If a conflict exists between these specifications and the manufacturer's recommendations, the latter will prevail.

Method of Measurement:

The quantity of mortar will be measured as the actual pounds (kilograms) of mortar placed and accepted. The pounds (kilograms) of mortar used will be calculated by multiplying the number of powder bags used by the weight of the bag. The liquid component will be considered incidental to the item.

Basis of Payment:

The quantity of mortar will be paid for at the Contract unit price per pound (kilogram). Price and payment shall be full compensation for furnishing all materials, removal and disposal of deteriorated concrete, surface preparation, application, shot or grit blasting and air blasting, for all tools, equipment, labor, and all necessary incidentals to complete the work.

01/17/01

602579 - DRILLING HOLES AND INSTALLING DOWELS

Description:

This work consists of furnishing all materials and drilling holes for dowels or anchor bolts as required and grouting the anchor bolts or dowels in place where required in the locations indicated on the Plans or as directed by the Engineer.

Materials:

The material for epoxy grout shall be MARK-194 CARBOPOXY GROUT as manufactured by POLY-CARB, 33095 Bainbridge Road, Cleveland, Ohio 44139 (Telephone 1-800-225-5649 or 216-248-1223) or SIKADUR 31 HI-MOD GEL as manufactured by Sika Corporation, 3000 Valley Ford Circle, King of Prussia, PA 19406, (Telephone 1-800-933-7452) or MASTERFLOW MP as manufactured by Master Builders, Inc., 23700 Chagrin Boulevard, Cleveland, Ohio 44122, (Telephone 1-216-831-5500 or 1-800-628-9990) or approved equal.

Construction Methods:

Drill holes at the locations and to the minimum depth shown on the Plans. Hole diameters shall be drilled in accordance with the epoxy grout manufacturer's recommendations considering the size(s) of the dowels or as shown on the Plans. Grout the anchor bolts or dowels in place using the epoxy grout in a manner to complete bonding of the anchor bolts or dowels in the holes and in accordance with manufacturer's recommendations. Repair any damage caused by the drilling operations to the satisfaction of the Engineer at no additional cost to the Department.

Method of Measurement:

The quantity of holes will be measured as the actual number of each hole drilled, grouted and accepted.

Basis of Payment:

The quantity of holes will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing and placing all materials, for all labor, equipment, tools, and all necessary incidentals to complete the work. Dowels and/or anchor bolts will be measured and paid for under a separate item(s) unless indicated otherwise on the Plans.

12/10/01

602586 - REHABILITATION OF CONCRETE STRUCTURE

Description:

This work consists of preparation and furnishing all materials, and repairing portions of the existing concrete substructure and/or superstructure in accordance with the notes and details on the Plans and as directed by the Engineer.

All applicable requirments of Section 602 of the Standard Specification for performing the work under this item shall be applicable except as modified herein.

Materials:

Concrete for repair work shall consist of a mixture of Portland Cement, aggregate, water, and other admixtures to provide a workable concrete. The Contractor has the option of using either Class A Concrete, Micro-Silica Modified Concrete, or Latex Modified Concrete for this item. The minimum concrete temperature at the time of placement shall be 75°F (24°C). The mix shall have a minimum compressive strength of 2000 psi (15 MPa) in 6 hours, if required in the Plans, and 4500 psi (30 MPa) in 28-days. The following shall be included in the Portland Cement Concrete mixture composition supplied by the Contractor:

Coarse Aggregate - Del. No. 8 Stone meeting the grading requirements of Section 813
Coarse Aggregate/Sand Ratio - 50 to 60%
Portland Cement Type I - 705 lb/yd³ (418 kg/m³) [Min.]
Water/Cement ratio - 0.45 (Max.)
Slump - 3" - 6" (75 to 150 mm)
Air - 5 % to 8%
Admixture - The quantity and AASHTO type or combination of AASHTO types of admixtures shall be determined by the Contractor.

If the Contractor chooses to use Class A concrete, the concrete shall have materials present in the mixture to mitigate alkali-silica reactivity (ASR) as per Section 812. Also, accelerators, if used, shall be non-chloride based.

If the Contractor chooses to use Micro-Silica Modified Concrete, the Micro-Silica shall conform to the requirements of AASHTO M307. If the Contractor chooses Latex Modified Concrete, the Latex Modifier shall be non-toxic, film forming, polymeric emulsion to which all stabilizers have been added at the point of manufacture, and shall be homogeneous and uniform in composition.

The Contractor shall be responsible for the quality of the concrete placed in any weather or atmospheric conditions. A smooth, durable riding surface of uniform texture, true to the required grade and cross-section, shall be obtained.

If Class A Concrete is utilized, prior to concrete placement, an approved bonding agent shall be applied to the existing concrete to ensure proper bond. If either the Micro-Silica Modified Concrete or the Latex Modified Concrete are utilized, the bonding agent shall be the rehabilitation concrete grout, placed and brushed into the rehabilitation areas. The grout shall be scrubbed onto the rehabilitation areas with enough care to ensure that all surfaces are evenly covered and that excess grout will not collect in low area.

Reinforcement, if required, shall be as indicated on the Plans.

Construction Methods:

All deteriorated, loose, and honeycombed concrete, as determined by the Engineer, shall be removed from the surface areas to be repaired with a pneumatic hammer. Unless specified otherwise on the Plans, the size of the hammer shall be 15 lb (7 kg). maximum for superstructure repair and 30 lb (14 kg). maximum for substructure repair.

All bar reinforcement exposed during the removal of the concrete shall be thorougly cleaned of rust and other foreign material by abrasive grit (use non silica, low dusting abrasive) blasting and then cleaned with a stream of compressed air before starting any repair work. In the case of damaged bar, it shall be cut and

mechanically spliced or replaced with a new bar of the same size and lapped or field-welded to the ends of the existing bar to the satisfaction of the Engineer. There shall be no separate payment for such work, and the cost shall be included in the item except that the new reinforcing bar will be paid for separately under a separate item in this Contract.

The Contractor shall submit to the Engineer a drawing showing details of forms and support system with appropriate dimensions for approval prior to the placing of concrete to repair the structure.

Concrete shall not be allowed to drop from the top of the forms which could otherwise result in the separation of the mix. Only approved mixing and placing equipment shall be used in preparation and handling of the concrete. Oil and other rust inhibitors shall be removed from all equipment in contact with the concrete before the mixes are used.

Method of Measurement:

The quantity of rehabilitation of concrete structure will be measured as the number of cubic feet (cubic meters) of concrete placed for the purpose of structure rehabilitation and accepted.

Basis of Payment:

The quantity of rehabilitation of concrete structure will be paid for at the Contract unit price per cubic feet (cubic meter). Price and payment will constitute full compensation for furnishing and placing all materials including concrete, abrasive grit blast cleaning of reinforcement bars, splicing and/or replacement of existing reinforcement bars, removal and disposal of deteriorated concrete, placement and removal of formings, surface preparation, for submission of working drawings, and all other work as described herein and on the Plans, for all labor, tools, equipment, and necessary incidentals to complete the work but shall not constitute payment for new bar reinforcement which shall be paid for under a separate item of this Contract.

3/14/02

602611 - REPAIR OF CONCRETE STRUCTURES BY EPOXY INJECTION

Description:

This work consists of furnishing all materials and repairing cracks in existing concrete structures by means of an epoxy injection system in accordance with the notes and details on the Plans and as directed by the Engineer.

Materials:

The epoxy injection system shall consist of a non-sag epoxy bonder to seal the surface cracks, and an injection epoxy used under low pressure to penetrate and fill the cracks, and bond the crack surfaces together.

The epoxy injection system shall be MARK-8 Non-sag epoxy bonder and Mark 10 injection epoxy manufactured by POLY-CARB, or NO. 22 Epoxy Paste and NO. 4 Eva - Pox manufactured by E-poxy Industries, Inc., or Duralcrete Gel and Duralcrete LV injection epoxy manufactured by Dural International Corporation, or Sikadur 31 Hi-Mod Gel and Sikadur 35 Hi - Mod LV injection epoxy, manufactured by Sika Corporation, or Nitobond Epoxy Gel and Nitobond ULV manufactured by Fosroc, Inc., or Approved equal. The Contractor shall furnish a copy of the comprehensive preparation and application instructions prior to the actual application, which have been developed by the manufacturer for use with the proposed epoxy bonder and epoxy injection system.

Construction Methods:

Concrete surfaces adjacent to the cracks to be repaired shall be cleaned to the extent necessary to achieve an adequate bond with epoxy bonder, and only by approved procedures which will not cause abrasive grit or concrete dust to get into the cracks. The use of solvents or thinners in cracks or on the bonding surfaces will not be permitted.

Dimensions of epoxy bonder to be used to seal the cracks shall be a maximum of 1/16" (1.5 mm) thick and 1" (25 mm) wide. Cracks to be injected shall have injection ports or tees installed in them. Unless otherwise specified on the Plans or directed by the Engineer, injection ports or tees shall be spaced at 6" (150 mm) to 12" (300 mm) for vertical repair and 6" (150 mm) to 18" (450 mm) for horizontal repair, but in no case closer together than the thickness of the concrete member if full depth penetration is desired. However, in certain cases, depth and spacing of holes at injection ports or tees shall be established with due consideration of the crack widths and depths compatible with flow characteristics of the epoxy and injection pressure to ensure that no further damage will be done to the member being repaired.

Ports or tees shall be set in dust free holes made either with vacuum drills or chipping hammers. After injection ports or tees have been inserted into the holes, all surface cracks in the area to be repaired shall be sealed with epoxy bonder between ports to ensure retention of the pressure injected epoxy within the confines of the member. The application of epoxy bonder shall be limited to clean and dry surfaces, and substrate temperatures shall be limited to not less than 50°F (10°C) during epoxy application.

The Contractor shall follow the manufacturer's recommendations for surface preparation, mixing of the components of the bonder epoxy and injection epoxy system, surface sealing and applications and all other works. If there is conflict between these specifications and the manufacturer's recommendations, the latter will prevail.

Method of Measurement:

The quantity of epoxy injection will be measured as the number linear feet (linear meters) of cracks injected and accepted. The non-sag epoxy bonder for sealing the crack surface areas shall not be measured and the cost shall be included in the unit price bid for this item.

Basis of Payment:

The quantity of epoxy injection will be paid for at the Contract unit price per linear foot (linear meter). Price and payment shall include full compensation for furnishing all materials, surface preparation, application, cleaning the areas of spills and other contaminates, abrading the concrete surface areas, for all

tools, equipment, labor, and all necessary incidentals to complete the work.

3/15/02

602646 - SILICONE ACRYLIC CONCRETE SEALER

Description:

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

Materials:

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

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

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

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

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

Surface Preparation:

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

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

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

Construction Methods:

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

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

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

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

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

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

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

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

Method of Measurement:

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

Basis of Payment:

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

2/1/07

602648 - PRECAST CAPSTONES, TYPE I
602649 - PRECAST CAPSTONES, TYPE II
602650 - PRECAST CAPSTONES, TYPE III
602651 - PRECAST CAPSTONES, TYPE IV
602652 - PRECAST CAPSTONES, TYPE V

Description:

This work consists of furnishing, fabricating, and installing in place the precast capstones as specified on the Plans, as described herein, and as directed by the Engineer. This work also includes furnishing and installing anchorage, joint material, and all other materials required to complete the work

Materials:

1. Portland cement - Type I or III, white and/or grey, ASTM C 150
2. Coarse aggregates - Granite, quartz or limestone, ASTM C 33 for "Severe Weathering Regions".
3. Fine aggregates - Manufactured or natural sands, ASTM C 33
4. Colors - Inorganic iron oxide pigments, ASTM C 979
5. Admixtures - ASTM C 494
6. Water - potable.
7. Reinforcement - ASTM A 615
8. Non shrink grout shall be composed of one sack of cement, 80.3 lbs. (47. 6 kg) of sand, and 76.6 lbs. (45.4 kg) of approved non shrink grout mixture.

Fabrication:

As indicated in the contract drawings and as follows:

1. General:

Precast Capstones shall have the following physical properties:

1. Compressive Strength, ASTM C 1194: 6,500 psi min
2. Absorption, ASTM C 1195: 6% max.

Capstones shall be tested according to the following:

1. Cast Stone Institute Technical Manual 04720-(current edition).
2. ASTM C 1194 - Test method for Compressive Strength of Architectural Cast Stone.
3. ASTM C 1195 - Test method for Absorption of Architectural Cast Stone.
4. ASTM C 1364 - Standard Specification for Architectural Cast Stone.
5. ASTM D 2244 - Test Method for Calculation of Color Differences From Instrumentally Measured Color Coordinates.
6. ASTM C 666 Test Method for Resistance of Concrete to Rapid Freezing and Thawing.
7. Testing: Test three specimens per 500 cubic feet at random from jobsite or from plant production for compressive strength and absorption in accordance with referenced standards.

Manufacturer must have ten (10) years minimum continuous operating experience and have facilities for manufacturing PreCast capstone as described herein. The Contractor must also be a member of the Cast Stone Institute and have a certified plant.

Shop drawings are to be provided in accordance with subsection 105.04 for review and approval before fabrication of any precast capstone may begin. Shop drawings shall include profiles, cross sections, reinforcement, exposed faces, arrangement of joints, anchoring methods, and their locations. All materials, equipment, processes of manufacture, and the finished capstones, including handling, storage, and transportation shall be subject to inspection and approval. Any defective construction that may adversely affect the strength or performance of a panel, shall be cause for rejection. Rejected sections shall be replaced at no expense to the Department.

A 2-foot by 2-foot sample must be submitted to the Department along with the shop drawings. The sample must be manufactured using the same materials, methods, and process that are to be used for the construction capstones.

Construction Methods:

Use Vibrant-Tamp method of machine manufacture using zero slump mixture to achieve desired appearance and physical properties.

Exposed surfaces shall exhibit a fine-grained texture similar to natural stone. No bugholes or air voids will be permitted.

Must match color and finish of approved sample when viewed in direct daylight at a 10-foot distance.

Cure cast stone components with a direct-fired steam generator at a minimum temperature of 105 degrees F for a minimum of six hours within 12 hours of fabrication. Cure cast stone components in presence of carbon monoxide and carbon dioxide to promote carbonation at surface to minimize efflorescence. Yard cure for 350 degree-days (i.e., 7 days @ 50F or 5 days @ 70F) prior to shipment. Acid-etch exposed surfaces to remove cement film prior to packaging for shipment.

Tolerances shall comply with the Cast Stone Institute Technical Manual 04270-(current edition). Set stones 1/8" within plane of adjacent unit (+/- 1/8”).

Setting contractor shall furnish all anchors and unload, store, set, and clean Cast Stone. Stone setter must have ten (10) years experience setting cast or natural building stone.

Use a full bed of mortar at all bed joints. Flush vertical joints full with mortar. Leave all joints with exposed tops open for sealant.

Verify location of anchor slots in the Precast Capstones and drill holes into wingwalls as required. Drench stones with clear running water, just prior to setting. Fill all dowel holes and anchor slots completely with non-shrink grout. Set all stones on a full bed of mortar. Leave head joints in coping and similar stones open for sealant. Rake mortar 3/4" for pointing. Sponge the face of each stone to remove excess mortar. Tuck point stone joints to a slight concave.

Use sealant on all stone areas partially or totally horizontal. Prime the ends of stones, insert properly sized foam backup rod, and gun in sealant

Re-clean stone by wetting with clear running water and applying a solution of stone and masonry acidic cleaner that dissolves mortar and construction dirt, leaving the surface clean and uniform with no acid burning or streaking.

Repair obvious chips with touchup material furnished by the manufacturer. Inspect by Cast Stone Institute standards.

Method of Measurement:

The quantity of Precast capstones will be measured as linear feet of Precast capstone installed and accepted. The measurement shall be taken along the fill face of the stones.

Basis of Payment:

The quantity of the Precast Capstone will be paid for at the Contract unit price per linear feet. Price and payment will constitute full compensation for furnishing all materials related to the precast capstone, designing, fabricating, and installing the capstone units on site and for all labor, tools, equipment, and necessary incidentals to complete the work. All materials and labor for the shop drawing and capstone sample submittal shall also be included in the bid price.

12/20/10

605002 - STEEL STRUCTURES

In addition to the requirements of Section 605 the following conditions shall apply:

NOTE:

A breakout sheet attached to the Proposal list the Steel for the Bridges under this item. The Contractor shall fill in a unit price for each item and the cost (unit price times the proposed quantity). The lump sum bid for Item 605002 - Steel Structures shall be the sum of the cost for all items listed. The breakout sheet shall be attached to the Bid Proposal. Failure to submit the breakout sheet with the Bid Proposal will result in the Bid Proposal being declared non-responsive and rejected.

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

9/16/10

605522 - URETHANE PAINT SYSTEM, EXISTING STEEL

Description:

This work consists of recoating and/or overcoating the entire existing steel structure as specifically indicated on the plans and in this item.

Materials:

All paint used on this structure shall be produced by a single manufacturer, and the coating system shall conform to the minimum requirements as noted below.

Total Removal Primer

Generic Type:	Zinc-rich, single-component, moisture-cured polyurethane
Vehicle Type:	Moisture-cured polyurethane
Volume of Solids:	60% Minimum
Pigment Type:	3.5 lbs/gal (0.42 kg/liter) Micaceous Iron Oxide/Zinc dust
Zinc/Micaceous Iron Oxide Content in Dry Film by Wt.:	83% Minimum
Coverage:	3 mils (75 µm) DFT minimum
VOC:	Not to Exceed 2.8 lbs/gal (0.335 kg/liter)
Weight Per Liter:	Minimum 22 lbs/gal (2.64 kg/liter)
Primer Performance:	No rusting, blistering or scribe undercutting when tested by salt fog in accordance with SSPC Paint 20.

Overcoat Primer or Intermediate Coat

Generic Type:	Micaceous iron oxide single-component, moisture-cured polyurethane.
Vehicle Type:	Moisture-cured polyurethane
Volume Solids:	60% minimum
Solids by Wt:	82% ± 2.0% minimum
Pigment Type:	4.0 lbs/gal (0.48 kg/liter) micaceous iron oxide
Color:	Tinted to distinguish from primer
Isocyanate:	Formulate with a moisture cure polyisocyanate diphenylmethane diisocyanate based prepolymer with an isocyanate content of 16.0 to 17.0 weight percent, an NCO equivalent weight of 247 to 263, and a viscosity of 1400 ± 200 cps @ 77 F (25 C).
Isocyanate Content:	9.6 ± 0.9 weight percent as determined by Kentucky method KM64-250.
Coverage:	3 mils (75 µm) DFT minimum
VOC:	Not to exceed 2.8 lbs/gal (0.335 kg/liter)
Weight per liter:	Minimum 16 lbs/gal (1.92 kg/liter)

Topcoat:

Generic Type:	Two-component, aliphatic polyurethane
Vehicle Type:	Acrylic aliphatic polyurethane
Resin:	A hydroxyl bearing polyacrylic resin with a typical hydroxyl content of 4% and an average equivalent weight of 425 (both values at 100% resin solids). This resin will make up at least 95% of the polyol vehicle solids.
Curing Agent:	A polyfunctional polyisocyanate resin based on Hexamethylene diisocyanate with an NCO content of 21.3 - 21.8% and an average NCO equivalent weight of 195.
Light Stabilizer:	The base component (Component A) must contain 1% of a hindered amine light stabilizer. This is calculated from the resin solids of component A and Component B.
Initial Gloss:	80%(minimum) @ 60 per ASTM D523
Solids Content:	Total solids of the mixed product will be 75.0 ± 2.0 percent by weight as determined by ASTM D 2369 using a 4 hour air dry time plus 1 hour oven

dry at 110 F (43.3 C).

Pot Life:	3 hours minimum at 77 F (25 C) and 50% relative humidity
Color:	As specified in the Plans
Coverage:	3 mils (75 µm) DFT minimum
VOC:	Not to exceed 2.8 lbs/gal (0.335 kg/liter)

All M.I.O. (Micaceous Iron Oxide) filled products must conform to ASTM D5532, Type I and have a certification of conformance from the Raw Materials Manufacturer. Each single coat of paint shall be a color different from the others. The color of the primer and intermediate coat shall be at the Contractor's option, and shall provide contrast with the underlying substrate or previously applied pant. The color of the finish paint shall be as specified in the Contract Plans.

A moisture-cured polyurethane topcoat will be acceptable provided the manufacturer submits data showing a 70% minimum gloss after 24 months exposure in southern Florida on panels facing due south at 45 from the horizon on a color the same or similar to the ones in the Plans.

The coatings manufacturer shall supply, in writing, the minimum and maximum recoat times of the primer and intermediate coat. If the Contractor fails to complete the painting during these established time periods, the surface area shall be cleaned at the Contractor's expense if necessary as determined by the Engineer.

Basis of Acceptance – All components of the system (primer, intermediate and finish coats) will be accepted on the basis of the manufacturer's written certification that the batch(s) produced meets their product specification and this Item. In addition, the Contractor shall submit a 1 quart (liter) sample of each component of the system (primer, intermediate and finish coats) to the DelDOT Materials and Research Section (call (302) 760-2401 for details) 30 days prior to the start of painting. The samples submitted shall be from paint to be used on the bridge with the same batch numbers and shall be labeled with the manufacturer's name, product name, component part, batch number, date of manufacture, and the bridge on which it is to be used. The Department will perform testing on the paint submitted. The Department reserves the right to take random samples of the paint at anytime during the construction and application.

Only paint arriving on the site in new, unopened containers shall be used.

Containers of paint shall be labeled with the manufacturer's name, product name, component part, batch number, date of manufacture, and shelf life date. Paint in containers having expired shelf life dates shall be immediately removed from the work site.

Construction Methods:

All structural steel members, railings, fascia, downspouts and other miscellaneous steel items that have previously been painted shall be cleaned and painted.

Surface Preparation – Surfaces to be cleaned shall be identified in the following manner:

Blast clean surfaces for total removal in accordance with Item 605533. Pressure wash surfaces for overcoating in accordance with item 605622.

Where power tool cleaning is specified, the perimeter or edge of intact paint adjoining the cleaned surface shall be feathered back and the adjoining paint shall be tightly adhered. Ragged edges on intact paint will not be allowed. Adherence will only be considered satisfactory if the adjoining remaining paint is smoothly feathered back and cannot be removed by lifting with a dull putty knife. After power tool cleaning operations are completed, all residue generated by the cleaning work shall be removed by vacuuming.

Blast cleaned surfaces shall be accepted by visual comparison to a project prepared standard. The Contractor shall prepare the project standard by cleaning a representative area on the structure that is being prepared for painting. The prepared standard shall generally conform to SSPC-Vis 1-89, "Visual Standard for Blast Cleaned Surface," Pictorial Standards A SP10, B SP10, C, SP10, and D SP10, as applicable, and shall be approved by the Engineer before the start of general cleaning work. More than one standard may be necessary if the cleaned steel differs significantly from the photographic standards due to the surface conditions or other factors. There shall be one standard per span of the bridge. Each standard shall be at least 1' x 1' (300 mm x 300 mm) in size, and shall be located in an area of the span that is accessible to, and

approved by the Engineer.

The Contractor shall protect the project standards from corrosion and contamination throughout the duration of the work. Protection shall be by applying a clear coat of polyurethane or by other means. At the completion of the cleaning work, the project standard shall be recleaned and painted in accordance with the specification. If, in the opinion of the Engineer, the project standard becomes deteriorated or otherwise ineffective, it shall be re-established in accordance with this specification at no additional cost to the Department.

Painting –

Manufacturer's Instructions – At least 5 working days prior to the start of work, the Contractor shall provide the Engineer with one copy of the paint manufacturer's current Technical Data and Materials Safety Data Sheets for the paint materials being furnished. Instructions, suggestions and precautions contained in these data sheets shall be followed to the extent that they do not contracdict the provisions of this specification.

Specifications and Inspection Equipment – Prior to the start of and throughout the duration of work, the Contractor shall be required to supply the Engineer with the following:

One bound copy each of the SSPC surface preparation specifications SSPC-SP1, Solvent Cleaning, SSPC-SP11, Power Tool Cleaning to bare metal , and SSPC-SP10, Near-White Metal Blast Cleaning.

One bound copy of SSPC pictorial standard SSPC-Vis1-89, Visual Standard for Blast Cleaned Surfaces, SSPC-Vis3, Visual Standard for Power and Hand Tool Cleaning.

One bound copy of SSPC Paint Application Standard No. 2 (SSPC-PA2), Measurement of Dry Film Thickness with Magnetic Gages.

One Bachrach Sling Psychrometer (Includes air thermometer)

One set of US Weather Bureau Tables

Three (3) Surface Thermometers, 0-150 F (-18 to 66 C)

One Positector 6000 Electronic Dry Film Thickness Gage.

One spring micrometer and one roll per span of Testex X-Coarse Replica Tape

Atmospheric Conditions – Painting shall not be performed unless the following conditions are met:

The receiving surface is clean and free of "rustback" and free of condensation and visible moisture; and

The receiving surface and ambient air temperature shall be as recommended by the paint manufacturer, except that in no case shall the painting work be performed when the surface and ambient temperatures are less than 35 F (2 C) or greater than 100 F (38 C).

All surfaces shall meet the manufacturer's dew point requirements when painting is performed. For moisture-cured urethanes, a surface will be considered too wet to paint if a moist handprint is visible after the surface is touched.

No painting is to occur in the winter months between the dates of December 15 and March 15.

Mixing Paint – All paints shall be thoroughly mixed with mechanical mixers in accordance with the manufacturer's recommendations.

Solvent Restrictions – Thin only with approved manufacturer's thinner. Thinning is allowed only in strict accordance the manufacturer's recommendations and state VOC regulations. Unauthorized use of solvents shall result in recleaning and repainting the surface in accordance with this specification, at the Contractor's expense.

Paint Application – Paint coatings may be applied using brush, roller or spray methods, except the primer which shall be applied by spray methods.

Stripe coating with primer will be required on the following surfaces cleaned to bare metal. All welds, rivets, bolts, nuts, and edges of plates, angles, lattice, pieces or other shapes, and corners and crevices shall be "striped" with primer before the general primer coat is applied. All stripe painting will be performed using brush only. No other method will be allowed for stripe painting.

Complete protection against paint spatter, spillage, overspray, wind-blown paint, or similar releases of paint shall be provided. Covers, tarps, mesh and similar materials shall be placed around the work area to protect public and private property, pedestrian, vehicular, marine and other traffic, all portions of the bridge, highway appurtenances, waterways, and similar surrounding areas and property, upon, beneath, or adjacent to the structure.

Number of Coats –

Steel shall be painted with one coat of Primer, one coat of Intermediate coat, and one coat of topcoat.

Film Thickness – Paint shall be applied in sufficient quantity to produce the minimum dry film thickness specified under Material.

Painting Schedule – Primer shall be applied on the same day of the cleaning operation and before rusting occurs to the cleaned surface. Failure to apply primer to a cleaned surface within 8 hours shall result in recleaning the surface in accordance with this specification at no additional cost to the Department.

The intermediate paint shall be applied to the receiving surface within 14 days of the application of the primer, or within the manufacturer's recommended maximum recoat time, whichever is less.

The finish paint shall be applied to the receiving surface within 14 days of the application of the previous coat (intermediate), or within the manufacturer's recommended maximum recoat time for the intermediate coat, whichever is less. The finish paint color on all the fascia beams for the bridge shall be painted with paint from the same batch number and date of manufacture in order to avoid uneven paint color. If more than one batch of paint is needed to paint the fascias, then a natural break point such as the end of a span shall be used to change batch numbers.

Areas failing to meet the specified minimum dry film thickness shall be recoated with the same type of paint to produce at least the total dry film thickness required. Paint applied containing thinners, paint applied to contaminated surfaces, and paint applied contrary to this specification shall result in recleaning and repainting the surface. The work of recleaning and repainting, if required, shall be done by the Contractor to the satisfaction of the Engineer at no additional cost to the Department.

If a coat of anti-corrosive grease is applied to an area on the bridge (such as the bearings) then the grease shall be sprayed with the finish coat of the bridge paint being used provided that the bearing for the other areas that are designated to receive the grease have already been cleaned and painted.

Materials Storage – Paint in storage shall be protected from damage and maintained between 40 F (4°C) and 85 F (29°C), unless the coatings manufacturer requirements are more stringent. Paint not used before the expiration date shall be immediately removed from the project site,

Painting of Galvanized Steel –

All galvanized steel surfaces shall be painted with a moisture-cured aluminum paint that is designed to adhere to galvanized steel surfaces. The moisture-cured aluminum paint must meet the following requirements:

One-Coat System

Generic Type:	Aluminum-filled aromatic moisture-cure urethane
Vehicle Type:	Moisture-cured aromatic polyurethane
Pigment Type:	Minimum 2 lbs/gal (0.240 kg/liter) non-leafing aluminum
Coverage:	2 mils (50 µm) DFT, minimum

VOC: Not to exceed 3.5 lbs/gal (0.42 kg/liter)
Weight per gallon: 9.2 lbs/gal (1.10 kg/liter)
Solids by volume: 52.0 ± 1.0%
Shelf life: 6 months minimum from date of shipment

Stenciling Requirement – At the completion of the painting work, the completion date (month and year) and the bridge number, shall be stenciled on the structure in 3" (75 mm) numbers. The paint used for this stenciling shall be th same as the topcoat except the color shall be black. The numbers shall be stenciled on the outside of each fascia beam at the approaching traffic ends of the structure, at a location designated by the Engineer.

Method of Measurement:

The quantity of painting will not be measured.

Basis of Payment:

The quantity of painting will be paid for at the Contract lump sum price. Price and payment will constitute full compensation for furnishing all materials, equipment necessary to complete the work, cost of providing protection against damage during paint application, for all labor, tools and necessary incidentals to complete the job.

Progress payments will be made based on percentage of the structure cleaned and painted in accordance with this specification.

12/17/03

605524 - BRIDGE DRAINAGE SYSTEM

Description:

This work consists of furnishing all materials and necessary labor to fabricate, assemble, and install the bridge drainage system along the deck longitudinal joint, including fabric reinforced rubberized trough material; stainless steel angles, bars, and fasteners; and stainless steel drain box and downspout in accordance with the notes and details on the Plans, these specifications and directions from the Engineer.

Materials:

(a) **Polyester Fabric.** Meet the following requirements:

- Number of Plies — 2
- Minimum Fabric Weight (oz./sq. yd [kg./sq.meter]) — 7 1/2 (.25)
- Minimum Tensile Strength (lb/in [kg./m]) ASTM-D378 — 425 (7590)

(b) **Rubberized Trough Material.** Furnish either Chloroprene or Butadiene Acrylonitrile meeting the following requirements:

- Minimum Hardness - Type A, ASTM-D2240 — 50 Durometer
- Maximum Hardness - Type A, ASTM-D2240 — 60 Durometer
- Minimum Tensile Strength, psi (kPa), ASTM-D412 — 1900 (9650)
- Minimum Elongation at Break, %, ASTM-D412 — 300
- Oven Aging, 70 hours @ 212°F (100°C)

Maximum Elongation Loss, %	-18
Maximum Tensile Strength Loss, %	-35
Maximum Hardness Points Change	+10

- Brittleness to Heat Aging, ASTM-D573 — -30°F (34°C)
- Tear Resistance, (lbs/linear in. [kg/linear meter]) Die C., ASTM-D624 — 120 (2143)

- Resistance to Ozone Aging, ASTM-D1149. No cracks for 100 hours of exposure of 20% elongated samples @ 100°F (38°C) and 100 pphm ozone.

- Oil Swell, 70 hours @ 212°F (100°C) using ASTM Oil 3. 45 Weight Change, % Max., ASTM-D471

(c) **Fabric Composite Properties**. Preformed fabric material consisting of the multiply polyester fabric and rubberized trough material vulcanized to form a laminate, with the following properties:

Minimum Thickness (inch [mm])	1/8 (3.2)
Minimum composite tensile strength of the fabric reinforced bridge trough, (lbs/in [kg/meter]) ASTM-D378	800 (14,285)
Maximum Elongation @ Ultimate Tensile Strength, %, ASTM-D412	30
Maximum resistance to Water Absorption, (less than 10% weight gain for 7 days of water immersion @ 66 C) %, ASTM-D471	10
Minimum Weight (kg/sq. meter)	3.66

(d) **Stainless Steel**

- All angles and bars shall conform to ASTM A276, Type 304.

- All plates used in the fabrication of the drain box shall conform to ASTM A240, Type 304.

- The 250 mm diameter, Schedule 10S pipe used for the downspout shall conform to ASTM A778, Type 304L.

- All fasteners, including concrete inserts, screws, and powder actuated fasteners shall be stainless steel.

Construction Methods:

Fabrication of the bridge drainage system, assembly, and application of adhesives shall be in accordance with manufacturers' written recommendations and as specified herein.

Prepare shop drawings for fabrication of the rubberized trough material and all stainless steel parts. Drawings for the trough shall clearly indicate width of trough at ends and at center, slope of trough, opening at midspan, and all holes for fasteners. Shop drawings for stainless steel drain box and trough supports shall indicate all member sizes and fastener locations. An erection drawing shall indicate assembly procedure clearly indicating work by construction phases. Acceptance of the shop drawings is required prior to fabrication.

Welding of stainless steel shall conform to all applicable requirements of AWS including qualifications of welders. All welds shall be inspected by a testing laboratory approved by the state. The Contractor shall submit the laboratory's certification for quality of materials and the result of welding inspection to the Engineer. Where, in the opinion of the Engineer, welds are defective, they shall be rewelded or repaired in a manner acceptable to the Engineer.

Cutting and drilling of the rubberized trough material shall be performed in a shop experienced with this type of work. The trough shall be supplied in one piece for the full width and length of the longitudinal deck joint; splices are not permitted. The ends of the trough are to be closed and watertight; use a rubberized sealer material as recommended by the manufacturer of the trough material. Also apply rubberized sealer material between drain trough and stainless steel supports prior to installation.

Method of Measurement:

The quantity of bridge drainage system will not be measured.

Basis of Payment:

The quantity bridge drainage system will be paid for at the Contract lump sum. Price and payment will constitute full compensation for furnishing, fabricating, and installing all materials as specified.

8/5/04

605525 - RELOCATING SIGN SUPPORT STRUCTURE

Description:

This work consists of removing, relocating and erecting an existing steel sign structure and sign panels, in accordance with the location, notes and details on the Plans and as directed by the Engineer. Such work shall include removing existing foundation and all materials, labor, tools, equipment, and incidentals necessary to complete the work.

Materials and Construction Methods:

The steel sign structure shall be carefully dismantled and all members including bolts, nuts, and all related hardware shall be stored for reuse. Rusted bolts and nuts shall be replaced in kind and shall conform to the requirements of Section 605 of the Standard Specifications unless otherwise indicated on the plans. The existing steel sign structure shall be modified as required to conform to the geometry and details as shown on the Plans for the relocated structure. Also, welding, galvanizing and all work related to dismantling and erecting the support structure at new location shall conform to the applicable requirements of Section 605 unless otherwise indicated on the plans.

A minimum period of fourteen (14) days shall elapse from the last concrete placement in foundation and pedestals to the beginning of erection of the sign structure. Steel anchor bolts, nuts and washers shall conform to the requirements of ASTM F1554 Grade 55 and shall be galvanized in accordance with AASHTO M 232.

Unless shown otherwise on the Plans the concrete foundation at the existing location shall be removed to a minimum depth of one foot from the ground surface and the area shall be graded and seeded. Removal will also include reinforcement bars, anchor bolts and other related hardware.

High strength steel bolts, nuts and washers for connections shall conform to the requirements of ASTM A325 and shall be hot dipped galvanized in accordance with ASTM A153.

Construct the tower base bearing areas of concrete pedestals, in a true and level position. Full bearing is required under bases.

Fully tighten anchor bolts by turning the nuts an additional 30 to 45 degrees. Progress by sequentially tightening the nuts on opposite side of the base plate (180 degrees apart).

All signs and miscellaneous attachments shall be installed within the same 8 hour period that the trusses are erected.

Method of Measurement:

The quantity of steel sign structures relocated and accepted will not be measured for payment, but shall be paid for on a lump sum basis for each steel sign structure.

Basis of Payment:

The quantity of steel sign structures relocated will be paid for at the Contract lump sum price. Price and payment will constitute full compensation for relocating the support structure, for modifying the existing sign support structure to match the details shown on the Plans for the relocated structure, for furnishing all materials such as concrete, anchor bolts, new hardware if required, removal of the existing foundation, grading and seeding or of the existing area, for all labor, equipment, tools and incidentals necessary to complete the work. Backfilling in accordance with Section 210, drilled shaft foundation construction and rock excavation in accordance with 206 are to be paid under separate item of this Contract.

10/18/10

605528 – UTILITY SUPPORT

Description:

The item shall consist of installing conduits and transition couplings supplied by Delmarva Power and fabricating and installing the utility support system on the bridge as indicated on the Plans, as specified herein, and as directed by the Engineer.

Materials:

Conduits and transition couplings for the electric lines will be furnished by Delmarva Power. The Contractor should contact Angel Collazo, telephone (302) 454-4370 or angel.collazo@delmarva.com to coordinate the delivery of Delmarva provided material to a suitable location on the job site. The Contractor shall furnish and install mandrels and pulling tape.

All structural steel shall be AASHTO M270, Grade 36 and shall be welded in accordance with the latest version of AWS D1.5. Fabrication, erecting, and painting shall conform to the requirements of DelDOT's *Standard Specifications* Subsection 605.

Bolts shall conform to the requirements of ASTM A325 and DelDOT's *Standard Specifications* Subsections 605.14 and 826.03. Nuts and washers shall conform to the requirements of ASTM A563 and ASTM F436, respectively.

Material certification tests to determine the physical and chemical properties of all materials shall be conducted in accordance with the appropriate specification governing the material. The test certificates shall be provided to the Engineer.

Working Drawings:

A support method has been included in the plans; however, the Contractor has the option to use an alternate method. For an alternate method, the Contractor must submit for approval alternative design calculations signed and sealed by a Professional Engineer registered in the State of Delaware.

The Contractor shall prepare and submit working drawings for the utility support system. Such drawings shall show all details of the support and connections and of the materials proposed for use and shall be approved by the Engineer prior to fabrication. The preparation of the working drawings shall include, but not be limited to, types of materials to be used, necessary details required for the support and connection, and associated calculations. Such approval shall not relieve the Contractor of any responsibility under the contract documents for the successful completion of work. The preparation of the working drawings shall conform to Section 18.1.1 of the *AASHTO LRFD Bridge Construction Specifications 2nd Edition with interims through 2009* and Section 105 of DelDOT's *Standard Specifications*. A Professional Engineer registered in the State of Delaware must seal the working drawings and calculations.

Construction Methods:

Utility support shall consist of drilling holes in the bottom flange of the diaphragms and attaching bolts to support the plates that will carry the conduits.
All field welding shall be done by the shielded metal-arc process. All requirements of the Standard Specifications shall be met, except that the requirements for radiographic and ultrasonic inspection shall be waived if a visual inspection by the Engineer indicates the welds are satisfactory.

Where new steel is to be connected to existing steel, new and existing surfaces shall have a prime coat of paint applied prior to completing the installation of the proposed steel. Intermediate and finish coats of paint shall be applied after installation of the proposed steel. Painting shall be in accordance with 605522 – URETHANE PAINT SYSTEM, EXISTING STEEL.

Any damage resulting from the Contractor's misuse of the support system to any portion of the utility or existing structure that is to remain in place shall be repaired to the satisfaction of the Engineer at the expense of the Contractor.

Associated with this work is the construction of a concrete encased conduit structure between the bridge and Delmarva manholes #579 and # 578. Conduits shall be installed to 10' from the manholes on both the north and south side of the bridge. The Contractor will install the transition couplings to connect the fiberglass conduits on the bridge to the PVC conduits installed as indicated on the Plans and as part of the work specified in Item602002.

After installation of the conduits, the Contractor shall check the ducts by mandrel to verify ducts are intact and not deflected (oval shape) that would hamper pulling of primary cables etc. Upon proving the conduits, assure that 20' of pulling tape remains rolled-up at each end of the conduits for use by Delmarva Power's contractor.

Method of Measurement and Basis of Payment:

"Utility Support" will be paid for at the Contract lump sum bid price. Price and payment shall constitute full compensation for installing the conduits and transition couplings furnished by Delmarva Power and furnishing all materials, equipment, and labor necessary to complete the work as described herein and within the Plans. This includes fabricating and/or installing any support system; structural steel and connection hardware; painting new steel; as well as preparing the required working drawings; and any additional utility coordination, labor, equipment, mandrels, pulling tape and other materials, and incidentals necessary to complete the work.

12/1/10

605533 - CLEANING EXISTING STEEL STRUCTURES, HAZARDOUS BASE (L.S.)
605629 - CLEANING EXISTING STEEL STRUCTURES, HAZARDOUS BASE (S.F.)

Description:

This work consists of cleaning the entire existing steel structure(s) or a part of it as noted on the Plans; collection; stabilization; and transportation of the "spent material" (rust particles, paint particles and dust, material assumed to be hazardous waste), resulting from cleaning operations, to an approved disposal site(s). The work under this item shall be performed in accordance with these Special Provisions and attached Appendix A.

Prior to the beginning of paint removal work, the Contractor shall set forth in detail and submit to the Delaware Department of Transportation (hereinafter referred to as Department), for approval, the proposed containment system (mini-containment system when only a part of the structure is to be cleaned as required) for complete capture, containment, collection and disposal of the "spent material" generated from paint removal work and testing by an outside laboratory, approved by the Department. The system shall be in compliance with these specifications, State, United States Environmental Protection Agency (EPA) and Occupational Safety and Health Act (OSHA) and other regulatory agencies with jurisdiction, rules, regulations, standards and guidelines in effect while the work is in progress. Upon approval, the plan shall be implemented to capture, contain, collect, and dispose of all "spent material".

The Contractor shall not begin cleaning and/or blasting operation until he/she has submitted final documentation that he/she has an approved disposal site and permits for the handling, storing, and transporting of hazardous waste and nonhazardous waste; and shall be responsible to protect the environment, workers, and the public from toxic substances resulting from the paint removal operations.

Pre-Bid Conference:

Prior to the bid opening, a date will be set if deemed necessary by the Contract Administration (bidder will be notified at the time of purchasing contract documents) for a pre-bid conference to alert the potential bidder to comply with the directives established by the OSHA, EPA and the State of Delaware during and after the execution of this item. It is recommended that the bidder (Prime Contractor) brings his/her Sub-Contractor to be engaged in removing the paint if he/she cannot perform the work of this item.

Materials:

The Contractor shall use recyclable metallic shot and metallic grit meeting the requirements of SSPC AB2 and SSPC AB3 as abrasive materials for removing paint.

Other removal and cleaning methods after approval may be used by the Contractor provided he/she can demonstrate that the proposed method satisfies all the safety and environmental requirements of this specification and provides a cleaned surface satisfactory to the Engineer.

Construction Requirements:

Containment System:

Prior to commencing any cleaning operations, the Contractor shall prepare a Cleaning Contaminant System for the capture, containment, collection and storage of the waste generated by the work, which includes abrasive blasting residue, spent blasting mediums, rust, paint particles, dust, etc.

The Containment System must be capable of containing the waste and resulting residue generated by the work. The Contractor shall strive to achieve total containment (100%); and is required to meet all Federal, State, City and Local regulations using the best available technology as applicable to each bridge site. The Containment System shall meet the requirements of SSPC Guide 6, Class 1A. Visible emisions in excess of SSPC Guide 6, Level 1 (one percent in the work day) shall be cause for immediate shut down until corrections are made.

While on the site, tarps shall be held securely in place, and kept sealed at all times during water blasting,

paint removal and painting.

For bridges over water, the Containment System shall include a skimming boom consisting of a float with a skirt to collect floating debris. Also, an approved capturing device such as floating curtain, screen or tarp shall be placed under and down wind of the bridge to catch rust, sand and paint particles; and the waste material collected on the capturing device shall be cleaned daily.

Prior to commencing work the Contractor must submit working drawings of the proposed containment system to the Department within 14 days from Notice of Award. The Department will review the drawings and evaluate the system as to its effect on the loading capacity of the existing structure. The Contractor shall also submit the design of the systems to be employed, including an analysis of the dead, live and wind loads which will be added to the existing structure by the containment system and blast waste. The load analysis shall be performed and stamped by a licensed Professional Engineer registered in the State of Delaware and experienced in bridge analysis. The analysis shall assure that the system will not induce a load on the bridge which will create an overstress condition or otherwise effect the structural integrity of the bridge. For bridges 23 feet (7 meters) or greater in height, the containment system submittals shall include a safety net meeting OSHA requirements in 29 CRF 126.105, 29 CRF 126.106, and 29 CRF 126.104. For bridges less than 23 feet (7 meters) in height, the submittals shall include necessary safety measurements such as safety harnesses, lifelines and lanyards meeting OSHA requirements in 29 CRF 126.104. In no case shall the containment system, safety devices, or equipment encroach upon the minimum bridge clearances shown on the Plans, unless otherwise approved by the Engineer.

The following guidelines shall be followed by the Contractor in preparing the Containment Drawing Plans. However, the Contractor may submit for approval a self-contained and self supporting blast and recovery system as an alternative option for removing the paint:

1. Working drawings with Professional Engineer Seal shall be submitted by the Contractor meeting the requirements of Subsection 105.04 of the Standard Specifications.

2. The working drawings shall show Containment System in plan & elevation views including details of clips and hangers.

3. The working drawings shall indicate maximum permissible load of abrasive or waste permitted on the Containment System.

4. The working drawings shall indicate if vehicles with abrasive and waste will be permitted on the bridge; if so indicate allowable load and locations. Vehicle and equipment loads may not be permitted behind abutments if surcharging results.

5. The working drawings shall indicate all restrictions on bridge including any load posting.

6. Permanent attachments or fasteners to the bridge will not be permitted.

7. The working drawings shall show the location(s) of skimming boom(s) if the bridge is over water.

8. The working drawings shall identify all containment system components; and shall indicate all rigid framework, work platform and scaffolding.

9. All curtains, screens or tarps used for containment shall be weighted down.

10. No load shall be attached to the bridge railings unless railing is in good condition, and details and calculations showing loading are approved by the Department.

With submission of the Containment System Drawing, the Contractor shall be required to develop and submit for approval an Effective Safety Program to be followed during the paint removal period. The Contractor's employees, before being engaged in paint removal work, must have proper training in accordance with the OSHA General Industry Standard.

The review and acceptance of the working drawings by the Department shall in no way relieve the Contractor of any responsibility for obtaining the required degree of capture, containment and collection.

Cleaning of Containment System must be properly maintained while work is in progress and shall not deviate from the approved working drawings without prior approval of the Engineer. Air within the containment structure shall be exhausted rapidly to maintain a slight negative pressure, so that outside air is drawn in through specifically designed openings rather than having contaminated air leaking from inside the containment. Also, sufficient fresh air must be circulated so that dust is reduced to enable good visibility for the operator. Public access to all rigging, scaffolding and the containment systems must be denied at all times.

Air Monitoring for PM 10 and TSP Lead:

The intent of the monitoring requirements in this specification is for the Contractor to establish a baseline background reading for the area(s) in proximity to steel cleaning. This specification also requires the Contractor to perform all of the testing required to ensure that lead particles are adequately contained and captured by the Contractor's steel cleaning operations. All costs associated with this work are included in the Contractor's bid price.

The Contractor shall engage a consultant responsible for conducting air monitoring work during the operation of the paint removal period; monitoring shall be conducted on the area downwind of the lead control area. The qualification of the consultant shall be approved by the Department prior to his/her engagement in air monitoring service. The air quality standard shall be monitored in accordance with National Ambient Air Quality Standards (NAAQS). At a minimum this containment system shall achieve a SSPC level 1 Standard Emissions level.

Baseline Monitoring shall take place at each structure where the Contractor is required to clean the existing steel in order to establish preconstruction background readings for the area(s) involved. Baseline Monitoring shall occur for a minimum of 3 consecutive calendar days before the steel cleaning begins. The Contractor shall conduct the monitoring so that the monitored hours match the proposed work schedule for the contract, including nightwork. The minimum duration of the monitoring for each calendar day must be 8 hours, regardless of the Contractor's proposed work schedule. The required sampling type shall be 2 (two) PM-10 and 2 (two) TSP-Lead and the Engineer must approve the locations of the sampling. During lead paint removal, air monitoring shall commence just prior to the start of any lead removal operation and shall continue whenever the contractor is cleaning steel under this item. The required sampling type shall be PM-10 and TSP-Lead and the Engineer must approve the locations of the sampling. If problems with containment occur, the Engineer will require the air monitoring to be reinstalled at the Contractor's expense.

The acceptance level for PM 10 (particles with an aerodynamic diameter less than or equal to a nominal 10 micrometers) shall be 150 micrograms per cubic meter of air for 24-hour average concentration (450 micrograms per cubic meter of air over an eight-hour period assuming no emissions occur from the project for the remaining 16 hours).

The acceptance level for Total Suspensed Particulate Matter (TSP) lead emissions shall be 1.5 micrograms per cubic meter of air averaged over a calendar quarter of the year, which can be converted as noted below to achieve daily lead level allowance during the project operation.

$$DA = \frac{90}{PD} x 1.5 \mu g/m^3, where$$

DA = Daily Allowance ($\mu g/m^3$)

PD = Number of paint removal operation days anticipated in a 90-day period.

For example, if it is expected that 30 days out of 90 will be worked, the TSP lead emission criteria for each of those days would be 4.5 $\mu g/m^3$, over a 24-hour period (90/30 x 1.5). However, since the paint removal operation will not continue for the full 24 hours, this level of emissions can be increased using the following formula:

$$ADA = DA x \frac{24}{H}, where$$

ADA = Adjusted Daily Allowance ($\mu g/m^3$)
H = Hours worked in 24 hours.

Using the above example, if the paint removal operation is continued for eight hours out of each 24-hour workday, the ADA will be 13.5 $\mu g/m^3$ (4.5 $\mu g/m^3$ x 24/8). Thus, 13.5 $\mu g/m^3$ could be emitted during the eight hours of work, provided no emissions occur during the remaining 16 hours.

The size of the containment system shall be a work area approximately equivalent to what a work crew can blast clean, inspect, paint and move in a 24 hour period. The Engineer may permit a larger containment system if the Contractor can demonstrate that such a system will increase prodictivity and not interfer with the flow of traffic. When dust leaks are noted in the containment system, repairs shall be made as soon as possible.

If at any time during the execution of the work, the cleaning containment system fails to function at the required level of efficiency, the Contractor must immediately suspend all operations except those intended to minimize the adverse impact to the environment. Operations shall not resume until modification have been made to correct the cause of the failure.

The Contractor shall have a full time hygenist on the job site during lead paint removal activities to insure required hygene procedures are being followed.

Cleaning:

All structural steel surfaces shall be cleaned and free of all rust, rust scale, mill scale, paint or other foreign matter in accordance with the requirements of SSPC-SP10.

Should the Contractor elect to use wet or water-vapor sandblasting, the water shall contain 0.32 percent of sodium nitrate and 1.28 percent by weight of ammonium phosphate for the purpose of inhibiting the development of rust.

No visible lead containing residue, debris, or paint chips shall remain or be present outside the containment area upon the completion of the abatement cleanup. Visible lead containing residue, debris, or paint chips outside the containment area shall be cleaned up immediately.

The type of containment systems used when cleaning steel shall be Class 1A for abrasive blasting and Class 2P for Power Tool Cleaning as per SSPC - Guide 6 "Guide for Containing Debris Generated During Paint Removal Operations".

Collection, Storage and Disposal of Hazardous and Non-Hazardous Waste:

All waste discharged and collected from the Containment System must be protected in a manner so as to prevent migration of the waste into the environment; and the Contractor shall abide by all Federal and State regulations relating to collection, storage and disposal of the hazardous waste and solid waste.

The Contractor shall provide a clean up area with soap, water and container for collection and disposing of the hazardous waste at each work site. The Contractor shall obtain a permit for hauling the hazardous waste from the State Department of Natural Resources and Environmental Control (DNREC).

Each day the Contractor shall collect and contain waste material in sealed 55 gallon (208 liter) open head type drums (I.C.C. Specification 17-H). All drums shall be in new condition and approved for use by the Engineer. Drums shall be labeled with the words "HAZARDOUS WASTE" and tagged in accordance with all State regulations including bridge number, Contract number, Contractor's name, contents and the date when waste accumulation in the drum begins. No more than 29 drums of hazardous material shall be kept at the site of each bridge.

The waste to be placed in drums also includes all filters used in abrasive blasting equipment and vacuum power tools for removing hazardous and nonhazardous paint waste; these filters shall be removed when the Contract is complete. At the end of the Contract all such filters shall be removed from equipment used on the project and placed in drums with other hazardous waste for proper disposal.

At the end of each working day the Contractor shall haul the waste material contained and collected to an approved temporary secure accumulation site. This site must be approved by the Engineer and be maintained in a secured condition by the Contractor. Hauling of hazardous waste must be performed by a license hauler.

The accumulation site must be capable of preventing the migration of the lead contaminated waste material into the environment. The accumulation area must also provide protection from vandalism and unauthorized access by the general public. At the completion of the work and in the presence of the Engineer, the Contractor shall take representative samples of the accumulated residues collected at each bridge.

The storage site must be capable of preventing the migration of the lead contaminated waste material into the environment. The storage area must also provide protection from vandalism and unauthorized access by the general public. At the completion of the work, the Contractor shall take representative samples of the accumulated residues collected at each bridge to be analyzed for lead content.

Samples exceeding 5 PPM (parts per million) according to the Toxicity Characteristics Leaching Procedure (TCLP) test shall be considered a hazardous waste and disposed of as hazardous waste. If the sample's toxicity level has dropped to 5 ppm or less, then the waste can be transported and disposed of as industrial waste, provided it is stabilized.

In order to stabilize the industrial waste (below the toxicity level), a slurry made from Portland Cement (10% of waste by volume) and water (50% of cement by volume) shall be added to the waste and thoroughly mixed at the disposal site by the licensed hazardous waste hauler. In no case shall blasting debris or dust collector waste be directly disposed of as an industrial waste. They shall either be stabilized or disposed of as a hazardous waste, irrespective of the results of the TCLP Test.

The samples shall be delivered to a laboratory approved by the Department for testing according to the Toxicity Characteristic Leaching Procedure (TCLP). Should test results indicate and if the contaminants listed in the following are above their respective regulatory limits, the residue shall be deemed a hazardous waste, and must be treated before disposal.

EPA HAZARDOUS WASTE NO.	CONTAMINANT	CAS NO.	REGULATORY LEVEL (mg/L)
D004	Arsenic	7440-38-2	5.0
D005	Barium	7440-39-3	100.0
D006	Cadmium	7440-43-9	1.0
D007	Chromium	7440-47-3	5.0
D008	Lead	7439-92-1	5.0
D009	Mercury	7439-97-6	0.2
D010	Selenium	7782-49-2	1.0
D011	Silver	7440-22-4	5.0

The Contractor shall remove from the accumulation site all treated waste within 90 days from the date of accumulation; and be transported to an industrial dump facility approved by the Delaware Department of Natural Resources and Environmental Control for disposal of such waste. A copy of the completed waste manifest (signed and dated by the Contractor and the Engineer at the site) shall be forwarded to the Department.

Method of Measurement:

For item 605533, the quantity of cleaning existing steel structures will not be measured. For item 605629, the quantity of cleaning existing steel structures will be measured by the square foot (square meter) of area cleaned and accepted.

Basis of Payment:

For item 605533, the quantity of cleaning existing steel structures will be paid for at the Contract lump sum. For item 605629, the quantity of cleaning existing steel structures will be paid for at the Contract unit price per square foot (square meter).

Price and payment shall constitute full compensation for furnishing and installing all materials, working drawings and Professional Engineer's service, Containment System, collection and temporary storage of the waste material as required, air monitoring service including consulting services, testing materials for contaminants, cleaning the structure, revisions and resubmissions of the Containment Plan and or Systems that may be required during the execution of the work, for providing respiratory protection and protective clothing to the worker and Departments employee at the time of inspection, hygiene facilities, for stabilizing the hazardous material and transporting and disposing of the stabilized waste complying with all the requirements as described herein in these special provisions, for all labor, equipment, tools and necessary incidentals to complete the work.

NOTE

The latest issue, revision, or amendment of the references noted below shall govern in execution of this item unless otherwise noted. **If there is a conflict between the attached Appendix A of this Special Provisions and the references noted below, the latter shall prevail**.

1. Steel Structures Painting Council (SSPC) Standards

SSPC-AB2	Specification for Cleanliness of Recycled Ferrous Metal Abrasive
SSPC-AB3	Specification for Newly Manufactured Steel Abrasive.
SSPC-QP 1	Standard Procedure for Evaluating Qualifications of Painting Contractors
SSPC Guide 6I	Guide for Containing Debris Generated During Lead Paint Removal Operations
SSPC Guide 7 (DIS)	Guide for the Disposal of Lead-Contaminated Surface Preparation Debris

2. U.S. Government Code of Federal Regulations

- 29 CFR, Part 1926.62, Safety and Health Regulations for Construction
- 40 CFR, Subchapter I, "Solid Wastes" (parts 260-263, and 268)

3. American National Standards Institute (ANSI)

ANSI/ASC Z9.4 For Exhaust Systems Abrasive Blasting Operations -- Ventilation and Safe Practice

4. State of Delaware

- 7 Del. C., chapter 63 - Hazardous Waste Management Act
- The Delaware Regulations Governing Hazardous Waste (DRGHW)
- 7 Del. C., Chapter 60 - Delaware Water and Air Resources Act
- The Delaware Regulations Governing Solid Waste (DRGSW)

SPECIAL NOTICE TO CONTRACTORS

The following documentation is required. **Failure of the apparent low bidder to present copies of the required certifications within 10 Calendar Days of notification of apparent low bidder status shall create a non-rebuttable presumption that the bid is non-responsive.**

Proof is required that the Prime Contractor, if he/she is performing the cleaning/painting operation, and any cleaning/painting Subcontractors are certified by the Steel Structures Painting Council (SSPC) Painting Contractor Certification Program (PCCP) QP-1 and QP-2. Such certification shall be for the duration of the project.

3/17/09

APPENDIX A

OCCUPATIONAL SAFETY AND HEALTH STANDARD FOR OCCUPATIONAL EXPOSURE TO LEAD DURING CONSTRUCTION

The regulations specified under the following topics and as described herein shall be followed by the Contractor, engaged in removing and cleaning lead base paint from the steel structures. This Appendix is considered as part of the Special Provisions for Items 605629 and 605533 - Cleaning Existing Steel Structures and 605614 and 605618 - Cleaning Existing Steel Structures with Vacuum Power Tools.

.01 Scope and Application

.02 Definitions

.03 Permissible Exposure Limit (PEL)

.04 Initial Determination and Exposure Monitoring

.05 Methods of Compliance

.06 Respiratory Protection

.07 Protective Work Clothing and Equipment

.08 Housekeeping

.09 Hygiene Facilities and Practices

.10 Medical Surveillance Program

.11 Medical Examinations and Consultations

.12 Medical Removal Protection

.13 Employee Information and Training

.14 Signs

.15 Recordkeeping

.16 Observation of Monitoring

.01 Scope and Application

A. This Appendix applies to occupational exposure to lead of every employee engaged in construction work. Each employer shall protect the employment and places of employment of each employee engaged in construction work by complying with the Appendix.

B. Compliance with this Appendix does not preclude or preempt the applicability of any other regulations or standards.

.02 Definitions

For the purpose of this Appendix certain words and terms are defined as follows.

A. Lead

(1) "Lead" means metallic lead, all inorganic lead compounds, and organic lead soaps.

(2) "Lead" does not include any other organic lead compounds.

B. "PEL" means Permissible Exposure Limit.

C. "TWA" means Time Weighted Average.

D. All references to "the Employer" herein shall mean "the Contractor", and all references to the Employee(s) shall mean "the Department's and Contractor's Employees".

.03 Permissible Exposure Limit (PEL)

A. The employer shall ensure that no employee is exposed to lead at concentrations greater than 50 micrograms per cubic meter of air averaged over an 8-hour period.

B. When an employee is exposed to lead for more than 8 hours in any work day, the employer shall use the following formula to reduce the permissible exposure limit, as a time weighted average (TWA) for that day: Maximum permissible limit (in micrograms/cubic meter) = 400 divided by hours worked in the day.

C. Respirators. When respirators are used to supplement engineering and work practice controls to comply with the PEL and in accordance with the requirements of Regulation .06, the employer, for the purpose of determining compliance with the PEL, may:

(1) Consider employee exposure to be at the level provided by the protection factor of the respirator for those periods the respirator is worn; and

(2) Average those periods with exposure levels during periods when respirators are not worn to determine the employee's daily TWA exposure.

.04 Initial Determination and Exposure Monitoring

A. General

(1) For the purpose of this regulation, employee exposure is that exposure which would occur if the employee were not using a respirator.

(2) Personal Samples.

(a) With the exception of monitoring under Section C, below, the employer shall collect personal samples for the entire time during the shift when lead exposure may occur.

(b) The personal samples shall:

(i) Include at least one sample for every job classification in each work area during each shift; and

(ii) Be representative of the monitored employee's regular, daily exposure to lead.

B. Initial Determination.

(1) An employer having a jobsite covered by this chapter shall determine before the beginning of potential exposure to lead if an employee may be exposed to lead at or above the PEL level.

(2) Written record.

(a) The employer shall:

(i) Make a written record of the determination; and

(ii) Post the record in a place accessible to employees.

(b) At a minimum, the record shall include:

(i) The information specified in Section C, below;

(ii) The date of determination;

(iii) Location of the jobsite;

(iv) Process;

(v) Materials;

(vi) Location within the jobsite; and

(vii) The name and social security number of employees monitored.

C. Basis of Initial Determination.

The employer shall base an initial determination on any of the following, relevant considerations:

(1) Information, observation, calculations, or anticipated operations which indicate employee exposure to lead;

(2) Previous measurements of airborne lead and analytical methods meeting the criteria of Section I, below; and

(3) Other indications of potential lead exposure.

D. Positive Initial Determination and Initial Monitoring.

(1) When a determination conducted under Sections B and C, above, shows the possibility of employee exposure at or above the PEL level, the employer shall conduct exposure monitoring immediately at the start of the operation which may involve lead exposure.

(2) The monitoring shall be representative of the exposure for each employee in the workplace who is exposed to lead.

(3) When the type of jobsite, process, and materials involved has not changed, measurements of airborne lead, taken in accordance with Section I, below, and made during the preceding 12 months may by used to satisfy this requirement.

E. Negative Initial Determination.

When the employer determines, in accordance with Sections B and C, above, that no employee is exposed to airborne concentrations of lead at or above the PEL level, the employer shall make a written record of the determination in accordance with Section B.

F. Frequency.

Except as required by Section G, below, when the initial determination or subsequent monitoring reveals employee exposure:

(1) Above the PEL, the employer shall conduct monitoring quarterly until at least two consecutive measurements, taken at least 7 days apart, are at or below the PEL.

G. Additional Monitoring.

(1) When there is either a production, jobsite, material, process, control, or personnel change which may result in new or additional lead exposure or any other reason to suspect a change, which may result in new or additional exposures to lead, the employer shall conduct

additional monitoring in accordance with this chapter.

(2) When an employee complains of symptoms which may be attributable to exposure to lead, the employer shall conduct personal monitoring representative of the exposure to each employee in the affected job classification or performing the same operation who may be exposed to lead.

H. Employee Notification.

(1) Within 5 working days of the receipt of any monitoring results, the employer shall notify each employee in writing of the results which represent that employee's exposure.

(2) Whenever the results indicate that the representative employee exposure, without regard to respirators, exceeds the PEL, the employer shall include in the written notice:

(a) A statement that the PEL was exceeded; and

(b) A description of the corrective action that has been, or will be, taken to reduce exposure to a level at or below the PEL.

I. Accuracy of Measurement.

The employer shall use a method of monitoring and analysis which has an accuracy, to a confidence level of 95 percent, of not less than plus or minus 20 percent for airborne concentrations of lead equal to or greater than 50 micrograms/cubic meter averaged over an 8-hour period.

.05 Methods of Compliance

A. Engineering and Work Practice Controls.

(1) When any employee is exposed to lead above the PEL, the employer shall implement engineering and work practice controls, including administrative controls, to reduce and maintain employee exposure to lead, except to the extent that the employer can demonstrate that these controls are not feasible.

(2) When the engineering and work practice controls which can be instituted are not sufficient to reduce employee exposure to a level at or below the PEL, the employer shall:

(a) Use them to reduce exposure to the lowest feasible level; and

(b) Supplement them by the use of respiratory protection which complies with the requirements of Regulation .06.

B. Compliance Program

(1) Each employer shall establish and implement a written compliance program to reduce exposure.

(2) Written Program. The written compliance program shall, at a minimum, include:

(a) A description of each operation in which lead is expected, including

(i) Equipment used,

(ii) Materials used,

(iii) Controls in place,

(iv) Crew size,

(v) Employee job responsibilities,

(vi) Operating procedures, and

(vii) Maintenance practices;

(b) A description of the specific means that will be employed to achieve compliance;

(c) A report of the technology considered in meeting the PEL;

(d) A work practice program which includes items required under Regulations .07,.08, and .09;

(e) The administrative control schedule required by Section C, if applicable; and

(f) Other relevant information.

(3) Written programs shall be:

(a) Submitted upon request to the Department; and

(b) Available at the jobsite for examination and copying by the Department, any affected employee, or authorized employee representative.

(4) At least every 6 months, the employer shall:

(a) Review the written compliance program; and

(b) If necessary, revise it to reflect the current status of the program.

C. Administrative Controls.

If administrative controls are used as a means of reducing employee TWA lead exposure, the employer shall establish and implement a job rotation schedule which includes:

(1) The name or identification number of each affected employee;

(2) The duration and the exposure level at each job or work station where an affected employee is located; and

(3) Any other information which may be useful in assessing the reliability of administrative controls in reducing exposure to lead.

.06 Respiratory Protection

A. General.

(1) When this chapter requires the use of respirators, the employer shall:

(a) Provide respirators that comply with the requirements of this regulation, at no cost to the employee; and

(b) Ensure their use.

(2) Respirators shall be used:

(a) During the time period necessary to install or implement engineering or work practice controls;

(b) In a work situation in which engineering and work practice controls are not sufficient to reduce exposure to a level at or below the PEL; and

(c) Whenever an employee requests a respirator.

B. Respirator Selection.

(1) When a respirator is required under this chapter, the employer shall select the appropriate respirator or combination of respirators in accordance with this section from Table I. Respiratory Protection for Lead Aerosols.

(2) Powered Air-Purifying Respirators: The employer shall provide a powered air-purifying respirator instead of the respirator specified in Table I Respiratory Protection for Lead Aerosols whenever:

(a) An employee chooses to use this type of respirator; and

(b) This respirator will provide adequate protection to the employee.

(3) The employer shall select respirators from among those approved for protection against lead dust, fume, and mist by the Mine Safety and Health Administration (MSHA) and the National Institute for Occupational Safety and Health (NIOSH) under the provisions of 30 CFR Part II.

C. Respirator Usage.

(1) The employer shall ensure that the respirator issued to the employee:

(a) Exhibits minimum facepiece leakage; and

(b) Is fitted properly.

(2) Fit Test.

(a) For each employee wearing a negative pressure respirator, the employer shall perform either a quantitative or qualitative face fit test:

(i) At the time of initial fitting; and

(ii) Minimally, every 6 months after that.

(b) The qualitative fit test:

(i) May be used only to test the fit of a half-mask respirator when it is otherwise permitted to be worn; and

(ii) Shall be conducted in accordance with the directive set in 29 CFR 1926.62.

(c) The tests shall be used to select facepieces that provide the protection prescribed in Table I. Respiratory Protection for Lead Aerosols.

TABLE I. RESPIRATORY PROTECTION FOR LEAD AEROSOLS

Airborne concentration of lead or condition of use	Required respirator[1]
Not in excess of 0.5 milligram/cubic meter (10X PEL).	Half-mask, air-purifying respirator equipped with high efficiency filters.[2,3,]
Not in excess of 1.25 milligram/cubic meter (25 x PEL)	Hood or helmet supplied air respirator operated in a continous flow mode.

Not in excess of 2.5 milligram/cubic meter (50X PEL).	(1) Full facepiece, air-purifying respirator with high efficiency filters.[3]
with	(2) Any powered, air-purifying respirator high efficiency filters.[3]
Not in excess of 50 milligram/cubic meter (1000x PEL).	Half-mask, supplied-air respirator operated in positive-pressure mode[2].
Not in excess of 100 milligrams/cubic meter (2000X PEL).	Supplied-air respirators with full facepiece, hood, helmet, or suit, operated in positive pressure mode.
Greater than 100 milligrams/cubic meter, unknown concentration or fire fighting.	Full facepiece, self-contained breathing apparatus operated in positive-pressure mode.

[1]Respirators specified for high concentrations can be used at lower concentrations of lead.

[2]Full facepiece is required if the lead aerosols cause eye or skin irritation at the use concentrations.

[3]A high efficiency particulate filter means 99.97 percent efficiency against 0.3 micron size particles.Certain Specific Type CE blast helmets can be used in atmospheres that are 1000x PEL.

(3) If an employee exhibits difficulty in breathing during the fit test or during use, the employer shall make available to the employee an examination in accordance with Regulation .11A(2) to determine whether the employee can wear a respirator while performing the required duty.

D. Respirator Program.

(1) The employer shall institute a respiratory protection program in accordance with the applicable section(s) of 29 CFR 1926.62, 29 CFR 1926.1127, and 29 CFR 1910.134.

(2) The employer shall:

(a) Permit an employee who uses a filter respirator to change the filter elements when an increase in breathing resistance is detected;

(b) Use identification of filters, cartridges and canisters with NIOSH color coded approved labels as required.

(c) Maintain an adequate supply of filter elements for this purpose; and

(d) Permit an employee who wears a respirator to leave the work area to wash his or her face and respirator facepiece when necessary to prevent skin irritation associated with respirator use.

(e) Record Keeping - Records must be kept and available in accordance with 29CFR 1910, 20 and include medical evaluation, fit testing, and a copy of the respiratory protection program.

.07 Protective Work Clothing and Equipment

A. Provision and Use.

When an employee is exposed to lead above the PEL, without regard to the use of respirators, or when the possibility of skin or eye irritation exists, the employer shall:

(1) Provide, at no cost to the employee, appropriate protective work clothing and equipment, such as, but not limited to:

(a) Coveralls or similar full-body work clothing:

(b) Shoes or disposable shoe coverlets, gloves, and hats;

(c) Face shields, vented goggles, or other appropriate protective equipment which complies with the applicable section(s) of 29 CFR 1926.62.

(2) Ensure that the employee uses the appropriate protective clothing and equipment.

B. Cleaning and Replacement.

The employer shall:

(1) Provide the protective clothing required in Section A -

(a) In a clean and dry condition,

(b) Daily to an employee whose exposure level, without regard to a respirator, is over 200 micrograms/cubic meter of lead as an 8-hour TWA, and

(c) At least weekly to other employees;

(2) Provide for the cleaning, laundering, or disposal of protective clothing and equipment required by Section A;

(3) Repair or replace required protective clothing and equipment as needed to maintain their effectiveness;

(4) Ensure that employees remove all protective clothing:

(a) At the completion of a work shift, and

(b) Only in designated change areas;

(5) Ensure that contaminated protective clothing which is to be cleaned, laundered, or disposed of, is placed in a closed container which:

(a) Is located in the designated change area, and

(b) Will prevent dispersion of lead;

(6) Inform, in writing, any person who cleans or launders protective clothing or equipment of the potentially harmful effects of exposure to lead;

(7) Ensure that a container required by Section B(5), above, is labelled as follows:

CAUTION: CLOTHING CONTAMINATED WITH LEAD. DO NOT REMOVE DUST BY BLOWING OR SHAKING. DISPOSE OF LEAD CONTAMINATED WASH WATER IN ACCORDANCE WITH APPLICABLE LOCAL, STATE, OR FEDERAL REGULATIONS; and

(8) Prohibit the removal of lead from protective clothing or equipment by blowing, shaking, or any other means which disperses lead into the air.

.08 Housekeeping

A. Surfaces.

An employer shall maintain all surfaces as free as practicable of accumulations of lead.

B. Cleaning Floors.

(1) An employer shall vacuum floors and other surfaces where lead accumulates.

(2) When vacuuming or other equally effective methods are not feasible, an employer shall use wet methods, including wet sweeping, wet shovelling, or wet brushing.

(3) Floors and other surfaces where lead accumulates may not be cleaned by the use of compressed air.

(4) An employer may use dry methods only when vacuuming and wet methods are not practicable.

C. Vacuuming.

When vacuuming methods are used, the employer shall ensure that the vacuums are equipped with HEPA filters are used and emptied in a manner which minimizes the re-entry of lead into the workplace.

.09 Hygiene Facilities and Practices.

A. For the purpose of this regulation, employee exposure is that exposure which would occur without regard to the use of a respirator.

B. The employer shall ensure that in an area where employees are exposed to lead above the PEL:

(1) Neither food nor beverage is present or consumed;

(2) Tobacco products are not present or consumed; and

(3) Cosmetics are not applied.

C. Designated Change Areas.

(1) The employer shall provide clean designated change areas for employees who work in areas where their airborne exposure to lead is above the PEL.

(2) The employer shall ensure that designated change areas are equipped with separate storage facilities for protective work clothing and equipment and for street clothes, sufficient to prevent cross-contamination.

D. Washing Facilities.

(1) The employer shall ensure that employees who work in areas where their airborne exposure to lead is above the PEL, shower or wash at the end of the work shift.

(2) The employer shall provide washing facilities in accordance with the applicable section(s) of 29 CFR 1926.62.

(3) The employer shall ensure that employees who are required to shower or wash pursuant to Section D(1) do not leave the jobsite wearing any clothing or equipment worn during the work shift.

E. Food and Beverage Consumption Areas.

The employer shall:

(1) Provide employees who work in areas where their airborne exposure to lead is above the PEL with food and beverage consumption areas:

(a) Sufficiently removed from the affected work area; and

(b) Readily accessible to employees; and

(2) Ensure that employees who work in areas where their airborne exposure to lead is above the PEL, wash their hands and face prior to eating, drinking, smoking, or applying cosmetics.

(3) Ensure that employees who work in areas where their airborne consumption areas with protective work clothing or equipment unless surface lead dust has been removed by vacuuming or other cleaning methods.

F. Lavatories.

The employer shall provide an adequate number of lavatory facilities which comply with the applicable section(s) of 29 CFR 1926.62.

.10 Medical Surveillance Program.

A. General.

(1) The employer shall institute a medical surveillance program for all employees who are or may be exposed above the PEL level. A blood test to determine the lead level is required for all employees before engaged in operation of removing/cleaning the paint. The Department is responsible for its employees for blood test; however, the Contractor shall be responsible for his workers for such test.

(2) The employer shall ensure that all medical examinations and procedures are performed by, or under the supervision of, a licensed physician.

(3) The employer shall provide the required medical surveillance, as set forth in Regulation .11:

(a) Without cost to employees, and

(b) At a reasonable time and place.

B. Biological Monitoring.

(1) Blood Lead and ZPP or FEP Level Sampling and Analysis: The employer shall make available to each employee covered under Section A(1), above, biological monitoring in the form of blood sampling and analysis for:

(a) Lead; and

(b) Zinc protoporphyrin (ZPP), or Free erythocite protoporphyin (FEP) levels.

(2) The biological monitoring shall be provided on the following schedule:

(a) Before assignment, when an employee is being assigned for the first time to an area in which airborne concentrations of lead are at or above the PEL level;

(b) At least every 2 months during the first 6 months to each employee covered under Section A(1), above, after that, every 6 months;

(c) At least every 2 months for each employee whose last blood lead sampling and analysis indicated a blood lead level at or above 40 micrograms/100g of whole blood, until two consecutive blood samples and analysis indicate a blood lead level below 40 micrograms/100g of whole blood;

(d) At least monthly during the removal period of each employee removed from exposure to lead due to an elevated blood lead level; and

(e) At the termination of employment.

(3) Follow-up Blood Sampling Tests.

When the results of a blood lead level test indicate that an employee's blood lead level exceeds the numerical criteria for medical removal under Regulation .12A(1), the employer shall provide a second (follow-up) blood sampling test within 2 weeks after receiving the results of the first blood sampling test.

(4) Accuracy of Blood Lead Level Sampling and Analysis.

Blood lead level sampling and analysis provided pursuant to these regulations shall;

(a) Have an accuracy, to a confidence level of 95 percent, within plus of minus 15 percent or 6 micrograms/100ml, whichever is greater; and

(b) Be conducted by a laboratory which:

(i) Is licensed by the Centers for Disease Control (CDC), United States Department of Health and Human Services, or

(ii) Has received a satisfactory grade in blood lead proficiency testing from CDC in the prior 12 months.

(5) Employee Notification.

Within 5 working days after receiving biological monitoring results, the employer shall notify in writing:

(a) Each employee of their blood lead level; and

(b) Each employee whose blood lead level exceeds 40 micrograms/100g, that this chapter requires temporary medical removal with Medical Removal Protection benefits when an employee's blood lead level exceeds the numerical criterion for medical removal under Regulation .12A(1).

.11 Medical Examinations and Consultations

A. Frequency.

The employer shall make available medical examinations and consultations to each employee covered under Regulation .10A(1) according to the following schedule:

(1) Immediately, for each employee for whom a blood sampling test conducted at any time during the preceding 12 months indicated a blood lead level at or above 40 micrograms/100g;

(2) As soon as possible, upon notification by an employee that:

(a) The employee has developed signs or symptoms commonly associated with lead intoxication,

(b) The employee desires medical advice concerning the effects of current or past exposure to lead on the employee's ability to procreate a healthy child, or

(c) The employee has demonstrated difficulty in breathing during a respirator fit test or during respirator use; and

(3) As medically appropriate for each employee who was either:

(a) Removed from exposure to lead due to a risk of sustaining material impairment to health, or

(b) Otherwise limited pursuant to a final medical determination.

B. Content.

Medical examinations made available pursuant to Section A(1), above, shall include all of the following elements:

(1) A detailed work history and a medical history, with particular attention to:

(a) Past lead exposure (occupational and non-occupational),

(b) Personal habits (smoking, hygiene), and

(c) Past gastrointestinal, hematologic, renal, cardiovascular, reproductive, and neurological problems;

(2) A thorough physical examination, with particular attention to teeth, gums, hematologic, gastrointestinal, renal, cardiovascular, and neurological systems;

(3) Pulmonary status, if respiratory protection will be used;

(4) A blood pressure measurement;

(5) A blood sample and analysis which determines:

(a) Blood lead level which meets the requirements of Regulation .10B(4).

(b) Hemoglobin and hematocrit determinations, red cell indices, and examination of peripheral smear morphology,

(c) Zinc protoporphyrin or free erythocite protoporphyrin,

(d) Blood urea nitrogen, and

(e) Serum creatinine;

(6) A routine urinalysis with microscopic examination; and

(7) Any laboratory or other test which the examining physician deems necessary by sound medical practice.

C. The content of medical examinations made available pursuant to Section A(2) and (3), above, shall:

(1) Be determined by an examining physician; and

(2) If requested by an employee, include pregnancy testing or laboratory evaluation of male fertility.

D. Multiple Physician Review Mechanism

(1) If the employer selects the initial physician who conducts any medical examination or consultation provided to an employee under this chapter, the employee may designate a second physician to:

(a) Review any findings, determinations, or recommendations of the initial physician; and

(b) Conduct the examinations, consultations, and laboratory tests the second physician deems necessary to facilitate this review.

(2) The employer shall promptly notify an employee of the right to seek a second medical

opinion after each occasion that an initial physician conducts a medical examination or consultation pursuant to this chapter.

(3) The employer may condition its participation in, and payment for, the multiple physician review mechanism upon the employee doing the following within 15 days after receipt of the foregoing notification, or receipt of the initial physician's written opinion, whichever is later:

(a) The employee informing the employer that he or she intends to seek a second medical opinion; and

(b) The employee initiating steps to make an appointment with a second physician.

(4) If the findings, determinations, or recommendations of the second physician differ from those of the initial physician, the employer and the employee shall ensure that efforts are made for the two physicians to resolve any disagreement.

(5) If the two physicians have been unable to reach agreement quickly, the employer and the employee, through their respective physicians, shall designate a third physician to:

(a) Review any findings, determinations, or recommendations of the prior physicians; and

(b) Conduct the examinations, consultations, and laboratory tests, and engage in discussions with the prior physicians that the third physician deems necessary to resolve disagreement of the prior physicians.

(6) The employer shall act consistently with the findings, determinations, and recommendations of the third physician, unless the employer and the employee reach an agreement which is otherwise consistent with the recommendations of at least one of the three physicians.

E. Information Provided to Examining and Consulting Physicians.

(1) The employer shall provide the initial physician conducting a medical examination or consultation under this chapter the following information:

(a) A copy of this chapter;

(b) A description of the affected employee's duties as they relate to the employee's lead exposure;

(c) The employee's exposure level or anticipated exposure level to lead and to any other toxic substance (if applicable);

(d) A description of personal protective equipment used, or to be used;

(e) Prior blood lead determinations; and

(f) Prior written medical opinions concerning the employee which are in the employer's possession or control.

(2) The employer shall provide the foregoing information to a second or third physician conducting a medical examination or consultation under this chapter upon request either by the second or third physician, or by the employee.

F. Written Medical Opinions.

(1) The employer shall obtain and furnish to the employee a copy of a written medical opinion from each examining or consulting physician which contains the following information:

(a) The physician's opinion as to whether the employee has any detected medical condition which would place the employee at increased risk of material impairment of the employee's health form exposure to lead,

(b) Any recommended special protective measures to be provided to the employee,

(c) Limitations to be placed upon the employee's exposure to lead,

(d) Any recommended limitation upon the employee's use of respirators, including, if a physician determines that the employee cannot wear a negative pressure respirator, a determination of whether the employee can wear a powered air purifying respirator, and

(e) The results of the blood lead determinations;

(2) The employer shall instruct each examining and consulting physician:

(a) Not to reveal either in the written opinion, or in any other means of communication with the employer, any finding, including laboratory results, or diagnosis unrelated to an employee's occupational exposure to lead, and

(b) To advise the employee of any medical condition, occupational or non-occupational, which dictates further medical examination or treatment.

G. Alternate Physician Determination Mechanism.

The employer and the employee or authorized employee representative may agree to use any expeditious alternate physician determination mechanism in place of the multiple physician review mechanism provided by this chapter, provided that the alternate mechanism satisfies the other requirements contained in this chapter.

H. Chelation.

(1) The employer shall ensure that any person whom he retains, employs, supervises, or controls does not engage in prophylactic chelation of any employee at any time.

(2) If therapeutic or diagnostic chelation is to be performed by any person in Section H(1), above, the employer shall ensure that:

(a) It is done:

(i) Under the supervision of a licensed physician,

(ii) In a clinical setting,

(iii) With thorough and appropriate medical monitoring; and

(b) The employee is notified in writing before its occurrence.

.12 Medical Removal Protection

A. Temporary Medical Removal and Return of an Employee.

(1) Temporary Removal Due to Elevated Blood Lead Levels.

The employer shall remove an employee from work having an exposure to lead at or above the action level on each occasion that:

(a) A periodic and a follow-up blood sampling test conducted pursuant to Regulations .10 and .11 indicates that the employee's blood lead

level is at or above 50 micrograms/100g; or

(2) Temporary Removal Due to a Final Medical Determination

(a) For the purposes of Section A(2), the phrase "final medical determination" means the outcome of either the multiple physician review mechanism or the alternate medical determination mechanism used pursuant to the medical surveillance provisions in Regulation .11, above.

(b) The employer shall remove an employee from work having an exposure to lead at or above the PEL level on each occasion that a final medical determination results in a medical finding, determination, or opinion that the employee has a detected medical condition which places the employee at increased risk of material health impairment from exposure to lead.

(c) When a final medical determination results in any recommended special protective measures for an employee, or limitations on an employee's exposure to lead, the employer shall implement the recommendations and act consistently with it.

(3) Return of the Employee to Former Job Status.

(a) The employer shall return an employee to his or her former job status in accordance with the following schedule:

(i) For an employee removed pursuant to Section A(1), when two consecutive blood sampling tests taken at least one month apart indicate that the employee's blood lead level is at or below 40 micrograms/100g of whole blood;

(ii) For an employee removed pursuant to Section A(2), when a subsequent final medical determination results in a medical finding, determination, or opinion that the employee no longer has a detected medical condition which places the employee at increased risk of material health impairment from exposure to lead.

(b) For the purposes of this subsection, the requirement that an employer return an employee to the employee's former job status is not intended to expand upon or restrict any rights an employee has or would have had, absent temporary medical removal, to a specific job classification or position under the terms of a collective bargaining agreement.

(4) Removal of Other Employee Special Protective Measures or Limitations.

The employer shall remove any limitations placed on an employee or end any special protective measures provided to an employee pursuant to a final medical determination when a subsequent final medical determination indicates that the limitations or special protective measures are no longer necessary.

(5) Employer Options Pending a Final Medical Determination.

When a multiple physician review mechanism, or alternate medical determination mechanism used pursuant to Regulation .11, has not yet resulted in a final medical determination with respect to an employee, the employer shall act as follows:

(a) Removal. The employer may remove the employee from exposure to lead, provide special protective measures to the employee, or place limitations upon the employee, consistent with the medical findings, determinations, or recommendations of any of the physicians who have reviewed the employee's health status.

(b) Return. The employer may return the employee to his or her former job status, end any special protective measures provided to the employee, and remove any limitations placed upon the employee, consistent with the medical findings, determinations, or recommendations of any of the physicians who have reviewed the employee's health status, with two exceptions:

(i) If the initial removal, special protection, or limitations of the employee resulted from a final medical determination which differed from the findings, determinations, or recommendations of the initial physician; or

(ii) If the employee has been on removal status for the preceding 18 months due to an elevated blood lead level, the employer shall await a final medical determination.

B. Medical Removal Protection Benefits.

(1) Definition of Medical Removal Protection Benefits.

For the purpose of this section, the requirements that an employer provide medical removal protection benefits means that an employer shall maintain the earnings, seniority, and other employment rights and benefits of an employee as though the employee had not been removed from normal exposure to lead or otherwise limited.

(2) Provision of Medical Removal Protection Benefits.

The employer shall provide to an employee up to 18 months of medical removal protection benefits on each occasion that an employee is removed from exposure to lead or otherwise limited pursuant to this chapter.

(3) Follow-up Medical Surveillance During the Period of Employee Removal or Limitation.

During the period of time that an employee is removed from normal exposure to lead, or otherwise limited, the employer may condition the provision of medical removal protection benefits upon the employee's participation in follow-up medical surveillance made available pursuant to this regulation.

(4) Workers' Compensation Claims.

If a removed employee files a claim for workers' compensation payments for a lead-related disability:

(a) The employer shall continue to provide medical removal protection benefits pending disposition of the claim;

(b) To the extent that an award is made to the employee for earnings lost during the period of removal, the employer's medical removal protection obligation shall be reduced by the amount of the award; and

(c) The employer shall receive no credit for workers' compensation payments received by the employee for treatment-related expenses.

(5) Other Credits.

The employer's obligation to provide medical removal protection benefits to a removed employee shall be reduced to the extent that the employee receives:

(a) Compensation for earnings lost during the period of removal either from a publicly or employer-funded made possible by virtue of the employee's removal.

(b) Income from employment with another employer compensation program; or

(6) Employees Whose Blood Lead Levels Do Not Adequately Decline Within 18 Months of Removal.

(a) The employer shall take the measures prescribed by Section B(6)(b) with respect to any employee:

(i) Removed from exposure to lead due to an elevated blood lead level; and

(ii) Whose blood lead level has not declined within the past 18 months of removal so that the employee has been returned to the employee's former job status.

(b) The employer shall:

(i) Make available to the employee a medical examination pursuant to this chapter to obtain a final medical determination with respect to the employee;

(ii) Ensure that the final medical determination obtained indicates whether the employee may be returned to his or her former job status, and if not, what steps should be taken to protect the employee's health;

(iii) When the final medical determination has not yet been obtained, or once obtained indicates that the employee may not yet be returned to the employee's former job status, continue to provide medical removal protection benefits to the employee until either the employee is returned to former job status, or a final medical determination is made that the employee is incapable of ever safely returning to the employee's former job status.

(c) When the employer acts pursuant to a final medical determination which permits the return of the employee to the employee's former job status despite what would otherwise be an unacceptable blood lead level, later questions concerning removing the employee again shall be decided by a final medical determination.

(d) The employer need not automatically remove the employee pursuant to the blood lead level removal criteria provided by this regulation.

(7) Voluntary Removal or Restriction of An Employee.

Where an employer, although not required by this regulation to do so, removes an employee from exposure to lead or otherwise places limitations on an employee due to the effects of lead exposure on the employee's medical condition, the employer shall provide medical removal protection benefits to the employee equal to that required by Section B(2).

.13 Employee Information and Training

A. Training Program

(1) Each employer who has a jobsite in which there is a potential exposure to airborne lead at any level shall inform employees of this chapter.

(2) The employer shall:

(a) Institute a training program for employees subject to:

(i) Lead exposure at or above the action level, or

(ii) The possibility of skin or eye irritation; and

(b) Ensure their participation in the training.

(3) The employer shall provide initial training for those employees covered by Section A(2), above, before the time of initial job assignment.

(4) The training program shall be repeated at least annually for each employee.

(5) The employer shall ensure that each employe is informed of:

(a) The content of this chapter;

(b) The specific nature of the operations which could result in exposure to lead above the action level;

(c) The purpose, proper selection, fitting, use, and limitation of respirators;

(d) The purpose and a description of:

(i) The medical surveillance program, and

(ii) The medical removal protection program;

(e) The adverse health effects associated with excessive exposure to lead, with particular attention to the adverse reproductive effects on both males and females;

(f) The Engineering controls and work practices associated with the employee's job assignment;

(g) The contents of any compliance program in effect; and

(h) Instructions to employees that chelating agents should not:

(i) Routinely be used to remove lead from their bodies, and

(ii) Be used at all except under the direction of a licensed physician.

(6) The employer shall:

(a) Obtain and include as part of the training program, the materials pertaining to the Federal Occupational Safety and Health Act, the regulations issued under the Act, and this chapter; and

(b) Distribute them to employees.

B. Access to Information and Training Materials

(1) The employer shall make readily available to all affected employees a copy of this chapter.

(2) The employer shall provide to the Department upon request, all materials relating to the employee information and training program.

.14 Signs

A. General

(1) The employer may use signs required by other statutes, regulations, or ordinances in addition to, or in combination with, signs required by this regulation.

(2) The employer shall ensure that no statement appears on or near any sign required by this regulation which contradicts or detracts from the meaning of the required sign.

B. Signs

(1) The employer shall post the following warning sign in each work area where the PEL is exceeded:

WARNING

HAZARD

LEAD WORK AREA

NO SMOKING, EATING OR DRINKING

(2) The employer shall ensure that signs required by this regulation are illuminated and cleaned as necessary so that the legend is readily visible.

.15 Recordkeeping

A. Initial Determination and Exposure Monitoring

(1) The employer shall establish and maintain an accurate record of:

(a) Initial determinations; and

(b) All monitoring required in Regulation .04.

(2) This record shall include:

(a) The information required in Regulation .04;

(b) For each sample taken:

(i) The date, or dates,

(ii) The number of samples,

(iii) The duration of sampling,

(iv) The location,

(v) The results on each sample taken, and

(vi) Where applicable, a description of the sampling procedure used to determine representative employee exposure;

(c) A description of the sampling and analytical methods used and evidence of their accuracy;

(d) The type of respiratory protective devices worn, if any;

(e) Name, social security number, and job classification of the employee monitored and of all other employees whose exposure the measurement is intended to represent; and

(f) The environmental variables that could affect the measurement of employee exposure.

(3) The employer shall maintain the initial determination and exposure monitoring records for

the longer of:

(a) 40 years; or

(b) The duration of employment plus 20 years.

B. Medical Surveillance

(1) The employer shall establish and maintain an accurate record for each employee subject to medical surveillance as required by Regulations .10 and .11.

(2) This record shall include:

(a) The name, social security number, and a description of the duties of the employee;

(b) One copy of each physician's written opinion;

(c) Results of any airborne exposure monitoring conducted for that employee and the representative exposure levels supplied to the physician; and

(d) Any employee medical complaints related to exposure to lead.

(3) The employer shall keep, or ensure that the examining physician keeps, the following medical records;

(a) A copy of the medical examination results, including medical and work history, required under Regulations .10 and .11.

(b) A description of the laboratory procedures together with a copy of any standards or guidelines used to interpret the test results or references to that information; and

(c) A copy of the results of biological monitoring.

(4) The employer shall maintain or ensure that the physician maintains the medical records for at least 40 years, or for the duration of employment plus 20 years, whichever is longer.

C. Medical Removals

(1) The employer shall establish and maintain an accurate record for each employee removed from current exposure to lead pursuant to Regulation .12.

(2) Each record shall include:

(a) The name and social security number of the employee;

(b) The date of each occasion on which the employee was removed from exposure to lead, together with the corresponding date on which the employee was returned to his or her former job status;

(c) A brief explanation of how each removal was, or is being, accomplished; and

(d) A statement with respect to each removal indicating whether the reason for the removal was an elevated blood lead level.

(3) The employer shall maintain each medical removal record for at least the duration of an employee's employment.

D. Availability

(1) Upon request, the employer shall make all records required by this chapter available to the Department for examination and copying.

(2) Upon request, the employer shall make environmental monitoring, biological monitoring, and medical removal records required by this chapter available to affected employees or their authorized employee representative for inspection and copying.

(3) Upon request, the employer shall make an employee's medical records required to be maintained by this regulation available to the affected employee or former employee, or to a physician or other individual designated by the affected or former employee for examination and copying.

E. Transfer of Records

(1) When the employer ceases to do business:

(a) The successor employer shall receive and retain all records required by this chapter.

(b) If there is no successor employer to receive the records required by this chapter and to retain them for the prescribed retention period, the employer shall transmit these records to the Department.

(2) At the expiration of the record retention period prescribed by this chapter, the employer shall:

(a) Notify the Department at least 3 months before the disposal of the records; and

(b) Transmit the records to the Department if requested within the period.

.16 Observation of Monitoring

A. Employee Observation

The employer shall provide affected employees or their designated representative an opportunity to observe monitoring of employee exposure to lead conducted pursuant to Regulation .04.

B. Observation Procedures

(1) When observation of the monitoring of employee exposure to lead requires entry into an area where the use of respirators, protective clothing, or equipment is required, the employer shall:

(a) Provide the observer with and ensure the use of the respirators, clothing, and equipment; and

(b) Require the observer to comply with all other applicable safety and health procedures.

(2) Without interfering with the monitoring, observers shall be entitled to:

(a) Receive an explanation of the measurement procedures;

(b) Observe all steps related to the monitoring of lead performed at the place of exposure; and

(c) Record the results obtained or receive copies of the results when returned by the laboratory.

605570 - JOINT REPAIR, (COMPRESSION SEAL), 2"
605571 - JOINT REPAIR, (COMPRESSION SEAL), 3"
605572 - JOINT REPAIR, (COMPRESSION SEAL), 4"
605623 - JOINT REPAIR, (COMPRESSION SEAL), 1 3/4"
605630 - JOINT REPAIR (COMPRESSION SEAL), 2 1/2"
605631 - JOINT REPAIR (COMPRESSION SEAL), 1 1/2"
605632 - JOINT REPAIR (COMPRESSION SEAL), 3/4"
605633 - JOINT REPAIR (COMPRESSION SEAL), 3/8"
605641 - JOINT REPAIR, (COMPRESSION SEAL), 1"
605662 - JOINT REPAIR (COMPRESSION SEAL), 5"

Description:

This work consists of furnishing all materials, cleaning and preparing the existing joints, including removal of the compression seal, and installing new compression seals in accordance with this Special Provisions, notes on the Plans and as directed by the Engineer.

Materials:

The elastomeric material shall be 100% virgin Polychloroprene (Neoprene), and shall meet the requirements of ASTM D2628 modified to omit the recovery test. The compression seal shall have the following physical properties as applicable ASTM tests.

ASTM Standard	Physical Properties	Performance Requirements
D2240 (Modified)	Hardness	60± points, Durometer (Type A)
D412	Tensile Strength Ultimate	200 psi, min.
	Elongation	250%, min.
D395 (Method B)	Compressive Set 70 hr. @212 degrees F.	40%, max.
D573	Heat Resistance (over aging) (70 hrs. @212 degrees F.)	
	Change in durometer hardness	0 to +10 pts. max.
	Change in tensile strength	-20%, max.
	Change in ultimate elongation	-20%, max.
D1360	Abrasion Resistance	Index of 200 or greater permissible
D1149	Ozone Resistance 20% strain, 300 pphm in ari, 70h @140 degrees F. (wiped) with toluene to remove surface contamination)	No cracks
D471	Oil Swell, ASTM Oil #3, 70h @ 212 degrees F., Weight change	45%, max.
D2240	Low Temperature Stiffening, max 7 days @ 14 degrees F.	+15 points Durometer (Type A)

Adhesive for installing the compression seal shall be supplied by the same manufacturer supplying the compression seal.

Construction Methods:

Steel surfaces of the armor and/or angles to receive the compression seal shall be sand-blasted to a near white metal SSPC-10 immediately before the application of the adhesive and installation of the seal.

All welding steel cutting work shall conform to the applicable requirements of Subsection 605.17 of the Standard Specifications.

All concrete surfaces to receive compression seal shall be free from dirt, oil, rust and any other loose

foreign debris which may be detrimental to effective joint sealing. Spalls and cracks shall be repaired with Acme Elastomeric Concrete or Ceva-Crete patch mortar or approved equal to form clean joint opening with sharp edges.

The Contractor shall follow the manufacturer's recommendations in surface preparation, application of adhesive, and installation of the compression seal. Any contradiction found between these Special Provisions and the manufacturer's recommendation, the latter will prevail.

Method of Measurement:

The quantity of compression seal joints repaired will be measured by the linear foot of the size(s) applicable to this Contract.

Basis of Payment:

The quantity of compression seal joint repair will be paid for at the Contract unit price per linear foot. Price and payment will constitute full compensation for removal of the existing compression seal, furnishing all materials, surface preparation concrete and/or steel as applicable, spall and crack repair, installation of the seal, for all labor, equipment, tools, all necessary incidentals to complete the work.

03/13/01

605581 – ELASTOMERIC BEARING PADS

Description:

The item shall consist of installing new reinforced elastomeric bearing pads in accordance with the locations, details, and notes on the Plans, these specifications, or as directed by the Engineer.

Materials:

Elastomeric bearing pads shall conform to the requirements of Sub-section 826.06 of DelDOT's *Standard Specifications* except as directed herein.

1. Elastomer
   The elastomer shall be either virgin Neoprene (polychloroprene) or natural virgin rubber (polyisoprene). The elastomer compound shall be 60-durometer, Grade 3, steel reinforced, and subjected to the testing requirements of AASHTO Materials Specification M251. The elastomer shall have a shear modulus at 73°F between 0.080 ksi and 0.175 ksi and shall conform to the requirements of Section 18.2 of the *AASHTO LRFD Bridge Construction Specifications 2nd Edition with interims through 2009* and AASHTO M251.

2. Steel Reinforcement
   The steel reinforcement shall conform to the requirements of AASHTO M251.

3. Anchor Bolts
   Anchor bolts shall conform to the requirements of Sub-section 826.03 of DelDOT's *Standard Specifications* and AASHTO M314.

4. Guide Angles
   Guide angles shall conform to the requirements of AASHTO M270 (ASTM A709) Grade 36.

5. Grout
   Grout shall be high strength, non-shrink grout.

Material certification tests to determine the physical and chemical properties of all materials shall be conducted in accordance with the appropriate specification governing the material. The test certificates shall be provided to the Engineer.

Working Drawings:

Contractor shall prepare and submit working drawings for the bearings. Such drawings shall show all details of the bearings and of the materials proposed for use and shall be approved by the Engineer prior to fabrication. Such approval shall not relieve the Contractor of any responsibility under the contract documents for the successful completion of work. The preparation of the working drawings shall conform to Section 18.1.1 of the *AASHTO LRFD Bridge Construction Specifications 2nd Edition with interims through 2009* and Section 105 of DelDOT's *Standard Specifications*. A professional engineer registered in the state of Delaware must seal the submitted working drawings.

Packaging, Handling, and Storage:

Prior to shipment from the point of manufacture, bearings shall be packaged in such a manner to ensure that during shipment and storage the bearings will be protected against damage from handling, weather, or any normal hazard. Each completed bearing shall have its components clearly identified, be securely bolted, strapped or otherwise fastened to prevent any relative movement, and be marked on its top as to location and orientation in each structure in the project in conformity with the Contract documents.

All bearing devices and components shall be stored at the work site in an area that provides protection from environmental and physical damage. Elastomeric pads shall not be stored in direct sunlight.

Construction Methods:

Elastomeric bearing pads shall be installed as per the Plans, Section 605 of DelDOT's *Standard Specifications*, or as directed by the Engineer.

The concrete pedestal upon which the elastomeric bearing pad will sit must be flat to a tolerance of 0.01 radians. The top of the bearing pad, once in place, must also be flat within 0.01 radians. Any lack of parallelism between the bottom of the sole plate and top of the bearing pad must be corrected by grouting or as otherwise directed by the Engineer. When installed, bearing shall be clean and free of all foreign substances.

Method of Measurement:

The quantity of "Elastomeric Bearing Pads" shall be measured in the field as the number of elastomeric bearing pads installed and accepted.

Basis of Payment:

The quantity of "Elastomeric Bearing Pads" will be paid for at the Contract unit price per each bearing pad installed and accepted. Price and payment shall constitute full compensation for fabricating, furnishing, and installing all materials as described herein and as specified on the Plans, as well as working drawing preparation and submission, labor, equipment, materials, and incidentals necessary for satisfactory completion of the work.

8/25/10

605607 - JACKING BRIDGE

Description:

This work includes the jacking of existing bridge as indicated on the Plans and as specified herein, or as directed by the Engineer.

Materials:

Jacks used for jacking operations shall have the rate capacity shown clearly on the manufacturer's name plate attached to each jack.

Construction Methods:

All field welding shall be done by the shielded metal-arc process. All requirements of the Specifications shall be adhered to, except that the requirements for radiographic and ultrasonic inspection will be waived if a visual inspection by the Engineer indicates the welds are satisfactory.

Areas under the jacks shall be thoroughly cleaned to provide a flat, clean jacking surface.

It is the Contractor's sole responsibility to ensure that he uses the correct scheme and jack capacity as shown on the Plans. Therefore, any damage resulting from the Contractor's misuse of the jacking scheme to any portion of the existing structure that is to remain in place shall be repaired by him to the complete satisfaction of the Engineer, all at the Contractor's sole cost.

When no longer required, as determined by the Engineer, all materials used for the temporary supports shall become the property of the Contractor and shall be disposed of by him clear of the site.

Jacking Requirements and Restrictions -

The following requirements and restrictions shall be closely adhered to by the Contractor during jacking sequences.

The Engineer or his representative shall be present during all jacking operations and shall check all pertinent dimensions and requirements as set forth on the Plans and herein to ensure that all pertinent stipulations are met before commencement of the actual jacking.

Jacks with a higher capacity than those listed in the Plans may be allowed, but the Contractor shall be responsible for monitoring the jack load to ensure the safety of the structure.

The jack system shall be equipped with a gage to directly read the jack force in pounds or kips or shall be accompanied by a chart with which the dial reading can be converted into pounds. Direct reading gages are preferred.

The maximum jacking forces shown on the plans shall not be exceeded.

The jack hydraulics may not be used to support the load after jacking. All load must be transferred to the jacking beam and stool supports after jacking.

Method of Measurement and Basis of Payment:

Jacking, including all materials, labor, and equipment necessary for jacking the existing bridge and removing the jacking assemblies, will be measured and paid for at the contract Lump Sum price bid for the item 605607 - Jacking Bridge.

This item includes jacking bearing plates, hydraulic jacks, any temporary blocking or shims, all labor and any additional materials required to jack existing bridge.

605657 - STRIP SEAL EXPANSION JOINT 1 1/2"
605658 - STRIP SEAL EXPANSION JOINT 2"
605659 - STRIP SEAL EXPANSION JOINT 3"
605660 - STRIP SEAL EXPANSION JOINT 4"
605661 - STRIP SEAL EXPANSION JOINT 5"

Description:

This work consists of furnishing of all materials and necessary labor to remove existing strip seal(s), clean the joint(s), and install prefabricated neoprene strip seal(s) of the size(s) specified on the Plans in existing expansion joint system(s) on roadway and/or sidewalk at locations specified on the Plans and in accordance with these specifications.

Materials:

The elastomeric material shall be 100% virgin Polychloroprene (Neoprene). the strip seal shall be an extruded neoprene material meeting the requirements of ASTM D 2628 modified to omit the recovery test. The elastomeric material shall have the following physical properties as determined by applicable ASTM tests:

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

Construction Methods:

Installation of the prefabricated strip seal, and application of adhesives, shall be in accordance with the manufacturer's written recommendations and instructions and as specified herein. Special tools for insertion of seals shall be provided by the manufacturer as may be required. The strip seal shall be furnished in one piece for the full width of the joint.

Method of Measurement:

The quantity of strip seal expansion joint will be measured as the actual number of linear feet (linear meters) of each size furnished and installed, measured along the centerlines of the slab joints.

Basis of Payment:

The quantity of strip seal expansion joint will be paid for at the Contract unit price per linear foot (linear meter) for size. Price and payment will constitute full compensation for furnishing and installing all materials and for all material, labor, equipment, tools and incidentals required to complete the work.

6/26/02

605664 - STEEL SIGN STRUCTURES

Description:

This work shall consist of furnishing, fabricating and erecting the sign structures as shown on the plans. Such work shall include the steel sign structure and all materials, labor, tools, equipment, and incidentals necessary to complete the work.

Materials:

All materials provided for the steel sign structures shall conform to the following:

(a) Pipes - ASTM A53, Type S, Grade B.

(b) Structural Angles, Plates, Bars, and Shapes - ASTM A36.

(c) Anchor Bolts, nuts and washers - ASTM F1554, Grade 55.

(d) U-Bolts - ASTM A307.

(e) U-Bolt Nuts - ASTM A307.

(f) High Strength Bolts, Nuts and Washers - ASTM A325.

(g) Pre-Assembly of Field Connections.

(h) All structural steel that is not stainless shall be hot-dipped galvanized in accordance with ASTM A123.

Construction Methods:

As indicated, as shown on the Standard Drawings and as follows:

(a) **General.** Prepare and submit detailed shop drawings for review and acceptance. Drawings shall be stamped by a PE registered in the state of Delaware. Material and workmanship not previously inspected will be inspected on the work site. Remove rejected material from the work site. Satisfactorily restore the site to its original condition, as directed, including the disposal of excess or unsuitable material. Contractor to verify sign and structure clearances.

(b) **Foundations.** A minimum period of fourteen (14) days shall elapse from the last concrete placement in foundation and pedestals to the beginning of erection of the sign structure. Use templates to accurately set tower base anchor bolts to the correct elevation and alignment.

(c) **Pre-Assembly of Field Connections.** Before galvanizing, preassemble field connections of chord trusses and chord sections to verify geometry and camber. If distortion occurs after galvanizing, re-verify.

(d) Any damage to galvanizing that occurs during shipping, handling or erection shall be repaired with a liquid galvanizing repair. Such repair material shall be submitted to the Engineer for approval prior to use.

(e) Fully tighten anchor bolts by turning the nuts an additional 30 to 45 degrees. Progress by sequentially tightening the nuts on opposite side of the base plate (180 degrees apart).

(f) Compaction of the backfill shall be in accordance with Section 202 of the Standard Specifications.

(g) All signs and miscellaneous attachments shall be installed within the same 8-hour period that the trusses are erected when existing sign is being removed.

Method of Measurement:

The number of Steel Sign Structures specified on the plans or as directed by the Engineer and constructed according to these specifications, complete in place and accepted, will not be measured for payment, but shall be paid for on a lump sum basis for each sign structure.

Basis of Payment:

The number of Steel Sign Structures, as determined above, shall be paid for at the contract lump sum price bid "Steel Sign Structure," which price and payment shall include all galvanized structural steel, bolts, and all labor, materials, equipment and incidentals necessary to construct the sign structure. Backfilling in accordance with Section 210, drilled shaft foundation and rock excavation in accordance with 206 are to be paid under separate item of this Contract.

NOTE:

A breakout sheet attached to the Proposal list the Steel Sign Structures under this item. The Contractor shall fill in a unit price for each item and the cost (unit price times the proposed quantity). The lump sum bid for Item 605664 - Steel Sign Structure shall be the sum of the cost for all items listed. The breakout sheet shall be attached to the Bid Proposal. Failure to submit the breakout sheet with the Bid Proposal will result in the Bid Proposal being declared non-responsive and rejected.

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

10/18/10

605697 - POT BEARINGS

Description:

This work is the fabrication of pot bearings, as indicated.

Materials:

Use new material at all times, with no reclaimed material incorporated in the finished bearing.

(a) Steel. Conform to AASHTO M 270 (ASTM A 709), Grade 50 galvanized in accordance with ASTM A123, except for steel for guide bars. Furnish guide bars as specified by the manufacturer and that are approved.

(b) Elastomeric Disc. Provide Shore A 50 Durometer and conform to the following requirements:

Furnish only virgin, crystallization-resistant polychloroprene (neoprene) or virgin, natural polyisoprene (natural rubber) as the raw polymer for the elastomeric rotational element used in the construction of pot bearings. Use individually molded and one-piece elastomers. Provide neoprene and natural rubber used in these bearings with physical properties, which conform to the following ASTM or AASHTO requirements, with the modification noted:

Compound	ASTM Requirement	AASHTO Requirement
Neoprene	ASTM D 2000, Line Call Out M2BC520A14B14	AASHTO M 251
Natural Rubber	ASTM D 2000, Line Call Out M4AA520A13B33	AASHTO M 251

Modification:

1) Samples for compression set tests shall be prepared using a type 2 die.
2) Shore A durometer hardness = 50 +/- 10 Points

(c) Sliding Surfaces.

1. General. Provide polytetrafluoroethylene (PTFE) resin sheets, PTFE fabric, interlocked bronze and PTFE structures, PTFE-perforated metal composite, back-up materials and all other parts of fixed or expansion bearings containing PTFE materials having the friction, mechanical, physical, and weathering properties as specified or indicated.

2. PTFE Resin. Furnish virgin PTFE resin (not reprocessed) conforming to the requirements of ASTM D1457. Provide resin with specific gravity of 2.13 to 2.19 and melting point of 623°F +/- 2°F.

3. Filler Material. When filler material is used, furnish milled glass fibers (15% maximum filler percent by mass (weight)), carbon (25% maximum filler percent by mass (weight)) or fabric containing PTFE fibers, or other approved inert filler materials.

4. Adhesive Material. Use heat cured, high temperature epoxy capable of withstanding temperatures of 385°F to 500°F when bonding the PTFE to its steel substrate. Provide adhesive material in epoxy resin conforming to the requirements of Federal Specification MMM-A-134 FEP film or approved equal.

5. Unfilled PTFE Sheet. Make finished unfilled PTFE sheet from virgin PTFE resin and ensure that it conforms to the following requirements:

Tensile Strength (minimum)	ASTM D 1457 2,800 psi
Elongation (minimum)	ASTM D 1457 200%

6. Filled PTFE Sheet. Make filled PTFE sheet from virgin PTFE resin uniformly blended with inert material. Ensure that finished filled PTFE sheets containing glass fiber or carbon conform to the following

requirements:

Requirement	ASTM Method	15% Glass Fibers	25% Carbon
Mechanical			
Tensile Strength (minimum)	D 1457	2,000 psi	1,300 psi
Elongation (minimum)	D 1457	150%	75%
Physical			
Specific Gravity (minimum)	D 792	2.20	2.10
Melting Point	D 1457	620°F +/- 18°F	620°F +/- 18°F

7. Fabric Containing PTFE Fibers. Use manufactured fabric produced from oriented, multifilament, PTFE, fluorocarbon fibers and other fibers as required by proprietary designs. Use PTFE fibers with the following typical physical properties:

Physical Requirement	ASTM Method	PTFE Fibers
Tensile Strength (minimum)	D 2256	24,000 psi
Elongation (minimum)	D 2256	75%

8. Interlocked Bronze and Filled PTFE Structures. Supply interlocking bronze and filled PTFE structures consisting of a phosphor bronze plate with a 0.010 inch thick porous bronze surface layer into which is impregnated a lead/PTFE compound. Provide an overlay of compounded PTFE not less than 0.001 inch thick. Ensure that the phosphor bronze back plate conforms to ASTM B 100 and the porous bronze layer conforms to ASTM B 103.

9. PTFE Metal Composite. Supply PTFE metal composite consisting of virgin PTFE molded on each side and completely through a 1.32-inch perforated stainless steel ASTM A 240, Type 304 sheet.

10. Surface Treatment. Where PTFE sheets are to be epoxy bonded, have an approved manufacturer factory treat one side of the PTFE sheet using the sodium napthalene or sodium ammonia process.

11. Stainless Steel Mating Surface. Furnish stainless steel sliding surfaces conforming to ASTM A 167 or A 240, Type 304 with an ANSI 0.02 mil surface finish or less. Attach a stainless steel sheet by an approved welding procedure, which keeps the sheet in contact with the substrate, or weld a stainless steel overlay using Type 309L electrodes. Use 0.05-inch minimum thickness stainless steel.

12. Manufacturing Requirements. Manufacture the expansion bearing to the dimensions of and to conform to the requirements of the method of fastening to the structure as indicated.

Attachment of PTFE Material. Factory-bond, mechanically connected; or recess into the back-up material PTFE material as indicated.

Bonding. Perform the bonding at the factory of the manufacturer of the fixed or expansion bearings under controlled conditions and according to the written instructions of the manufacturer of the approved adhesive system. Ensure that after completion of the bonding operation, the PTFE surface is smooth and free from bubbles. Then polish filled PTFE surfaces.

Mechanically Fastened. If mechanically fastened, fasten PTFE sheet as indicated with the size, type, and number of fasteners required, taking care to have full bearing of the fastener used in the PTFE sheet and back-up material.

Fabric Containing PTFE Fibers. Bond or mechanically attach the fabric to a rigid-substrate. Supply fabric capable of carrying unit loads of 10,000 pounds per square inch without cold flow. Provide a fabric-substrate bond capable of withstanding a shear force equal to 10% of the perpendicular or normal application loading without delaminations in addition to the shear force developed as a result of the natural bearing friction shear force.

(d) Sealing Rings.

1. Rings with Rectangular Cross Sections. Furnish brass sealing rings conforming to ASTM B 36.

2. Rings with Circular Cross Sections. Furnish round cross section metal sealing rings conforming to Federal Specifications QQ-B-626, composition 22, half hard.

(e) Bronze Elements. Ensure that bronze bearing and expansion plates conform to the specification for Bronze Castings for Bridges and Turntables, AASHTO M 107 (ASTM B 22). Furnish alloy C91100 unless otherwise specified. Cast bronze plates according to the indicated details. Plane sliding surfaces parallel to the movement of the spans and polish them unless otherwise indicated.

(f) Lubricant. Furnish solid lubricant consisting of a combination of solids having non-deteriorating characteristics as well as lubricating qualities and capable of withstanding long term atmospheric exposure, de-icing materials, and water. Do not use molybdenum disulfide and other ingredients, which promote electolytic or chemical action between the bearing elements. Do not use shellac, tars and asphalts, or petroleum solvents as binders.

Construction Methods:

(a) Rotational Elements. Furnish elements conforming to the following requirements:

Manufacture from a solid plate by machining or fabricate by welding a flame-cut shape to a plate. Test all welded areas by the magnetic particle method meeting AWS D1.5, Section 6 requirements. Welding is as specified in standard specifications.

Machine inside diameter (ID) of pots to a tolerance of 0.005 inch up to 20 inches ID and 0.007 inch over 20 inches ID.

Pots machined parallel to the inside to Class "A" tolerance.

Machined surfaces to an ANSI 125 micro-inch rms finish or better.

Elastomeric discs with tolerances as follows:

Diameters up to 20 inches, 1/16 inch.

Diameters greater than 20 inches, 3/32 inch.

Total thickness of all pieces, -0 inch, +1/8 inch.

Mold discs in one piece, do not layer elastomer.

Pistons with tolerances as follows:

Diameters up to 20 inches, 0.005 inch.

Diameters greater than 20 inches, 0.007 inch.

Upper side, Class "A" tolerance. Lower side, Class "B" tolerance.

(b) Non-Rotational Elements. Furnish elements conforming to the following requirements:
Furnish masonry and distribution plates with tolerances as follows:

Plan dimensions up to 30 inches, -0 inch, +3/16 inch.

Plan dimensions over 30 inches, -0 inch, +1/4 inch.

Thickness tolerance, -0.030 inch, +0.060 inch.

Masonry plates used with pot, disc, or spherical bearings, Class "C" tolerance for the underside and Class "A" tolerance for the upper side.

Provide PTFE sliding surfaces with tolerances as follows:

Plan dimensions "total design area", +5%, -0%

Substrate flatness: Class "A" tolerance for pot and disc bearings, Class "B" tolerance for spherical bearings.

Seal weld the stainless steel sheet around the entire perimeter using techniques, which ensure it will remain in contact with the backing plate.

Provide an ANSI 20 micro-inch rms finish or better. Flatness to Class "A" tolerance. Furnish sole plates with tolerances as follows:

Plan dimensions up to 30 inches, -0 inch, +3/16 inch.

Plan dimensions over 30 inches, -0 inch, +1/4 inch.

Center line thickness, -1/32 inch, +1/8 inch.

Flatness of surface in contact with steel beams, Class "B" tolerance; in contact with fresh concrete, none; in contact with stainless steel sliding surface, Class "A" tolerance; in contact with another steel plate, Class "B" tolerance.

Minimum edge thickness, 3/4 inch.

Machined bevels to an angular tolerance of 0.002 rad

Flatness of beveled surfaces, Class "A" tolerance

Provide guide bar with tolerances as follows:

Length, unless integral with plate, 1/8 inch.

Section dimensions, 1/16 inch.

Flatness where it bears on another plate, Class "A" tolerance

Bar-to-bar, nominal dimension 1/32 inch.

Not more than 1/32 inch out of parallel

Overall bearing height shall not be more than 1/8 inch or less than 0 inch from nominal dimension. Chamfer all edges.

(c) Determination of Flatness and Tolerances. Furnish bearings with flatness determined by the following method:

Place a precision straightedge, longer than the nominal dimension to be measured, in contact with the surface to be measured or as parallel to it as possible.

Select a feeler gage having a tolerance of 0.001 inch and attempt to insert it under the straightedge using the least number of blades.

Flatness is acceptable if the feeler gage does not pass under the straightedge.

Flatness tolerances are arranged in the following classes:

Class "A" = 0.0005 inch x "Nominal Dimension"
Class "B" = 0.001 inch x "Nominal Dimension"
Class "C" = 0.002 inch x "Nominal Dimension"

"Nominal Dimension" is defined as the actual dimension of the plate, in inches, under the straightedge.

In determining flatness, the straightedge may be located in any position on the surface being evaluated and not necessarily at 90 degrees to the edges.

Ignore a 1-inch wide border around the plate in determining flatness.

(d) Painting. Do not paint before completion of welding.

If the time of exposure before welding is to exceed 90 calendar days, provide metal surfaces with a protective coating of clear lacquer or other approved coating.

Paint all steel surfaces as indicated and according to recommendations of the coating manufacturer.

(e) Testing. Conduct the following tests before installation of the bearings, and in the presence of the Representative.

1. Sampling. Select one sample, for testing purposes, at random from each "lot" of completed bearings at the manufacturer's plant.

A "lot" consists of one of the following:

No more than 25 fixed bearings of one "load category"
No more than 25 expansion bearings of one "load category"

One "load category" may consist of bearings of differing vertical force capacity but the bearings may not exceed a range of capacity differing by more than 300 kips.

2. Friction Test. Test only those bearings actually fabricated for the project.
Test a sample from each lot of expansion bearings. For all guided and non-guided expansion type bearings, measure the sliding coefficient of friction at the bearing's design capacity as specified in below and on the fifth and fiftieth cycles, at a sliding speed of 1 inch per minute.

Calculate the sliding coefficient of friction as the horizontal force necessary to maintain continuous sliding of one bearing, divided by the bearing's vertical design capacity.

The test results will be evaluated as follows:

Measured sliding coefficients of friction shall not exceed 3%.

Visually examine the bearing both during and after the test. Any resultant visual defects, such as bond failure, physical destruction, cold flow of TFE to the point of de-bonding, or damaged components will cause rejection of the lot.

Test Method. Obtain approval of the test method and equipment and comply with the following requirements:

Arrange the test so that the coefficient of friction on the first movement of the manufactured bearing can be determined.

Clean the bearing surface before testing.

Conduct the test at maximum working stress for the TFE surface with the test load applied continuously for 12 hours before measuring friction.

Determine the first movement static and dynamic coefficient of friction of the test bearing at a sliding speed of less than 1 inch per minute, which is not to exceed the coefficient of friction for design.

Subject the bearing specimen to 100 movements of at least 1 inch of relative movement and, if the test facility allows, the full design movement at a speed of less than 1 foot per minute.

Following this test, determine the static and kinetic coefficient of friction again, which is not to exceed the values specified above. Verify that the bearing or specimen shows no appreciable sign of bond failure or other defects.

Bearings represented by test specimens passing the above requirements will be approved for use in the structure subject to on-site inspection for visible defects.

Bearings not damaged during the testing of performance characteristics may be used in the work.

3. Proof Load Test.

Test one bearing from each production "lot" of fixed and expansion bearings. Load a test bearing to 150% of the bearing's rated design capacity and simultaneously subject it to a rotational range of 0.02 radians (1.146 degrees) or design rotation, whichever is greater, for a period of 1 hour.

Visually examine the bearing both during the test and upon disassembly after the test. Any resultant visual defects, such as extruded or deformed elastomer, polyether urethane or TFE, damaged seals or limited or cracked steel, will cause rejection of the lot.

During the test, for pot bearings maintain continuous and uniform contact between the steel bearing plate and steel piston for the duration of the test. For disc bearings maintain continuous and uniform contact between the polyether urethane element and the bearing plates and between the sliding steel top plate and the upper bearing plate for the duration of the test. Any observed lift-off will cause rejection of the lot.

4. Material Tests.

Submit one sample of elastomer and one sample of PTFE from each "lot of material" to MTD for material testing to ensure compliance with appropriate material specifications.

(f) Packing and Shipping.

1. Packaging and Handling.

Ensure that the bearings are securely banded together as units by fabricator, shipped to the job site, and stored without relative movement of the bearing parts or disassembly at any time. Wrap bearings in moisture resistant and dust resistant material to protect against shipping and job site conditions. Match mark the bearings to indicate normal position of each bearing.

Take care to ensure that bearings are stored at the job site in a dry sheltered area free from dirt or dust until installation. Inspect bearings within one week after arriving on the project. Do not disassemble unless the fabricator's representative is present. Following inspection, rewrap the bearings to keep them clean until installation.

Do not remove the sole and top plates of bearings for separate attachment to the structure except under the direct supervision of the fabricator.

With each shipment, enclose a copy of the materials, fabrication, and testing compliance certifications.

(g) Shop Drawings.

Submit as specified in standard specification section 105 and include the following information:

The total quantity of each kind of bearing required (fixed and expansion), grouped first according to type (load range) and then by actual design capacity.

Plan view and section elevation including all relative dimensions.

Details of all components and sections showing all materials incorporated into the bearing.

All ASTM, AASHTO, and other material designations.
The maximum design coefficient of friction as indicated.

Clearly describe and detail any welding process used in the bearing manufacture that does not conform to the approved processes of the AWS code.

Vertical, horizontal, rotation, movement, and load capacity.

A schedule of all bearing offsets, if required by the project.
Alignment plans.

Paint or coating requirements.

Installation scheme.

Complete design calculations verifying conformance with the provisions of this specification. Stress analysis and the mechanics of standard bearing details are not required.

Anchorage details.

Bearing pre-set details.

Location of the fabrication plant.

The manufacturer's name and the name of its representative responsible for coordinating production, sampling, and testing.

(h) Certification.

Ensure that the fabricator provides a certification package as specified in standard Section 106.03 and containing the following:

Material test reports for all steels used except AISI C1018 and C1020 for which a mill conformance certificate is acceptable.

Certificate of Compliance for all non-ferrous metals.

Material test reports for any elastomeric components.

Certificate of Compliance for PTFE and any adhesive used.

A Certificate of Compliance for the bearings, executed by an officer of the manufacturing company.

Certificate of Compliance for any dowels or bolts supplied.
Test reports for the performance tests.

Method of Measurement:

The quantity of “Pot Bearings” will be measured as the number of pot bearings furnished, installed and accepted.

Basis of Payment:

The quantity of “Pot Bearings” will be paid for at the Contract unit price for each “Pot Bearing”. Price and payment will constitute full compensation for the furnishing, painting and installing the new bearings, anchor bolts, nuts, and washers, welding and for all materials, labor, equipments, tools and incidentals necessary to complete this item of work.

611500 - STONE MASONRY

Description:

The item shall consist of furnishing all materials and constructing stone masonry, composed of approved stones laid in mortar bed in accordance with these specifications and in reasonably close conformity with the form, dimensions, and details shown on the Plans and/or as directed by the Engineer.

Materials:

Mortar for stone masonry shall conform to the applicable requirements of Section 611 of the Standard Specifications. All steel wall ties shall be hot dipped galvanized.

Stone shall be of the dimensions and type as detailed and specified on the Plans. The Contractor shall submit samples of stone for approval prior to starting in case of new masonry work. Materials for masonry repair/replacement shall match the existing stone and patterns.

Construction Methods:

The stone shall be laid to the wall to form the pattern shown on the Plans, and shall be thoroughly wetted before laying in mortar. All joints shall be completely filled with mortar and shall be finished properly as work progresses. Mortar joints shall be 1" to 1 1/2" (25 mm to 37 mm) thick. The Contractor shall employ competent mason to perform the masonry work.

After constructing the stone masonry, the entire area shall be thoroughly cleaned of all mortar, scars or spots. Efflorescence may be partly removed by water, but where special treatment is necessary, the area shall be first washed down with water, then treated with a solution of three parts hydrochloric acid to 100 parts of water following washing with water again. The Contractor shall be watchful to notice for any deteriorating reaction to the stone masonry, and in such case the treatment shall stop, and the treated area should be thoroughly washed down with water. However, this shall be the responsibility of the Contractor to clean the constructed masonry as to present a natural color.

Basis of Payment:

The payment for the item shall be made at the contract square foot (meter) price bid for "Stone Masonry", which price and payment shall constitute full compensation for furnishing and placing all materials, disposal of samples materials, and for all labor, equipment, tools, and incidentals necessary to complete the work.

8/15/05

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

Description:

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

Materials:

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

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

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

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

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

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

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

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

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

Construction Methods:

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

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

Method of Measurement:

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

Basis of Payment:

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

4/17/03

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

Description:

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

Materials:

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

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

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

Construction Methods:

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

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

Minimum cover for pipe under pavement, including local roads, subdivision roads and non-residential driveways, shall be 1' measured from the top of pipe to bottom of pavement. The minimum cover for pipe under the travel way of roads with higher classifications shall be 2' measured from the top of pipe to the bottom of pavement. Otherwise, the cover shall be 1' measured from the top of pipe to top of grade unless otherwise

recommended by the manufacturer to prevent pipe flotation.

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

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

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

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

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

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

Video Inspection:

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

Method of Measurement:

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

Basis of Payment:

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

9/14/05

612529 - PIPE VIDEO INSPECTION

Description:

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

Construction Methods:

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

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

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

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

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

Documentation:

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

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

ALL PIPE TYPES	MAXIMUM JOINT OPENING ALLOWED
12-36" (300 - 900 mm) ROUND	0.75" (19 mm)
42" (1050 mm) & LARGER	1.25" (32 mm)

ALL ELLIPTICAL	1.50" (38 mm)

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

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

Method of Measurement:

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

Basis of Payment:

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

8/13/07

614861 - STRUCTURAL PLATE ARCH (STEEL)

Description:

This work consists of furnishing, fabricating and installing a steel plate arch structure, including stiffening members, anchoring hardware, and fasteners where required as shown on the Plans, as described in these Specifications, and as directed by the Engineer.

Materials:

Structural steel plates, bolts, and nuts supplied under this item shall conform to the requirements of AASHTO M167 (ASTM A761), Chapter 12 of AASHTO LRFD Bridge Design Specifications, US units, 4th edition with interims through 2009, and Chapter 26 of AASHTO LRFD Bridge Construction Specifications, US units, 3rd Edition, 2010.

All structural plates shall be galvanized in accordance with AASHTO M111. All bolts shall be galvanized in accordance with AASHTO M232. The gage for steel plates shall be as specified on the plans.

All plates or assembled sections with dimensions at variance from those specified shall be replaced or repaired by the Contractor at his expense as ordered by the Engineer. The Engineer shall determine whether a damaged plate or section may be repaired or must be replaced. Fabrication, workmanship, and inspection shall be done in accordance with the applicable requirements of Section 614 of the Standard Specifications.

Working Drawings:

The Contractor shall provide Manufacturer's installation instructions or working drawings and design calculations in sufficient detail to permit a structural review. The design shall be in accordance with AASHTO LRFD Bridge Design Specifications, US units, 4th edition with interims through 2009. The working drawings shall be submitted in advance of construction to allow for their review, revision, and approval without delay to the work. The Contractor shall not start the construction of any metal culvert for which working drawings are required until the drawings have been approved by the Engineer. Such approval will not relieve the Contractor of responsibility for results obtained by use of these drawings or any other contractual responsibilities. The working drawings shall be stamped by a Professional Engineer registered in the State of Delaware. All drawings shall be submitted in accordance with Section 105 of the Standard Specifications.

Construction Methods:

General: It shall be the Contractor's responsibility to have a qualified and experienced manufacturer's representative at the structure site continuously during all phases of assembly and installation of the structure up to the time that the following conditions are met:

1. Backfill has been placed and compacted and approved to a depth of 1' above the top of the plate arch.
2. All temporary supports are removed.

The manufacturer's representative shall be subject to the approval of the Department based on a written submission of qualifications and work experience with this type of structure, including the project location and owner of each installation shown in the experience record submitted. This qualification and experience summary shall be submitted to the Department for review within 14 days after the award of the contract. The manufacturer's representative is to supervise the installation of the structure for the Contractor, subject to the direction of the Engineer. Installation of the arch shall not start by the Contractor until the manufacturer's representative is approved by the Department and present at the work site.

Arches may require special shape control during the placement and compaction of structure backfill.

Prior to construction, the Manufacturer shall attend a preconstruction conference to advise the Contractor(s) and Engineer of the more critical functions to be performed during backfilling and to present the intended quality control steps to be used to control loads, shape and movements.

All damage to the structure, attributable to the Contractor's operations or omissions, shall be rectified in a manner satisfactory to the Engineer, and at no cost to the Department.

Where any discrepancies arise, Chapter 26 of AASHTO LRFD Bridge Construction Specifications, US units, 3rd Edition, 2010 shall govern unless otherwise directed by the Engineer.

Assembly: All elements of the structure shall be handled and assembled in accordance with the manufacturer's instructions, except as modified herein, on the Plans, or directed by the Engineer in writing.

The Contractor shall maintain the shape of the proposed plate arch during all stages of assembly and backfilling. In order to prevent distortion and maintain structure shape within specified limits, the following methods or combination of methods may be used:

1. Field strutting and temporary shoring.
2. Utilization of cables.
3. Utilization of backfill material.

No temporary support shall be removed until the backfill around the plate arch has been placed and compacted and accepted up to an elevation to provide the necessary support. Care shall be exercised to align plates and to avoid permanent distortion from specified dimensions.

The bolts nearest the visible edge of the lapped joints at the top of the corner plate of steel arch structures shall be in the valleys of the corrugations.

Seam bolts shall be tightened during the installation to at least 100 ft-lbs, but not more than 300 ft-lbs. Final tightening to the required torque will not be permitted until all bolts are placed in the seam within 10 feet of those being tightened. Any nuts loosened by plates being drawn together shall be retightened to required torque.

The tolerances specified in Chapter 26 of AASHTO LRFD Bridge Construction Specifications, US units, 3rd Edition, 2010 shall be followed.

Backfilling: Backfilling shall be done in accordance with the details shown on the Plans, Section 207 of the Standard Specifications, and this Special Provision unless otherwise approved by the Engineer. The difference in backfill elevation from one side of the structure to the other shall not exceed one foot at any time.

Care shall be taken during assembly to avoid bending the plates from specified shape. Before backfilling, the final assembled and tightened structure shall be checked for rise, span, and alignment to ensure conformance with the above specified tolerance criteria. The variation in span and rise during and after backfilling shall not exceed 2 percent of their design dimensions. The final accepted structure shall be within these specified tolerances.

Method of Measurement:

The quantity of tunnel liner plate arch will be measured in linear feet along the centerline installed in place, completed, and accepted.

Basis of Payment:

The quantity of tunnel liner plate arch will be paid for at the Contract unit price per foot. Price and payment will constitute full compensation for all labor, materials and equipment necessary for furnishing and erecting the liner plate arch structure, including anchor bolts, nuts, reinforcing ribs or thrust beams where called

for on the Plans or by the manufacturer, and all temporary support systems for maintaining shape during grouting, along with all incidental work associated with the above, including shop drawings, monitoring the shape of the structure and removal of temporary support system. The price bid shall also include the cost of the manufacturer's representative required during construction. The cost for the reinforcing steel and concrete for the foundation, coarse aggregate for foundation stabilization, and the backfill will be paid for under the respective pay items.

11/29/10

618526 - DRILLED SHAFT FOUNDATIONS

Description:

This work shall consist of all labor, materials, equipment, and services necessary to perform all operations to complete the installation and integrity testing of drilled shafts. The work shall be completed in accordance with the plans, The State of Delaware Department of Transportation Standard Specifications for Road and Bridge Construction dated August 2001 and this Special Provision.

Materials:

Materials shall meet the following requirements:

A. Hydraulic Cement Concrete

Portland cement concrete shall conform to the requirements Section 812 and Table 812-A, for Class B concrete. Where not otherwise specified, ACI 336.1-89 shall be followed. Water used in mixing concrete or slurry shall conform to the requirements of Section 803 of the Standard Specifications.

Concrete shall remain workable and maintain a 4-inch slump for up to four hours after placing. If free fall methods are utilized for placement, the maximum coarse aggregate size shall be reduced to 0.5-inches. A slump value range of 7±1 inches shall be provided for all dry uncased holes and a slump range of 7±1 inches shall also be provided when temporary or permanent casing is used. A minimum slump of 6-inches with the addition of a retarder is required when a casing is being withdrawn. A minimum slump of 8±1 inches is required for concrete placed under a drilling fluid. An acceptable water reducing and retarding admixture shall be added to the concrete to produce the specified slump. Under no circumstances shall the admixture cause segregation of the concrete material components. If any admixtures are added to the concrete at the site, the admixture must be added to the concrete by a qualified technician furnished by the Contractor. Immediately after the addition of the admixture, the drum shall be turned a minimum of 30 revolutions, at high mixing speed, until the concrete is thoroughly mixed. The technician shall then test the slump and consistency of the concrete mixture. Under no circumstances shall the Contractor add additional water to the concrete mixture to reach the desired slump. The mix design including any water reducing and retarding admixtures to be used shall be submitted to the Engineer for approval at least 30 days prior to concrete placement.

B. Reinforcing Steel

Deformed reinforcing bars shall be in accordance with the sizes, spacing, dimensions, and details shown on the plans and shall conform to ASTM A615, Grade 60, and the requirements of Section 824 and Section 603 of the Specifications.

C. Casing

Casing pipe shall conform to ASTM A 252, Grade 2 as minimum for temporary or permanent application. Casing shall be metal, smooth, clean, watertight, and of ample strength to withstand both handling and driving stresses and the pressure of both concrete and the surrounding earth materials. Thickness of the casings shall not be less than 0.25-inches. The inside diameter of casing shall not be less than the specified size of the shaft. No extra compensation will be allowed for concrete required to fill an oversized casing or oversized excavation. All casings, except permanent casing, shall be removed from shaft excavations. Any length of permanent casing installed below the shaft cutoff elevation shall remain in place.

D. Slurry

1. Slurry shall be a stable suspension of mineral or polymer in potable water. The Contractor shall anticipate encountering leakage from storm and sanitary sewers, and other agents that may be deleterious to slurry and make provisions to prevent such materials from contaminating the slurry. The Contractor is responsible for and shall modify the slurry mix as required so as to maintain a stable suspension at all times.

2. Slurry shall be of such consistency that the tremie concrete will readily displace it.

3. Additives shall be used in the slurry if needed to maintain the necessary properties.

4. Fluid loss in an open excavation shall be limited to a drop in the slurry level of no greater than 1-inch per hour per 20-feet of excavation depth, and no more than 2-feet total in a 24-hour period.

5. Bentonite slurry shall be mineral slurry of powdered Wyoming or Dakota bentonite, with the following density, viscosity, and pH. Attapulgite mineral slurry may be used for sites with brackish or saline water, and shall conform to the range of values as shown in Table 1. Polymer slurry shall be a suspension of powdered polyacrylamide or vinyl polymer and shall conform to the range of values shown in Table 2.

6. Slurry Testing Density shall be measured by 68 degrees F by the mud density balance, test method FM 8-RP13B-1. Viscosity shall be measured by the Marsh Cone Method, test method FM 8-RP13B-3. The pH shall be measured by test method FM8-RP13B-4.

Notes for Table 1:

a. Increase density values by 1.86 lb/ft^3 (30 kg/m^3) in salt water.
b. At time of concreting, sand content shall not exceed 4% (by volume) at any point in the shaft excavation as determined by the American Petroleum Institute sand content test.
c. Mixing time shall be a minimum of 10-minutes for mineral slurry.
d. Storage time to allow hydration shall be a minimum of 6 hours for mineral slurry.

Table 1: Range of Values (at 68°F) for Bentonite Slurry

Property (Units)	At the Time of Slurry Introduction in the Drilled Shaft	Before Concrete Placement in the Drilled Shaft	Test Method
Density	1025 to 1105 kg/m^3 63.55 to 68.51 lb/ft^3	1025 to 1200 kg/m^3 63.55 to 74.41 lb/ft^3	Density Balance
Viscosity	30 to 48 seconds/liter 849.5 to 1359.2 seconds/ft^3	30 to 48 seconds/liter 849.5 to 1359.2 seconds/ft^3	Marsh Cone
pH	7 to 11	7 to 11	pH paper or meter
Sand Content %	1 max	4 max	200 Sieve Retain

Notes for Table 2:

a. Increase density values by 1.86 lb/ft^3 (30 kg/m^3) in salt water.
b. If desanding is required, sand content shall not exceed 1% (by volume) at any point in the shaft excavation as determined by the American Petroleum Institute sand content test.
c. Maximum Viscosity by Marsh Cone method shall be in accordance with Manufacturer recommendations.
d. Mixing time shall be a minimum of 15-minutes for polymer slurry.
e. Storage time to allow hydration shall be a minimum of 2-hours for polymer slurry.

Contractor Qualifications:

This work shall be performed under the supervision of the Contractor's Superintendent, who will be fully knowledgeable and experienced, as defined herein, in the construction of drilled shaft foundations of similar size and in similar geotechnical conditions using both cased and slurry methods. Further, the Contractor and the Contractor superintendent shall have at least five years experience within the last eight years constructing drilled shafts. The Contractor's equipment proposed for use at the site shall have the demonstrated capacity to successfully complete the work within the specified contract time.

At least 30 days prior to the start of drilled shaft construction, the Contractor shall provide the following documentation of his qualifications, experience record, prior project references, and the availability of the equipment suitable to perform the required work. All references shall be currently available personnel who can verify the quality of the Contractor previous work and shall include current name, address, and telephone number(s). This documentation shall reference the experience of the drilled shaft Contractor and the drilled shaft Contractor's superintendent in responsible charge of the drilled shaft operations. As a minimum, this documentation shall include:

1. Experience in the successful installation of drilled shafts of the sizes shown in the plans and employing construction methods similar to those required at this site. The minimum experience shall consist of five similar-sized projects in the past five years. At least three of the projects shall be sites with similar ground conditions. The person in responsible charge of day-to-day drilled shaft operations shall have prior experience constructing shafts similar to those described in these plans and specifications. That person shall have at least five years in the past eight years constructing drilled shafts and at least two years with the current firm.

2. Experience of subcontractor performing the crosshole sonic logging testing. The crosshole sonic logging subcontractor shall have previous experience in conducting crosshole sonic logging tests on at least 5 drilled shaft projects of similar size in the past five years.

   This submission shall be made in conjunction with the submittals of the Drilled Shaft Installation Plan. Upon review of the Contractor's qualifications and the Drilled Shaft Installation Plan described hereafter, the Department expressly reserves the right to not approve the drilled shaft Contractor if, in the opinion of the Department, the Contractor's experience, qualifications or equipment is suspect in its ability to complete the work in a timely manner and in accordance with the specifications.

Equipment:

The Contractor shall furnish all equipment and instrumentation necessary for installation of the shafts.

The excavation and drilling equipment shall have adequate capacity including power, torque, and down thrust to excavate a hole of the maximum diameter shown on the plans and to a depth of 15-feet or 20 percent beyond the maximum depths shown in the contract documents, whichever is greater. Overreaming may be accomplished with a grooving tool, overreaming bucket, or other method approved by the Engineer.

The excavation and overreaming tools shall be of adequate design, size, and strength to perform the work shown in the contract documents or described herein. When the material encountered cannot be drilled using conventional earth augers with soil or rock teeth, drilling buckets, and/or overreaming tools, the Contractor shall provide special drilling equipment including but not limited to: rock core barrels, rock tools, air tools, blasting materials, and other equipment as necessary to construct the shaft excavation to the size and depth required.

The Contractor shall provide equipment that produces a stable slurry suspension and provides mechanical agitation. The Contractor also shall provide a temporary pipeline or other safe methods to transport slurry and provide equipment that removes detrimental quantities of excavated material from the slurry.

Site Information:

Boring logs from the subsurface investigation are included in the contract documents for use by the Contractor. Data on subsurface conditions are not intended as representations or warranties of continuity of such conditions. It is expressly understood that the Department will not be responsible for interpretations or conclusions drawn from the subsurface information by the Contractor. The data is made available for convenience of the Contractor. The Contractor may make additional test borings and other exploratory operations at no additional cost to the Department.

Prior to bidding, the Contractor shall visit and examine the work site and all conditions thereon and take into consideration all such conditions that may affect this work, in accordance with the requirements of Section 102.05 of the Standard Specifications.

Submittals:

The Contractor shall submit to the Engineer for review and approval, an Installation Plan for the construction of drilled shafts not less than 45-days before the start of work. The Installation Plan shall include the following:

A. Details of environmental control procedures used to prevent the loss of slurry, sediment or concrete into waterways or other protected areas.

B. Details of measures used to maintain and protect the integrity of existing structures. Include documentation of utility clearance procedure, including but not limited to Miss Utility ticket information (within two weeks of anticipated construction).

C. List of proposed equipment to be used including cranes, drills, augers, bailing buckets, final cleaning / inspecting equipment, desanding equipment, slurry pumps, sampling equipment, tremie or concrete pumps, casing, and other appurtenances.

D. Details of overall construction operation sequence and the sequence of shaft construction in bents or groups, including scaled plan and profile showing the location, size and movements of equipment setup and operations. The completion of any required integrity tests shall be noted in this construction operation sequence.

E. Submit project experience and resumes of the Contractor and Contractor superintendent Qualification.

F. Details of shaft excavation methods.

G. When slurry is required, data from the supplier giving the physical and chemical properties of the slurry, details of the method proposed to mix, circulate, desand, and test the slurry.

H. Method of monitoring and continuously maintaining slurry level in drilled shaft, if applicable. Include method of maintaining stability of drilled shafts in the event of sudden slurry loss or loss of slurry stabilization properties.

I. Method of monitoring verticality of the shaft excavation during excavation and details of proposed corrective measures to be implemented as necessary.

J. Methods to clean and inspect the shaft excavation. The use of airlift pipe is required unless otherwise approved by the Engineer at the time of construction. Include details of method for identifying type of bearing material for consistency with design assumptions prior to placement of concrete.

K. Details of reinforcement placement including support and centralization methods.

L. The Contractor shall submit a Concrete Placement Plan, including the concrete mix design, including admixtures to be used. Details of concrete placement, curing, and protection. Include method of collecting slurry from the excavation.

M. Details of method and means to obtain and report record information for each shaft, as required by this Special Provision, as well as copies of proposed forms for maintaining construction logs.

N. Details of the Pile Integrity Testing Plan. See ile Integrity Testing of Drilled Shaft Foundations included in the Contract Documents.

O. Other information shown on the plans or requested by the Engineer.

The Contractor shall not start the construction of drilled shafts until the Engineer has approved the Drilled Shaft Installation Plan. The Installation Plan will be rejected if it is incomplete or inconsistent with this special provision. Such approval by the Engineer will not relieve the Contractor of responsibility for results obtained by the use of the Installation Plan or any of his other responsibilities under the contract.

Construction Methods:

A. Protection of Existing Structures

All reasonable precautions shall be taken to prevent damage to existing structures and utilities, in accordance with the requirements of Section 107 of the Standard Specifications. These measures shall include but are not limited to, selecting construction methods and procedures that will prevent excessive caving of the shaft excavation, monitoring, and controlling the vibrations from the driving of casing or sheeting, drilling of the shaft, or from blasting, if permitted.

B. Construction Sequence

All excavation of the foundation in which drilled shafts are to be constructed shall be complete before shaft construction begins unless otherwise noted in the contract documents or approved by the Engineer. The Contractor prior to the footing pour shall repair any disturbances caused by shaft installation to the footing area.

C. Methods of Drilled Shaft Installation

Excavations required for shafts shall be performed through whatever materials are encountered, to the dimensions and elevations shown on the plans or otherwise required by the Special Provisions. The method used shall be suitable for the intended purpose and materials encountered. Generally, either the dry method, wet method, temporary casing method, or permanent casing method shall be used as necessary to produce sound, durable concrete foundation shafts free of defects. The permanent casing method shall be used only when required by the contract documents or authorized by the Engineer. When a particular method of construction is required in the contract documents, that method shall be used. If no particular method is specified for use, the Contractor shall select and use the method, as determined by site conditions and subject to approval of the Engineer, which is needed to properly accomplish the work.

1. Dry Construction Method

The dry construction method shall be used only at sites where the groundwater table and site conditions are suitable to permit construction of the shaft in a relatively dry excavation (i.e., less than 3-inches of water accumulates above the final base elevation over a 1-hour period when no pumping is permitted), and where the sides and bottom of the shaft are stable and may be visually inspected by the Engineer prior to placing the concrete. The dry method consists of drilling the shaft excavation, removing accumulated water and loose material from the excavation. Where caving occurs or if there is excess seepage into the drilled shaft, the drilling should be done using an alternate method of construction. Concrete shall be placed in accordance with this provision.

2. Wet Construction Method

The wet construction method, or slurry method, may be used at sites where a dry excavation cannot be maintained for placement of the shaft concrete. The slurry method is useful where a temporary casing

cannot be sealed in an impermeable stratum. This method consists of using water or slurry to maintain stability of the hole walls while advancing the excavation to final depth, placing the reinforcing cage, and shaft concrete. Temporary surface casings shall be provided to aid shaft alignment and position, and to prevent sloughing of the top of the shaft excavation, unless it is demonstrated to the satisfaction of the Engineer that the surface casing is not required.

Slurry shall be premixed thoroughly with clean fresh water and adequate time allowed for hydration prior to introduction into the shaft excavation. Adequate slurry tanks will be required. Excavated slurry pits will only be allowed with written permission of the Engineer. Adequate desanding equipment will be required to maintain slurry properties as required by Section II.D of this Special Provision. Steps shall be taken as necessary to prevent the slurry from loosing its fluid properties in the shaft excavation, such as, agitation, circulation, and adjusting the properties of the slurry. The level of the slurry shall be maintained at a height sufficient to prevent caving of the hole, and shall at all times be at least 6-feet higher than the elevation of groundwater.

The Contractor shall carry out control tests on slurry to determine density, viscosity, and pH as required by this Special Provision. Tests to determine density, viscosity, and pH values shall be done during the shaft excavation to establish a consistent working pattern.

Prior to placing shaft concrete, the Contractor shall clean the excavation and collect slurry samples from the bottom and at intervals not exceeding 10-feet for the full height of slurry. Any heavily contaminated slurry that has accumulated at the bottom of the shaft shall be eliminated. The slurry shall be within specification requirements immediately before shaft concrete placement. Concrete shall be placed in accordance this Special Provision.

3. Temporary Casing Construction Method

The temporary casing construction method may be used at all sites where excessive caving or seepage could occur. This method typically consists of advancing the excavation through caving material by the wet construction method as in this provision. When a nearly impervious formation is reached, a temporary casing shall be placed in the hole and sealed in the nearly impervious formation. After the drilling fluid is removed from the casing, drilling may proceed as with the dry method to the projected depth. If it is not possible to maintain the seal of the casing, caving or raveling occurs, then the excavation shall be completed using an alternative method. As an alternative to use of the wet excavation method, temporary casing may be installed by drilling, driving or vibratory procedures in advance of excavation to the lower limits of the problem material.

Slurry may be omitted at the discretion of the Engineer if it can be demonstrated that the casing can be installed with only minor caving of the hole. Minor caving shall be considered less than 25% increased volume over theoretical shaft volume, for a section not to exceed ten feet of shaft. If slurry is omitted, casing shall be installed to the final base elevation to allow for inspection of the bearing stratum.

Clean the excavation and test the drilling fluid for compliance according to the Department specifications. Lower the reinforcing steel cage in place and fill the excavation with concrete. Before the casing is withdrawn and while the casing is being withdrawn, the level of fresh concrete in the casing shall be such that all the fluid trapped behind the casing is displaced upward without contaminating the shaft concrete. Concrete placement and pulling of the temporary casings shall be conducted in accordance with the requirements of this provision.

Where drilled shafts are located in open water areas, exterior casings shall be extended from above the water elevation into the ground to protect the shaft concrete from water action during placement and curing of the concrete. The exterior casing shall be installed in a manner that will produce a positive seal at the bottom of the casing so that no piping of water or other materials occurs into or from the shaft excavation.

4. Permanent Casing Construction Method

The permanent casing construction method shall be used only when specified on the plans. This method consists of driving or drilling a casing to a prescribed depth before excavation begins. If the casing cannot be advanced to the prescribed depth prior to beginning excavation operations, the Engineer may require the Contractor to facilitate casing installation by either (1) excavating the material within the casing to the depth that the casing was advanced, or (2) drilling a pilot hole, of a diameter less than 60% of the shaft diameter, down to the final prescribed casing depth. In some cases, overreaming to the outside diameter of the casing may be required in order to advance the casing to the prescribed depth.

The casing shall be continuous between the elevations shown on the plans. Unless shown on the plans, the use of temporary casing in lieu of or in addition to the permanent casing will not be used, except when directed in writing by the Engineer.

After the installation of the casing and the excavation of the shaft are complete, the top of the casing shall be cutoff at the prescribed elevation, final shaft cleaning done, and the reinforcing steel and shaft concrete placed within the portion of the casing left in place as shown on the plans. Concrete shall be placed in accordance with this provision.

5. Alternative Construction Methods

The Contractor may propose alternative methods to prevent caving and control ground water. Such proposals, accompanied by supporting technical data, shall be submitted to the Engineer for review and approval.

D. Excavations

The Contractor shall obtain Engineer's approval of the field locations of the foundations before excavation is begun. Foundation shall be placed, wherever possible, on undisturbed material. The bottom elevation of the drilled shaft and rock socket as shown on the plans may be adjusted during construction when the Engineer determines that the foundation material encountered during excavation is unsuitable or differs from that anticipated in the design of the drilled shaft. The Engineer may take soil samples or rock cores if so considered necessary to determine the character of the material directly below the shaft excavation. The Engineer will inspect the samples or cores and determine the final depth of required shaft excavation.

The Contractor shall maintain a construction method log during shaft excavation. The construction log shall contain information such as drilling procedures and equipment, details of concrete, reinforcing and casing, the description and approximate top and bottom elevation of each soil or rock material, seepage or groundwater. Also included shall be remarks regarding setbacks or difficulties encountered during shaft construction, including such things as cave-ins, cavities, fluid loss, weather conditions, and equipment malfunctions. Sample drilled shaft log forms indicating the minimum acceptable information are attached to this Special Provision as Appendix A.

Excavated materials, which are removed from the shaft excavation and any drilling fluids used, shall be disposed of offsite in accordance with federal, state and local environmental regulations and the plans and specifications or as directed by the Engineer.

Sidewall overreaming shall be required when the sidewall of the drilled shaft excavation is determined by the Engineer to have softened due to excavation methods, swelled due to delays in concreting, or degraded because of slurry cake buildup. The thickness and elevation of the sidewall overreaming shall be as directed by the Engineer. Overreaming thickness shall be a minimum of 0.5-inches and a maximum of 3-inches. The Contractor shall bear all costs associated with sidewall overreaming. Any drilled shaft concrete over the theoretical amount required to fill any overreaming for shafts, as dimensioned on the plans, shall be furnished at the Contractor expense.

The Contractor shall provide the necessary equipment to remove and dispose of any materials encountered in forming the drilled shaft and rock socket excavation to the dimensions shown on the plans or

as directed by the Engineer. No separate payment will be made for either excavation of materials of different densities and character or employment of special tools and procedures necessary to accomplish the excavation according to these specifications.

The Contractor shall provide the necessary equipment to remove and dispose of any materials/rock including removal of obstructions and excavation to the dimensions shown on the plans or as directed by the Engineer. No separate payment will be made for either excavation of materials/rock of different densities and character or obstruction or employment of special tools and procedures necessary to accomplish the excavations in an acceptable fashion.

Drilled shaft and rock socket excavation shall also include removing surface and subsurface obstruction at drilled shaft locations. Such obstructions may include man-made materials, such as old concrete foundations, and natural materials, such as boulders and cobbles.

In alluvial or residual soils containing boulders, cobbles, gravel, sand, silt and clay, when the hole cannot be advanced more than 1-foot in fifteen minutes using approved equipment operating at maximum power, torque, and down thrust, and using conventional augers fitted with soil or rock teeth and drilling buckets, the Contractor shall use special tools.

Special tools and/or procedures shall be employed by the Contractor after the hole cannot be advanced more than 1-foot in fifteen minutes using approved equipment operating at maximum power, torque, and down thrust, using conventional augers fitted with soil or rock teeth, drilling buckets and/or under reaming tools. Such special procedures/tools may include but are not limited to: chisels, boulder breakers or rock breakers or hammer grabs to break up or lift the boulders intact, core barrels, air tools, hand excavation, temporary casing, and increasing hole diameter. Blasting will not be permitted.

E. Lost Tools

Drilling tools that are lost in the excavation shall be considered obstructions and shall be promptly removed by the Contractor without compensation. All costs due to lost tool removal shall be borne by the Contractor including but not limited to costs associated with hole degradation due to removal operations or the time the hole remains open.

F. Cleaning and Excavation Inspection

The Contractor shall provide equipment for checking the dimensions and alignment of each shaft excavation. The Contractor shall determine dimensions and alignment under the observation and/or direction of the Engineer. Final shaft depth shall be measured after final cleaning.

Shaft cleanliness and the bearing surface will be evaluated and approved by the Engineer. The Contractor shall provide safe access and egress to the Engineer for inspection of the bottom of the excavation prior to placement of reinforcing steel and concrete. After the Contractor has prepared the bottom of the shaft excavation, the Contractor shall notify the Engineer. The Contractor shall coordinate schedules for excavation inspection by the Engineer.

Bottom elevations of drilled shafts and rock sockets shown on the plans are based on design criteria developed by the Engineer and on subsurface conditions depicted on the Engineering Geology sheets included in the plans. The bottom elevations may be adjusted by the Engineer to obtain the required design capacity based on the bearing material encountered during installation of each drilled shaft. The Engineer will be the sole judge as to the classification of the material encountered during drilled shaft excavation.

The Contractor shall not permit any worker to enter the shaft excavation for any reason unless: both a suitable casing has been installed and the water level has been lowered and stabilized below the level to be occupied, and functional and appropriate safety equipment and procedures have been provided to workers entering the excavation as covered under 29 CFR 1910.146. The Contractor shall submit a written permit space program for confined-entry-space in accordance with OSHA 1910.146 to the Engineer for review and approval

prior to constructing the drilled shafts.

Prior to placement of reinforcing steel and concrete, the Contractor shall ensure that loose material from the bottom and sides of excavation has been removed, including sediment and water, and that the shaft is within the construction tolerances, listed in this Special Provision. The Contractor shall test the slurry for compliance with these specifications, collecting slurry samples from the bottom and at intervals not exceeding 10-feet for the full height of the slurry.

The Contractor shall be responsible for correcting drilled shafts not constructed within the specified tolerances. Remedial measures, including engineering analysis and redesign, to correct for out-of-tolerance drilled shaft foundations, shall be performed at no additional cost to the Department.

G. Reinforcing Steel Cage Construction and Placement

The reinforcing steel cage consisting of the steel shown on the plans plus cage stiffener bars, spacers, centralizers, and other necessary appurtenance shall be completely assembled and placed as a unit immediately after the shaft excavation is inspected and accepted and prior to shaft concrete placement. Prior to installation of the steel cage in the shaft excavation, inspect and clean the reinforcing steel of materials that may prevent effective bonding. Clear spacing between bars of the rebar cage shall be at least five times the size of the maximum coarse aggregate. Hooks at the top of the rebar cage shall not be bent outward if temporary casing will be used. Similarly, interior hooks must be designed to permit adequate clearance for a concrete tremie pipe (i.e. 12-inches minimum), if concrete is tremied into place. Where clearance is a problem, hooks may be placed on dowels that may be rotated after concrete placement or casing removal and repositioned after the tremie is removed. The concrete must remain fluid during dowel repositioning. Shafts that require a large amount of reinforcing steel shall use bundled longitudinal bars to maintain the minimum clear spacing requirement. The assembled rebar cage outside diameter shall be at least 6-inches smaller than the drilled hole diameter of the shaft and rock socket, which corresponds to at least 3-inches of concrete cover over the rebar.

The reinforcing steel in the shaft shall be tied and supported so that the reinforcing steel will remain within allowable tolerances until the concrete will support the reinforcing steel. When concrete is placed by tremie methods, temporary hold-down devices shall be used to prevent uplifting of the steel cage during concrete placement. Concrete spacers or other approved non-corrosive spacing devices shall be used at sufficient intervals not exceeding 5-feet along the shaft excavation. When the size of the longitudinal reinforcing steel exceeds 1-inch in diameter, the spacing may be increased but shall not exceed 10-feet.

H. Concrete Placement, Curing, And Protection

All concrete placement, consolidation and curing activities shall conform to the requirements of Section 602 of Specifications, and the Contractor approved concrete placement plan, except as otherwise specified herein or as directed by the Engineer

Concrete shall be placed as soon as possible after reinforcing steel cage placement. Concrete placement shall be continuous in the shaft to the top elevation of the shaft. Placement shall continue after the shaft is full until good quality concrete is evident at the top of the shaft.

Concrete to be placed in dry shafts less than 60-feet in length may be placed by allowing the concrete to free fall into the excavation. Limit the segregation of the concrete by placing the concrete through the use of a tube, sectionalized pipe or other means to direct the free fall of the concrete so that it does not strike the sides or reinforcement of the shaft. If water has infiltrated the base of the excavation, it shall be removed prior to placement of the concrete. No more than 1-inch of standing water shall be allowed in the base of an excavation to prevent segregation of the concrete.

Concrete to be placed in water or slurry shall be placed through a tremie or concrete pump. The tremie shall be supported so as to permit free movement or permit rapid lowering when necessary to retard or stop the flow of concrete. The discharge end shall be sealed closed at the start of work so as to prevent water or slurry from entering the tube before the tube is filled with concrete. After placement has started the tremie tube shall be kept full of concrete to the bottom of the hopper. If fluid enters the tube after placement is started, the tremie

shall be withdrawn, the discharge end resealed, and the placement restarted. The flow of concrete shall be continuous until the work is completed. The discharge end of the tremie and pump line shall always be located a minimum of 6-feet below the level of the already placed concrete. As concrete is placed in the excavation, the slurry should be collected and properly disposed of as approved by the Engineer. Tremie pipes shall be a minimum of 10-inch diameter and use with a minimum slump of 8-inches. Tremie pipes shall not have aluminum parts that will react with concrete. Pump hoses shall be a minimum of 4-inches in diameter. All tremie pipe, pump hoses and connections shall be watertight and the end of the line must be rigid and straight.

The concrete placing rate shall be not less than 30 cubic yards of concrete per each 1-hour period. The concrete mix shall be of such design that the concrete remains in a workable plastic state throughout the placement of the concrete and the concrete slump at the end of the shaft pouring still measures at least 4-inches.

When the top of shaft elevation is above ground, the portion of the shaft above ground shall be formed with a removable form or a permanent form when specified.

All concrete, except for that placed under water, shall be vibrated to a depth of 5-feet below the ground surface except where soft uncased soil or slurry remaining in the excavation will possibly mix with the concrete. After placement, any exposed surfaces of the shaft concrete shall be protected to allow proper curing. Portions of drilled shafts exposed to a body of water shall be protected from the action of water by leaving the forms in place for a minimum of 7-days after concrete placement.

For at least 48-hours after shaft concrete has been placed, no construction operations within a 50-foot radius that would cause soil movement adjacent to the shaft, other than mild vibration, shall be conducted. A minimum period of fourteen (14) days shall elapse from the last concrete placement in foundation and pedestals to the beginning of erection of a sign structure. After constructing the concrete foundations, backfill the excavation around the foundation using acceptable material, in uniform loose layers, not exceeding 4 inches in depth. Compact by means of acceptable mechanical tempers to the required density.

J. Casings and Forms

When the shaft extends above ground or through a body of water, the portion of the shaft exposed above ground or through a body of water may be formed with removable concrete forms or permanent casing. Removable forms shall be stripped from the shaft in a manner that will not damage the concrete. Forms can be removed when the concrete has attained sufficient strength provided: (1) curing of the concrete is continued for the full 72-hour period in accordance with the requirements of Sections 801 and 602 of the Specifications; (2) the shaft concrete is not exposed to salt water or moving water for 7-days; (3) and the concrete has reached a compressive strength of at least 2500 psi as determined from concrete cylinder breaks.

Temporary casings shall be removed while the concrete remains fluid and workable. The removal of temporary casing shall not be allowed until the level of the concrete placed in the shaft is high enough to withstand the pressure exerted by the surrounding soil, water or drilling fluid. After concreting begins, removal of the temporary casing should begin before the concrete begins to set. Telescoping casing may be used but the bottom end of temporary casing shall be located a minimum of 10-feet below the level of already placed concrete. If the concrete begins to set prior to removal of the casing, the removal of the casing should cease and the casing should be cut off at its current elevation and remain in the ground permanently. The cost of the temporary casing and the cost of template and all negative effects that this casing has on the shaft shall be the responsibility of the Contractor.

Movement of the casing by rotating, exerting downward pressure and tapping to facilitate extraction or extraction with a vibratory hammer will be permitted. Casing extraction shall be at a slow, uniform rate with the pull in line with the shaft axis. Do not damage or displace reinforcing cage when withdrawing casing. If a permanent casing is used as part of the drilled shaft, fill void between permanent casing and shaft excavation with concrete or fluid grout at no additional cost to the Department.

K. Construction Tolerances

The following construction tolerances shall be maintained in constructing drilled shafts.

1. The drilled shaft shall be within 3-inches of the plan position in the horizontal plane at the plan elevation for the top of the shaft.

2. The vertical alignment of the shaft excavation shall not vary from the plan alignment by more than 1-inch per 3-feet of depth.

3. After all the shaft concrete has been placed, the top of the reinforcing steel cage shall be no more than 6-inches above and no more than 3-inches below plan position.

4. When casing is used, its outside diameter shall not be less than the shaft diameter shown on the plans. When casing is not used, the minimum diameter of the drilled shaft shall be the diameter shown on the plans for diameters 24-inches or less, and not more than 1-inch less than the diameter shown on the plans for diameters greater than 24-inches.

5. After all concrete has been placed, the top elevation of the shaft shall be within 1-inch of the plan top of shaft elevation. The top of the reinforcing steel cage shall be no less than 4-inches below the top of the shaft.

6. The bottom of the shaft excavation shall be normal to the axis of the shaft within 3-inches per 3-feet of shaft diameter.

Completed drilled shaft excavations constructed in such a manner that the concrete shaft cannot be completed within the required tolerances are unacceptable. The Contractor shall submit correction methods for the Engineer approval. Approval will be obtained before continuing with the drilled shaft construction. Materials, engineering and work necessary to effect correction for out-of-tolerance drilled shaft excavations shall be furnished at no cost to the Department.

L. Record Information

The Contractor shall provide the Department with the drilled excavation information as recorded on the approved log forms. For each drilled shaft foundation installed, the Contractor shall record on drilled shaft installation logs the location, alignment, dimensions, elevation of the top and bottom, depth of the bearing stratum penetration, description of the materials encountered at all elevations, description of any change in excavated material, elevation of the water table during excavation, condition of the bottom of the excavation and bearing surface, slurry test data, concrete data, verticality and deviation from plan location, drilling time for all changing layers, and other data called for on the drilled shaft log form or pertinent to the drilled shaft. The Contractor shall also record the theoretical volume of excavation, volume of concrete placed versus depth, and total volume of concrete placed. The Contractor shall report any observed irregularities to the Engineer within 8-hours of discovery.

When not indicated on the plans, contract documents, or provided by the Engineer, the Contractor is required to report minimum record information in accordance with FHWA Publication No. HI-88-042 rilled Shafts, Appendix G, *Inspection and Reporting Forms*, pp. 535-544. Copies of these reporting forms are included with this Special Provision as Appendix A. Submit draft record information for each completed shaft within 24-hours of completion. Submit final record drawings of each drilled shaft installed no more than three weeks after completion of the work. Maintain daily records of slurry testing in accordance with this Special Provision. Submit records on a daily basis, or more frequently if variation occurs.

M. Acceptance of Completed Drilled Shafts

The acceptance of each drilled shaft will be the decision of the Engineer, based on the results of the shaft integrity testing report(s) and other information on the shaft installation. Rejection of a shaft based on the shaft integrity testing shall require conclusive evidence that a defect exists in the shaft that will result in inadequate or unsafe performance under service loads. If the NDT records are inconclusive, the Engineer may

require coring or excavation of the shaft to verify shaft conditions. If a defect is confirmed, the Contractor shall pay for all coring or excavation costs and completing grouting of all core holes. If no defect is encountered, the Department shall pay for all coring or excavation costs, including grouting of all core holes.

If testing discloses voids or discontinuities in the concrete which, as determined by the Engineer, indicate that the drilled shaft is not structurally adequate, the shaft shall be rejected and construction of additional drilled shafts shall be suspended until the Contractor repairs, replaces or supplements the defective work, and the Engineer approves the remedial work. Suspension of drilled shaft construction shall remain in effect until the Engineer approves the Contractor written changes to the methods of drilled shaft construction as necessary to prevent construction deficiencies.

In the case that any shaft is determined to be unacceptable, the Contractor shall submit a plan for remedial action to the Engineer for approval. Any modifications to the foundation shafts and load transfer mechanisms caused by the remedial action will require calculations and working drawings stamped by a registered professional engineer for all foundation elements affected. All labor, calculations, drawings or other documentation and materials required to perform remedial shaft action shall be provided at no cost to the Department and with no extension of the contract time.

Method of Measurement:

Drilled shafts, complete in place, will be measured by the linear foot for each diameter of shaft listed in the estimated quantities. The length will be determined as the difference between the top of the shaft elevation shown on the plans and the final bottom of the surface of the drilled shaft excavation elevation, as authorized, complete, and accepted by the Engineer.

Basis of Payment:

Drilled shafts will be paid for at the contract unit price per linear foot, complete-in-place, and accepted by the Engineer. Such payment will be considered to be full compensation for all costs involved with shaft excavation, using slurry when necessary, removal from the site and disposal of excavated material, the furnishing and placing of concrete and reinforcing steel including all labor, materials, equipment, temporary and permanent casing, and incidentals necessary to complete the drilled shafts to the diameters and depths under the Contract Documents. Additional compensation will not be allowed for concrete required to fill oversized excavations and casings.

10/18/10

619511 - EXPLORATORY DRILLING

Description:

This work consists of subsurface exploration required to confirm the top of rock elevation and to characterize the approximate rock mass quality of the bedrock to a point 10 feet below.

Materials:

Materials for sand, water and cement shall conform to Section 818, 803 and 801 respectively.

Construction Methods:

A. Submit a boring plan and notify the Engineer at least 48 hours before drilling in any area. All borings on the plan are to be located horizontally and vertically by survey prior to drilling.

B. Perform air track drilling as directed in the presence of the Engineer. Advance the hole through the overburden without sampling using any approved drilling apparatus. Accurate logging of the drilling during construction will be important. Provide written documentation that all drillers performing work on this project have a minimum of five years or more experience. Do not proceed with this work until the Engineer has approved documentation detailing the experience of the drillers.

1. Provide downward pressure control air track drilling machinery of a type or types approved by the Engineer complete with all the accessories. Provide drilling(s) of sufficient size and capacity to carry on drilling operations in an efficient manner and provide holes of adequate size [minimum of 3 in diameter] through the bedrock.

2. Ensure that a plumb hole is attained when drilling. An open borehole must be maintained. As required, support the hole with casing advanced by driving or jacking. Seat the casing tightly in rock. Record the depth of overburden drilling through bedrock to elevations as indicated or directed. This casing is temporary and may be withdrawn at the time of grouting.

3. Provide a log of the boring including the depth of overburden and rock penetrated, methods used to advance the hole, methods used to advance the casing, length of casing installed, location of any voids encountered, and depths of loss of air pressure with its associated elevation. Also include a tabulation of time per foot (meter) of penetration for entire boring length, including any tool drops, and classification of cuttings.

C. Upon encountering any subsurface feature, such as soft zones, soil seams and/or voids the Engineer should be notified immediately. Each boring should obtain a minimum of 10 feet of continuous rock below the estimated pile tip elevation or bottom of footing elevation or as directed by the Engineer prior to termination. All borings on the submitted boring plan should be completed prior to any grouting. Use a grout mix ratio of 3 water:2 cement:2 sand.

Method of Measurement and Basis of Payment:

The quantity of Exploratory Drilling shall be measured and paid for at the Contract unit price per linear foot. The price and payments will include grout and the cost of furnishing and installing casing to maintain an open borehole is incidental to exploratory drilling.

2/10/10

619512 - PRE-DRILLING FOR END BEARING PILES

Description:

This work consists of drilling, maintaining open, and backfilling of holes for pile placement, with or without casing, to either the predetermined pile tip elevation or other elevation as directed by the Engineer.

Materials:

Materials for Fine Aggregate shall conform to Section 804.

Temporary casing shall be a protective steel pipe, typically cylindrical shape, installed by drilling, driving, or vibrating, which provides lateral earth support during pre-drilling; controls groundwater infiltration; and is removed as part of the annulus sand placement operation.

Construction Methods:

A. Provide a pre-drilled hole with a minimum diameter of 3 greater than the diagonal dimension of the pile cross-section.

B. Advance the pre-drilling in accordance with one of the following two criteria:

1. Predetermined pile tip elevation.
2. As determined by the Engineer based on results of test piles or Exploratory Air Track Drilling.

C. Maintain an open hole. If steel casing pipe is used, the pipe may or may not be left in place. If the steel casing is left in place, perform drilling operations in a manner to ensure that a tight fit is achieved with no significant annular space between the borehole and the outside face of the casing. If the casing is removed, withdraw casing at a rate that keeps the bottom of the casing equal to the top of the aggregate backfill.

D. Backfill the drilled hole with fine aggregate. Place the pile prior to backfilling. Place the aggregate backfill in one continuous operation. Properly seat placed piles with the backfill in place. If necessary, place additional fine aggregate after driving as required to fill the annular space up to the subgrade elevation.

Method of Measurement:

The quantity for Pre-Drilling for End Bearing Piles shall be measured and paid for at the Contract unit price per linear foot. Measurement shall be from the bottom of the footing excavation to the end of the pre-drilled hole. Payment will include furnishing and placing backfill material. Temporary or permanent casing will be considered incidental to drilling operations. Payment of the Contract unit price will be made regardless of the material through which the drilled hole is advanced. Payment will not be made for portions of the drilled hole that require re-drilling to advance the pile.

2/10/10

619519 - DYNAMIC PILE TESTING BY CONTRACTOR

Description:

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

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

Materials and Construction Methods:

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

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

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

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

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

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

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

All dynamically tested piles shall be driven to an adequate depth to achieve the minimum tip elevation and the minimum initial driving resistance specified by the Engineer. Should the field data indicate the hammer system is not transferring to the pile the full energy anticipated at the end of initial drive, the Contractor shall increase the hammer stroke and/or driving resistance until the minimum initial drive capacity is displayed on

the dynamic testing apparatus. However, in no case, shall the permissible stress limits be exceeded.

The Contractor shall maintain a minimum distance of 1 foot (300 mm) between the pile monitoring gages and the ground surface, water surface, or pile template. If additional ground penetration is required, the driving shall be halted, the gages removed and the pile spliced before proceeding with additional driving and monitoring. Prior to splicing, the pile splice segment shall be properly prepared for gage installation in accordance with ASTM D4945 and made accessible to DelDOT for inspection. After the pile has been properly spliced and the hammer and leads have been reset, the gages shall be reattached to the new pile segment and the drive continued.

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

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

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

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

Reporting

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

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

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

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

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

Method of Measurement:

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

Basis of Payment:

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

10/22/07

701500 - INTEGRAL PORTLAND CEMENT CONCRETE CURB AND GUTTER, SPECIAL

Description:

This work consists of furnishing all materials and constructing special curb and gutter in accordance with locations, notes, and details on the Plans; the Standard Specifications; and as directed by the Engineer.

Materials and Construction Methods:

Materials and construction methods for curb and gutter, special shall conform to the requirements of Section 701 of the Standard Specifications, and the notes and details on the Plans.

Method of Measurement and Basis of Payment:

The quantity of curb and gutter, special will be measured and paid for in accordance with Subsections 701.15 and 701.16 of the Standard Specifications.

10/29/01

705509 - PATTERNED PORTLAND CEMENT CONCRETE SIDEWALK, 4"
705519 - PATTERNED PORTLAND CEMENT CONCRETE SIDEWALK, 6"

Description:

This work consists of furnishing all materials and constructing a patterned/imprinted Portland cement concrete sidewalk in accordance with notes and details on the Plans, their specifications and as directed by the Engineer.

Materials:

Materials shall conform to Subsections 705.02, 705.03 and 705.04, and other as modified herewith. In case of a conflict, the requirements of the manufacturer shall govern.

The imprinted concrete shall be colored using ready to use dry-shake type hardener and shall be streak free integrands of pigments, include surface conditioning and dispersing agents. The color hardener shall have a sufficient history of use with proven durability and stability. All shake hardener shall be distributed evenly by mechanical spreader.

The dispersing/ releasing agent shall be clear liquid compatible with color hardener. This shall be specifically formulated to prevent bonding of texturing tools to the concrete surfaces. The powdered pigmented dispersing/-releasing agent can be allowed, if this is of the same color as hardener and recommended by the manufacturer.

The imprinted concrete shall be sealed with penetrating sealer of acrylic polymer in the organic solvent having sufficient resistant to discoloration, abrasion, acids and alkalis.

All materials including hardener, dispersing agent, sealer shall be compatible and preferably manufactured by the same manufacturing firm.

The colors shall be as depicted on the Plans. Modifications of color during the sample approval process shall not affect bid prices.

To assure a high quality imprinted/stamped concrete, work should be performed by experience contractor must have minimum 5-year experience dealing with stamped concrete and must be approved by the manufacturer. The contractor shall submit materials source of materials, previous successful history of work to Materials & Research for approval. A sample of minimum size of 3’x3’ for each pattern of patterned concrete sidewalk for shall be submitted for color and design approval from the Engineer. Any necessary changes to the color will be directed by the Engineer.

Construction Methods:

Construction methods shall conform to the applicable requirements of Subsections 705.05 through 705.10, the recommendations of the manufacturer, and as modified herewith. In case of a conflict, the requirements of the manufacturer shall govern.

Special concrete mix shall be placed and screened to the proper grade and floated to a uniform surface in the normal manner. The depth of the concrete sidewalk shall be as noted on the Plans.

Color hardener shall be applied evenly to the concrete while in the plastic, stage of set by dry shake method using a minimum of 60 lbs per 100 sq-ft. It shall be applied in two or more shakes, floated after each and trowel led only after the final floating. The first shake shall consume two third of materials, one third being withheld for the second shake and final touch up. Release agent and sealer shall be applied in accordance with manufacturers instructions.

While concrete is still in plastic stage of set, the imprinting tools shall be applied to make the desired pattern and texture. The patterns shall be as noted on the Plans.

Method of Measurement and Basis of Payment:

Method of Measurement and Basis of Payment shall be in accordance with Subsection 705.11 Method of Measurement and 705.12 Basis of Payment respectively.

12/5/06

708505 - JUNCTION BOX, SPECIAL

Description:

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

Materials:

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

Construction Methods:

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

Method of Measurement:

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

Basis of Payment:

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

8/15/05

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

Description:

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

Materials and Construction Methods:

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

Method of Measurement and Basis of Payment:

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

10/29/01

708582 – MANHOLE, SPECIAL

Description:

This work consists of furnishing materials and constructing a manhole as specified on the Plans, and as directed by the Engineer. It includes connecting to new and/or existing pipe(s), concrete masonry, reinforcing and forms, all in conformity with the details on the Plans and these Specifications.

Materials and Construction Methods:

Materials and construction of the manhole shall conform to the applicable subsections of Section 708 of the Standard Specifications. Concrete shall conform to Class A, Section 812, of the Standard Specifications. Bar reinforcement shall conform to Sections 603 and 604 of the Standard Specifications.

Method of Measurement:

The quantity of special manholes will be measured as the actual number of manholes constructed, complete in place and accepted.

Basis of Payment:

The quantity of special manholes will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing and placing materials, including bar reinforcement, removal of portions of existing pipe, frame and grate and/or cover, and for all labor, equipment, tools, and incidentals necessary to complete this item. The excavation and backfilling for the special manhole shall be made under the item 207000 of this contract. The furnishing and placing of the #57 stone base shall be made under the item 302012 of this contract. The furnishing of Borrow Type C for structure backfill shall be made under the item 210000 of this contract.

708583 - PERSONNEL GRATE FOR PIPE INLET

Description:

This work consists of furnishing all materials, fabricating, delivering and constructing personnel grates for pipe inlets in accordance with the Standard Details, at locations as shown on the Plans, as directed by the Engineer and as required by these Special Provisions.

Materials:

Materials shall conform to the requirements of Sections 603 and 612 and shall be galvanized in accordance with Subsection 826.07 including all rebar, hardware and fasteners as shown on the Standard Details.

Working drawings shall be submitted in accordance with Subsection 105.04.

Construction Methods:

Personnel grates for pipe inlets shall be constructed based on the Standard Details and at the size and locations shown on the Plans.

Method of Measurement:

The number of inlet grates to be paid for under this item shall be the actual number of inlet grates installed and accepted.

Basis of Payment:

The quantity of personnel grate for pipe inlet will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing, hauling and installing materials, including bar reinforcement; for excavating including removal and disposal of existing end sections, backfilling, and compacting; for cribbing, shoring, sheeting, coating, and paving; and for all labor, materials, equipment, tools, and incidentals required to complete the work. Design services for the personnel grate for pipe inlet including the preparation and submittal of working drawings shall be incidental to this item.

8/23/10

710502 - ADJUSTING CATCH BASINS
710504 - ADJUSTING MANHOLES

Description:

This work consists of adjusting the catch basins frames and grates and/or manholes frames and covers to match proposed grades as indicated on the Plans and/or as directed by the Engineer.

Materials:

The materials required for adjustment/construction shall conform to the requirements of Section 710 of the Standard Specifications.

Construction Methods:

Frames, grates and covers of catch basins and/or manholes as applicable shall be removed prior to paving operations and all masonry found in poor condition within 1.5 feet (0.5 meters) from the top of the grates shall be removed and rebuilt with materials conforming with the existing structures and as indicated herein

Method of Measurement:

The quantity of catch basins and/or manholes adjusted will be measured as the actual number of each completed and accepted.

Basis of Payment:

The quantity of catch basins and/or manholes adjusted will be paid for at the Contract unit price per each. Price and payment shall constitute full compensation for furnishing and placing all materials, excavation, backfill and backfilling, removing and resetting the grates, frames, covers as applicable, for all labor, equipment, tools and necessary incidentals to complete the work.

8/28/01

712524 - CONCRETE SLOPE PAVING REPAIR, 4"

Description:

This work consists of removing and disposing of the existing deteriorated material, furnishing new material and constructing the concrete slope paving in accordance with the locations, notes and details on the Plans and as directed by the Engineer.

Materials:

All concrete shall be Class B, and shall conform to the requirements of Section 812 of the Standard Specifications.

Preformed expansion joint filler material shall conform to the requirements of AASHTO M 153, Type I.

Hot-poured joint sealer shall conform to the requirements of Section 808, Material Details.

Wire mesh reinforcement shall meet the requirements of AASHTO M 55.

Construction Methods:

The foundation on which the concrete is to be placed shall be shaped to an even surface and to the required grade. Cavities and depressions in the foundation shall be filled with Borrow Type C. Immediately prior to the placing of concrete the surface shall be thoroughly compacted and dampened. The crack control grooves shall be made as shown on the Plans. The top edges of the grooves or construction joints shall be rounded to a 1/4" (6 mm) radius.

The concrete shall be thoroughly spaded, and shall be struck-off to the required finished grades and slopes by means of an approved screed. Before the initial set of the concrete, it shall be finished with a wood float to an even, smooth surface at proper grade.

The wire mesh reinforcement shall be either blocked-off the subgrade to the required elevations by means of concrete blocks, and the concrete placed in one course, or the concrete ma be placed in two courses with the wire fabric placed after the first course has been placed and struck off. Should the Contractor elect to construct the slope paving in two courses, the first course shall be struck-off by means of a screed operated from the forms, and the second course placed within 30 minutes, and before the first course has begun to attain its initial set.

Sheets of wire mesh reinforcement shall overlap each other a sufficient amount to maintain uniform strength, and shall be securely fastened to each other at the ends and edges. The edge lap shall not be less than one mesh. Wire mesh reinforcement shipped in rolls shall be straightened into flat sheets before being placed.

A 1/2" (13 mm) preformed expansion joint sealed with hot-poured joint sealer shall be placed between the concrete slope paving and bridge abutment, wing wall and piers.

Only those joints adjacent to or abutting any other object or structure shall be sealed with a hot-poured joint sealer. it will not be necessary to seal the joints within the perimeter of the slope paving.

The concrete shall be cured in accordance with the requirements of Section 501.

Method of Measurement:

The quantity of concrete slope paving repair will be measured as the number of square feet (meters) measured at surface of the slope paving repaired and accepted.

Basis of Payment:

The quantity of concrete slope paving repair will be paid for at the Contract unit price per square foot (meter). Price and payment shall constitute full compensation for saw cutting, removal and disposal, furnishing and placing all materials, furnishing and placing foundation material, foundation preparation, vegetation and debris removal, for all labor, equipment, tools, and necessary incidentals to complete the work.

11/10/04

712527 - TURF REINFORCING MAT

Description:

This work consists of furnishing and installing turf reinforcing mat in accordance with this specification, details and notes on the Plans and as directed by the Engineer.

Materials:

Unless otherwise noted on the Plans, the turf reinforcing mat shall meet the following requirements:

Property	Test Method	English	Metric
Tensile Strength	ASTM D-4595 ASTM D-5035	3,200 x 2,200 lb/ft 3,100 x 2,000 lb/ft	46.7 x 32.1 kN/m 45.2 x 29.2 kN/m
Tensile Elongation	ASTM D-4595 ASTM D-5035	80% (max) 55% (max)	80% (max) 55% (max)
Tensile Strength @ 10% Elongation	ASTM D-4595	1,850 x 1,600 lb/ft (typ)	27.0 x 23.4 kN/m (typ)
UV Resistance @ 1000 hours	ASTM D-4355	80%	80%
Thickness	ASTM D-1777	0.5 in	12.7 mm
Resiliency	ASTM D-1777	80%	80%
Mass Per Unit Area	ASTM D-5621	14 oz/sq. yd.	475 g/m²
Ground Cover Factor	Light Projection Analysis	75%	75%

Performance	Maximum Permissible Values	
	Short-Term (1/2 hr)	Long-Term (50 hrs)
Velocity		
Vegetated	7.6 m/sec (25 ft/s)	4.3 m/sec (14 ft/s)
Unvegetated	6.1 m/sec (20 ft/s)	3.0 m/sec (10 ft/s)
Shear Stress		
Vegetated	48.9 kg/m² (10 lb/sq.ft.)	29.3 kg/m² (6 lb/sq.ft.)
Unvegetated	39.2 kg/m² (8 lb/sq.ft.)	14.7 kg/m² (3 lb/sq.ft.)

Any reinforcing mat with manufacturing defects, or damage incurred during transportation or storage shall be rejected.

Ground anchoring devices for securing the reinforcing mat shall be U-shaped wire staples or metal pins, or approved equal. Wire staples shall be 8 gauge minimum. Metal pins shall be 3/16" (4.76 mm) diameter steel minimum 10" (250 mm) long with a 1-1/2" (38 mm) steel washer at the head of the pin.

Construction Methods:

Site preparation including grading, adding lime and fertilizer to the soil and seeding prior to installing the reinforcing mat shall be performed under separate respective items of this contract.

Reinforcing mat placement and anchoring shall be performed in accordance with Standard Construction Detail E-25 Turf Reinforcement Mat Application, notes and details on the Plans and as directed by the Engineer. However, all rocks, clods, vegetation on other obstructions conflicting with the installation process shall be removed under this item.

Method of Measurement:

The quantity of turf reinforcing mat will be measured in square yards (square meters) of top surface area

covered and accepted. The overlapped area of the mat shall not be measured twice.

Basis of Payment:

The quantity of turf reinforcing mat will be paid for at the Contract unit price per square yard (square meter). Price and payment will constitute full compensation for furnishing all materials and installing same, for all labor, equipment, tools and incidentals necessary to complete work.

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

720506 - RELOCATING PORTABLE P.C.C. SAFETY BARRIER

Description:

This work consists of relocating the P.C.C. Safety Barrier at the job site to locations indicated on the Plans and/or as directed by the Engineer.

Construction Methods:

The relocations under this item shall be made once the initial placements of the P.C.C. Barriers are completed and accepted under the item(s) 720567 - Furnish and Maintain Portable P.C.C. Barrier.

The relocation(s) may be made for temporary storage at job site for later use, or relocation(s) required by the Plans and/or as directed by the Engineer at the construction sites. The vertical surfaces of the barriers to be exposed to the moving traffic, shall be painted with white latex paint prior to each relocation. Also, the barriers shall be painted every six-months after relocation if left at the same location and shall be painted before the winter shut-down in the Fall.

Method of Measurement:

The quantity of portable P.C.C. safety barrier relocated will be measure in linear feet (meters) of barrier relocated.

Basis of Payment:

The quantity of portable P.C.C. safety barrier relocated will be paid for at the Contract unit price per linear foot (meter). Price and payment will constitute full compensation for relocating the barriers, temporary storage at the job site, furnishing paint and painting, maintenance, for all labor, tools, equipment and necessary incidentals to complete the work.

01/21/01

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

Description:

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

Materials:

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

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

Construction Methods:

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

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

Method of Measurement:

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

Basis of Payment:

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

10/29/01

720526 - FURNISHING PORTABLE P.C.C. STRUCTURE-MOUNTED SAFETY BARRIER

Description:

The work under this item shall consist of furnishing at the job site(s) Portable P.C.C. Structure-Mounted Safety Barrier, as required by the contract; placing the barrier at locations in accordance with the notes and details of the Plans.

Materials and Construction Methods:

Materials shall conform to the requirements listed on the contract plan and as noted herein.

Portland cement concrete shall have a minimum compressive strength of 4,000 psi, and shall conform to the material requirements of Class A Concrete, Section 812 of the Standard Specifications.

Bar reinforcement shall conform to Section 603 or 604 of the Standard Specifications.

Galvanized anchor bolts, washers and nuts shall conform to ASTM A325.

The barriers shall be constructed in conformity with the applicable requirements of Sections 602, 603 and 604 of the Standard Specifications. Detailed Plans shall be submitted to the Engineer for approval. Design of the concrete, the reinforcement and the anchor bolting system shall meet the requirements of the AASHTO Standard Specifications for Highway Bridges, I, 2.7.1.3.6 and I, 2.7.3.2. The bolting system may be designed to utilize threaded inserts cast into the deck or bolts, with an adhesive anchor system which will provide sufficient strength while permitting the bolt to be unscrewed when no longer in use. The adhesive anchor system shall be the same as or similar to the Kelibond/Keligroutin polyester resin system, as manufactured by Kelken-Gold, Inc., South Plainfield, NJ.

Holes in the deck shall be located and drilled in such a manner as to avoid previously placed reinforcement bars. The Contractor shall use an acceptable magnetic locator, such as the James Pachometer Model C-4946 or the Profometer by Proceq or an approved equal to locate the holes and shall be prohibited from using a rotary drill. A percussion-type drill will be acceptable.

Joints between sections of the Portable P.C.C. Structure-Mounted Safety Barriers shall be connected.

Prior to placing the barrier on the construction site at the location(s) shown on the Plans, and as directed, the exposed surfaces of the barriers shall be painted with acceptable exterior white latex acrylic paint.

Workmen or equipment movements shall not be allowed to traverse between the barricaded areas, and the travel lanes, except as approved by the Engineer; and then only with an adequate number of flagmen to safeguard workmen and traffic, in advance of, and at the point where the barricade is opened.

Warning lights, reflectors, and other traffic protective devices shall be placed in accordance with the manual "Delaware Traffic Controls for Street and Highway Construction and Maintenance Utility and Emergency Operations", (latest edition with all revisions till the date of advertisement). Payment for these traffic protective devices shall be made under the applicable bid items elsewhere in the proposal.

Following the removal of the safety barrier after its use, the bolt holes in the bridge deck shall be filled with repair mortar.

Repair mortar shall be one of the following products, or an approved equal:

1. Gold Label, Standard, as manufactured by:

Preco Industries, Limited
Skyline Drive
Plainview, New York 11803

2. Sikaset Mortar (544), as manufactured by:

Sika Corporation
P.O. Box 297
Lyndhurst, New Jersey 07071

3. Set Vertipatch, as manufactured by:

Master Builders
Cleveland, Ohio 44122

Basis of Payment:

The payment for the item as required by the contract shall be made at the unit price per Linear Foot bid for "Furnishing Portable P.C.C. Structure-Mounted Safety Barrier", which price and payment shall constitute full compensation for furnishing all required materials, constructing the barrier, placing, maintaining, painting, removing, repairing the bolt holes, transporting and storing, as directed, for all labor, equipment, tools, and incidentals necessary to complete the work.

720532 - INSTALL PORTABLE IMPACT ATTENUATOR
720534 - FURNISH PORTABLE IMPACT ATTENUATOR
720539 - RELOCATE PORTABLE IMPACT ATTENUATOR

Description:

Work under these items shall consist of furnishing, installing, maintaining, repairing, and relocating portable impact attenuators under the proper item(s) as required to protect the various construction work zones in accordance with these specifications and/or as directed by the engineer in the field.

Materials:

The impact attenuator shall be an energy-absorbing, non-gating, redirectional device meeting the requirements of the NCHRP Report 350, Test Level 3. The configuration of the device shall be as specified (in published literature) by the manufacturer for the design speed indicated on the Plans. Dimensional requirements, if any, shall be as noted on the Plans.

No system that requires removal from site for repairs shall be accepted.

An example of such a portable impact attenuator is a modular plate, QuadGuard CZ, 6 Bay, 24" wide unit manufactured by Energy Absorption Systems, Inc.

Construction Methods:

Installation of the attenuator system shall be accomplished by experienced workmen in accordance with the manufacturer's recommendations. The Contractor shall provide written certification that the impact attenuator has been properly installed. Such certification shall be to insure that the attenuator system device is crash-worthy according to the manufacturer's current specifications. Certification must be provided within 24 hours of the installation of the attenuator system.

Each attenuator system must be re-inspected and recertified after relocation.

The Contractor shall furnish (720534), install (720532) and relocate (720539) the attenuator system in project locations in accordance with these specifications and/or as directed by the Engineer in the field. Additionally, the Contractor shall furnish (720534) two complete replacement (stand-by) attenuator systems and store on site. If an installed attenuator is damaged, requiring replacement, the Contractor shall remove the damaged attenuator, install (720532) the replacement (stand-by) attenuator, and re-order a replacement (stand-by) attenuator system to be furnished to the project site (720534). If additional replacement (stand-by) attenuator systems are required on this contract, the procedure for payment outlined above will continue to be followed.

Relocate Portable Impact Attenuator (720539) shall constitute removal of an undamaged, previously installed attenuator system; any temporary storage, and re-installation relocation of the attenuator system to another location on the site. Installation of a relocated unit will be paid under Item 720532, Install Portable Impact Attenuator System.

The attenuator system shall be repaired or replaced within 24 hours of the time when the Contractor is notified. After repair or replacement is completed as described above, re-inspection and recertification is required. The Contractor shall provide a 24-hour emergency contact, specifically for the repair or replacement of the attenuator system.

When no longer needed on the contract, any undamaged attenuator system(s) and the stand-by system shall become the property of the Contractor. Damaged attenuators will become the property of the Contractor.

Basis of Payment:

The payment for this item as required by the contract shall be made for the actual number of "Furnish Portable Impact Attenuator" furnished at the unit price bid per each, the actual number of "Install Portable Impact Attenuator" installed at the unit price bid per each, and the actual number of relocations performed under the item "Relocate Portable Impact Attenuator", as required and approved by the Engineer at the unit price bid per each relocation. The prices under these items shall constitute full compensation for furnishing, installing, maintaining, relocating, delivery to the site, removal from the site, all labor, equipment, tools, and incidentals necessary to complete the work. When attenuators are damaged by the public and replaced with a stand-by attenuator by the contractor, the replacement will be paid for as one (1) installation.

All maintenance of traffic costs associated with portable impact attenuator replacement or repairs shall be paid for under the unit price bid for the respective maintenance of traffic items. Attenuators damaged by the Contractor shall be repaired or replaced at the Contractor's expense.

9/30/09

720540 - DELINEATORS

Description:

This work consists of furnishing, installing, relocating, maintaining, and removing high performance flexible plastic channelization and delineation devices. These devices are to be bonded on or embedded in asphalt or concrete surfaces.

Materials and Construction Methods:

The material for the delineator posts shall be of a flexible plastic which shall be resistant to impact, ultra violet light, ozone, hydrocarbons, and shall remain impact resistant from -30^{0}F to 140^{0}F (-34^{0}C to +60^{0}C).

The reflector shall be of impact resistent reflective sheeting which shall be subject to approval by the Department.

The delineator(s) shall meet the requirements of the DE MUTCD (Delaware Manual on Uniform Traffic Control Devices) (latest edition with all revisions made up to the date of Advertisement of this project) and as stated on the Plans.

The post shall exhibit good workmanship and shall be free of burns, discoloration, contamination, and other objectional marks or defects which affect appearance of serviceability.

Installation of delineators on or in asphalt or concrete surfaces shall be as specified by the manufacturer of the delineators. The method of installation must provide for easy replacement of damaged delineators.

It is required that the Contractor will keep spare delineators at site for replacement of the damaged delineators immediately. The Contractor shall be liable for the damage caused as a result of his failure to replace the damaged delineators immediately.

The payment for replacement of each damaged delineator shall be made at the Contract unit bid price for Delineators after the number is verified by the Engineer. No payment shall be made for delineators damaged by the Contractor vehicles during construction.

Method of Measurement:

The quantity of delineators will be measured as the actual number of delineators installed and accepted.

Basis of Payment:

The quantity of delineators will be paid for at the Contract unit price per Each. Price and payment shall constitute full compensation for furnishing, installing, relocating, maintaining, and removing after no longer required; and for all labor, tools, equipment, and necessary incidentals to complete the work.

7/23/02

720544 - REFLECTORS, WHITE, CONCRETE
720545 - REFLECTORS, YELLOW, CONCRETE

Description:

This work consists of furnishing and installing white and/or yellow reflectors on P.C.C. Safety Barrier or on concrete surfaces in accordance with the details and at the designated locations as shown on the Plans and/or as directed by the Engineer.

Materials and Construction Methods:

The reflector and related hardware shall be approved prior to its installation.

The reflector unit shall be installed to the P.C.C. Safety Barrier or to any other required concrete objects in accordance with the manufacturer's recommendations and/or notes on the Plans.

Method of Measurement:

The quantity of reflectors will be measured as the actual number of reflectors installed and accepted.

Basis of Payment:

The quantity of reflectors will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing the reflector, installing, labor, equipment, tools, and incidentals necessary to complete the work.

10/29/01

720550 - PORTLAND CEMENT CONCRETE BARRIER, MODIFIED

Description:

This work consists of furnishing all materials and constructing the Portland Cement Concrete Barrier, Modified in accordance with the locations, details, and notes shown the Plans, and/or as directed by the Engineer.

Material:

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

Bar reinforcement shall meet the requirements of AASHTO M 31M, Grade 400.

Corrugated Polyethylene Tubing shall meet the requirements of AASHTO M 252.

Stone backfill shall conform to Section 813, DE No. 57 Stone.

Filter Fabric shall meet the requirements of AASHTO M 288.

Construction Methods:

Construction methods shall conform with the applicable subsections of Sections 602 and 603 of the Standard Specifications, and details shown on the Plans. Underdrain construction shall conform to Section 715.06 of the Standard Specifications.

The Contractor shall have the option of constructing the modified barriers by selecting Cast-In-Place, or Pre-Cast methods. The Contractor shall submit his plans for the selected method to the Department's Materials and Research Section for approval.

Method of Measurement:

The quantity of modified Portland Cement Concrete Barrier will be measured in linear feet (linear meters) along the toe of the barrier, installed in place and accepted.

Basis of Payment:

The quantity of modified Portland Cement Concrete Barrier will be paid for at the Contract unit price bid per linear foot (linear meter). Price and payment will constitute full compensation for all material, formwork, sawing of joints, reinforcement bars, and concrete all complete in place and accepted, for all labor, equipment, tools and incidentals necessary to complete the work. Payment for excavation shall be made elsewhere in the contract.

10/26/10

720551 - RELOCATING PORTABLE P.C.C. STRUCTURE-MOUNTED SAFETY BARRIER

Description:

The item shall consist of relocating the P.C.C. Structure Mounted Safety Barrier at locations of the job site as indicated on the Plans and/or as directed by the Engineer.

Construction Methods:

The relocations under this item shall be made once the initial placements of the P.C.C. Structure-Mounted Barriers are completed and accepted under the item 720526 - Furnishing Portable P.C.C. Structure mounted Safety Barrier as applicable to this Contract.

The relocation(s) may be made for temporary storage at job site for later use or relocation(s) required by the Plans and/or as directed by the Engineer at the construction sites. The vertical surfaces of the barriers to be exposed to the moving relocation. Also, the barriers to be exposed to the moving traffic, shall be painted with white latex paint prior to each relocation. Also, the barriers shall be painted every six-months after relocation if left at the same location and shall be painted before the winter shut-down in the Fall.

Method of Measurement and Basis of Payment:

The measurement for the item shall be made as the number of linear feet and the payment shall be made for at the Contract unit price per Linear Foot bid for item "720551 - RELOCATING PORTABLE P.C.C. STRUCTURE-MOUNTED SAFETY BARRIER", which price and payment shall constitute full compensation for relocating the barriers, temporary storage at the job site, furnishing paint and painting, maintenance, for all labor, tools, equipment and necessary incidentals to complete the work.

720567 - FURNISH AND MAINTAIN PORTABLE P.C.C. SAFETY BARRIER

Description:

The item shall consist of furnishing and placing Portable P.C.C. Safety Barrier at the locations in accordance with the notes and details on the Plans and as directed by the Engineer. After the completion of the project, the safety barrier shall become the property of the Contractor and shall be removed from the project site.

General Requirements:

All barrier provided to satisfy this special provision shall be certified to be crashworthy in accordance with the National Cooperative Highway Research Program (NCHRP) Report 350 and the memorandum issued August 28, 1998 by the USDOT Federal Highway Administration **Information:** Crash Tested Work Zone Traffic Control Devices.

For new barrier, the Contractor shall submit to the Engineer the Federal Highway Administration NCHRP-350 acceptance letter prior to acceptance.

An exception to this requirement is barrier that:

1.) Was manufactured prior to October 1, 2002.

2.) Is constructed of Class A concrete (as defined in Section 812 of the Standard Specifications) and is adequately reinforced.

3.) Has a joint system that provides a positive connection between adjacent segments that can transfer tension and moment in a vertical plane across the joint [The Contractor must certify that the joint system provided has been tested and found acceptable under National Cooperative Highway Research Program (NCHRP) Report 230 test criteria].

For this barrier, the Contractor shall certify, in writing to the Engineer prior to installation, that his/her barrier meets the above three (3) conditions.

On each project, the Contractor shall use only one type of barrier. All sections of barrier shall be of equal length and use the same type connector.

For DelDOT administered projects the certification (for new barrier or barrier manufactured prior to October 1, 2002) shall be submitted to the Engineer prior to installation.

The barriers shall be placed on the construction site at the location(s) shown on the Contract Plans, and as directed by the Engineer. The vertical surface of the barriers to be exposed to the moving traffic, shall be painted with white latex paint prior to the initial installation. The barriers shall be painted every six months after the initial placement if left at the same location and shall also be painted before the Winter shut down in the Fall.

Workmen or equipment movements shall not be allowed to traverse between the barricaded areas and the travel lanes, except as approved by the Engineer. However, after obtaining the approval, adequate number of flaggers shall be provided to safeguard workmen and traffic, in advance of, and at the point where the barrier is opened.

Warning lights, reflectors, and other traffic protective devices shall be placed in accordance with the DE MUTCD (Delaware Manual on Uniform Traffic Control Devices) (latest edition with all revisions made up to the date of Advertisement of this project) and as directed by the Engineer. Payment for these traffic protective devices shall be made under the applicable bid items elsewhere of this Contract.

Method of Measurement and Basis of Payment:

The measurement of the item shall be made along the centerline of the barrier as the number of linear feet (meters) and payment shall be made at the Contract unit price per linear foot (meter) bid for the item "Furnish and Maintain Portable P.C.C. Safety Barrier", which price and payment shall constitute full compensation for furnishing, placing, painting, and maintaining, for all labor, equipment, tools, and incidentals necessary to complete the work. Furnishing and Maintaining of Portable P.C.C. Barrier End Section, and/or Curved Sections if required and specified on the Plans, shall be treated as Item 720567 for measurement and payment and other requirements.

Payment for all subsequent relocations after initial placement performed under this item shall be made under the item 720506 - Relocating Portable P.C.C. Safety Barriers of this Contract.

5/14/02

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 50:1 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.

7/19/02

720620 - FURNISH AND MAINTAIN PINNED PORTABLE P.C.C. SAFETY BARRIER, SINGLE FACE
720636 - FURNISH AND MAINTAIN PINNED PORTABLE P.C.C. SAFETY BARRIER, DOUBLE FACE

Description:

This item shall consist of furnishing and placing Pinned Portable P.C.C. Safety Barrier, Single Face and Pinned Portable P.C.C. Safety Barrier, Double Face at the locations in accordance with the notes and details on the Plans and as directed by the Engineer. After the completion of the project, the safety barrier shall become the property of the Contractor and shall be removed from the project site.

General Requirements:

All barrier provided to satisfy this special provision shall be certified to be crashworthy in accordance with the National Cooperative Highway Research Program (NCHRP) Report 350 and the memorandum issued August 28, 1998 by the USDOT Federal Highway Administration **Information:** Crash Tested Work Zone Traffic Control Devices.

The Contractor shall submit to the Engineer the Federal Highway Administration NCHRP-350 acceptance letter prior to acceptance.

On each project, the Contractor shall use only one type of barrier. All sections of barrier shall be of equal length and use the same type connector.

For DelDOT administered projects the certification shall be submitted to the Engineer prior to installation.

The Contractor shall also submit shop drawings to the Engineer for the pinned barrier prior to installation along with a certification that the pinning system provided has been tested and found acceptable in accordance with NCHRP Report 350.

The barriers shall be placed on the construction site at the location(s) shown on the Contract Plans, and as directed by the Engineer. The vertical surface of the barriers to be exposed to the moving traffic, shall be painted with white latex paint prior to the initial installation. The barriers shall be painted every six months after the initial placement if left at the same location and shall also be painted before the Winter shut down in the Fall.

Workmen or equipment movements shall not be allowed to traverse between the barricaded areas and the travel lanes, except as approved by the Engineer. However, after obtaining the approval, adequate number of flaggers shall be provided to safeguard workmen and traffic, in advance of, and at the point where the barrier is opened.

Warning lights, reflectors, and other traffic protective devices shall be placed in accordance with the DE MUTCD (Delaware Manual on Uniform Traffic Control Devices) (latest edition with all revisions made up to the date of Advertisement of this project) and as directed by the Engineer. Payment for these traffic protective devices shall be made under the applicable bid items elsewhere on this Contract.

The pinning of each barrier section shall consist of 4 - #5 bars of 4' 0" length spaced 3' apart. The bars shall be inserted through the toe of barrier along the traffic side. The top of bar shall be flush with the surface of this barrier. A minimum of 2' embedment of each bar into the ground is required. Drill 1" diameter holes through the pavement before driving the pinning bars. Following the removal of the safety barrier after its use, backfill the holes with a non-shrink grout.

Method of Measurement and Basis of Payment:

The measurement of the item shall be made along the centerline of the barrier as the number of linear feet (meters) and payment shall be made at the Contract unit price per linear foot (meter) bid for the item "Furnish and Maintain Pinned Portable P.C.C. Safety Barrier, Single Face" and “Furnish and Maintain Pinned Portable P.C.C. Safety Barrier, Double Face”, which price and payment shall constitute full compensation for furnishing, placing, pinning, painting, and maintaining, for all labor, equipment, tools, and incidentals necessary to complete the work. Furnishing and Maintaining of Pinned Portable P.C.C. Barrier End Section, and/or Curved Sections if required and specified on the Plans, shall be treated as Item 720620 and 720636 for measurement and payment and other requirements.

Payment for all subsequent relocations after initial placement performed under this item shall be made under the item 720621 - Relocating Pinned Portable P.C.C. Safety Barriers of this Contract.

11/2/10

720621 - RELOCATING PINNED PORTABLE P.C.C. SAFETY BARRIER

Description:

This work consists of relocating the Pinned P.C.C. Safety Barrier, Single Face and Pinned P.C.C. Safety Barrier, Double Face at the job site to locations indicated on the Plans and/or as directed by the Engineer.

Construction Methods:

The relocations under this item shall be made once the initial placements of the Pinned P.C.C. Barriers are completed and accepted under the item(s) 720620 - Furnish and Maintain Pinned Portable P.C.C. Barrier, Single Face and 720636 - Furnish and Maintain Pinned Portable P.C.C. Safety Barrier, Double Face.

The relocation(s) may be made for temporary storage at job site for later use, or relocation(s) required by the Plans and/or as directed by the Engineer at the construction sites. The vertical surfaces of the barriers to be exposed to the moving traffic, shall be painted with white latex paint prior to each relocation. Also, the barriers shall be painted every six-months after relocation if left at the same location and shall be painted before the winter shut-down in the Fall.

The pinning of the barrier shall be in accordance with items 720620 and 720636.

Method of Measurement:

The quantity of pinned portable P.C.C. safety barrier relocated will be measure in linear feet (meters) of barrier relocated.

Basis of Payment:

The quantity of pinned portable P.C.C. safety barrier relocated will be paid for at the Contract unit price per linear foot (meter). Price and payment will constitute full compensation for relocating the pinned barriers, temporary storage at the job site, furnishing paint and painting, maintenance, for all labor, tools, equipment and necessary incidentals to complete the work.

9/2/10

734551 – NATIVE GRASS SEEDING: NO MOW MIX

Description:

The work included in this item shall consist of providing an acceptable uniform stand of established perennial native grass, including mulching, on all areas to be treated as shown on the plans or where designated by the Engineer.

Materials:

Native Grass Seeding: No Mow Mix

Mulch: Small Grain Straw- Straw for mulching shall be from oats, wheat, rye or other approved grain crops that

Species Name Common / *(Latin)*	Max. % Weed Seeds	Min % Purity	Min % Germination	Seeding Rate lb/Ac
Annual Rye *(Lolium multiflorum)*	0.15	98	90	30
Little Bluestem *(Schizachyrium scoparium var. scoparium (*formerly *Andropogon scoparius*))	1.00	80	70	40
Deertongue (*Dichanthelium clandestinum* (formerly *Panicum clandestinum*))	1.00	95	60	30
Switchgrass *(Panicum virgatum)*	1.00	95	70	20
Indian Grass *(Sorghastrum nutans)*	1.00	85	75	30
			Total Seed Quantity (lb/Ac)	**150**

are free from noxious weeds, mold or other objectionable material. Straw mulch shall be in air-dry condition and shall be suitable for placing with an approved mechanical blower.

Construction Methods:

This work shall consist of disking the soil to a depth of 4", placing the seed at a rate of 150 lbs/acre to provide a suitable stand of perennial native grass and placing mulch.

Native Grass Seeding and mulching shall occur between the following dates: March 1 to May 15 and August 15 to October 31.

All disturbed soil areas shall be treated during the seeding seasons as follows:

a) **Areas meeting final grade.** Seeding and mulching shall be completed.

b) **"Out of Season" Periods.** During "out of season" periods, unseeded areas shall be treated in accordance with temporary stabilization as per Section 110.09(d).

c) **"Out of Season" seeding.** "Out of season" seeding shall be performed in the same manner as "in-season" seeding. Requests for out of season seeding will be considered if sufficient written justification is provided, with the understanding that in-season re-seeding will be required, at no cost to the Department, if the turf stand fails to conform to the requirements listed below under Acceptance of Native Grass Seeding: No Mow Mix.

Disk areas to be seeded to a depth of 4". Uniformly and evenly broadcast seed over the disked areas. The seed shall be incorporated into the soil to a minimum depth of one-quarter inch (1/4") and a maximum depth of one-half inch (1/2"), or as otherwise shown on the plans. Mulch seeded areas, then track in the mulch. Low-pressure tires or equipment shall be used in preparation of the seed bed and on seeding equipment.

No Lime or Fertilizer shall be added to the Native Grass Seeding: No Mow Mix.

Acceptance of Native Grass Seeding: No Mow Mix:

Acceptance of Item 734551 - Native Grass Seeding: No Mow Mix will require production of a uniform stand of native grass species having attained a minimum height of 3 inches with a density of 70% of the seeded area. Any area identified without a density of 70% native grass cover shall be repaired at the Contractor's expense.

No Maintenance Bond is required for this work.

Method of Measurement:

The Engineer will measure the quantity of acceptably placed Native Grass Seeding: No Mow Mix. The quantity of Native Grass Seeding: No Mow Mix will be measured in square yards (square meter) of surface area. Unless otherwise specified on the plans, mulching will not be measured.

Basis of Payment:

The quantity of Native Grass Seeding: No Mow Mix will be paid for at the Contract unit price per square yard (square meter). Price and payment will constitute full compensation for preparing the ground, for furnishing and placing all materials including seed and mulch; and for all labor, equipment, tools and incidentals required to complete the work.

4/15/11

735531 - SOIL RETENTION BLANKET MULCH, TYPE 1
735532 - SOIL RETENTION BLANKET MULCH, TYPE 2
735533 - SOIL RETENTION BLANKET MULCH, TYPE 3
735534 - SOIL RETENTION BLANKET MULCH, TYPE 4
735535 - SOIL RETENTION BLANKET MULCH, TYPE 5
735536 - SOIL RETENTION BLANKET MULCH, TYPE 6
735537 - SOIL RETENTION BLANKET MULCH, TYPE 7

Description:

This work consists of furnishing, placing and anchoring soil retention blanket mulch over seeded areas in accordance with notes and details on the Plans, these specifications and direction of the Engineer.

Materials:

The blanket mulch shall be one of the pre-approved products listed in the Approved Product List (APL) at the time of bid, for the type(s) of mulch required on the Plans.

Pre-approval procedures and the current APL may be obtained by writing to the Stormwater Engineer, Delaware Department of Transportation, P. O. Box 778, Dover, DE 19903 or calling (302) 760-2177 or viewing DelDOT's web page at **www.deldot.net/business**. The Contractor shall submit an 8" x 8" (200 mm x 200 mm) sample to the Stormwater Engineer to verify pre-approval. Also, the Contractor shall submit manufacturer's literature, including installation recommendations, to the Engineer.

The products on the APL have been used extensively on DelDOT projects with satisfactory results and/or have received satisfactory evaluations by the Texas Department of Transportation/Texas Transportation Institute (TxDOT/TTI).

Soil Retention Blanket Mulch, Types 1, 2, 3, 4 and 5, generally referred to as erosion control blankets (ECB), shall be composed entirely of 100% biodegradable material.

Soil Retention Blanket Mulch, Types 6 and 7, generally referred to as turf reinforcement mats (TRM), shall be composed of mostly non-degradable material.

In order for a product to be added to DelDOT's Approved Product List and be eligible for use in DelDOT's construction and maintenance works, the product must meet the above guidelines and receive a satisfactory evaluation by TxDOT/TTI. The Department will remove products from the APL when field performance is unsatisfactory.

Types of Soil Retention Blanket Mulch Application

Type 1. Sandy soils on slopes steeper than 3H:1V
Type 2. Sandy soils on slopes equal to or flatter than 3H:1V
Type 3. Top-soiled slopes steeper than 3H:1V
Type 4. Top-soiled slopes equal to or flatter than 3H:1V
Type 5. Top-soiled grass swale at maximum design shear stress less than or equal to 2 pounds per square foot (96 Pascals)
Type 6. Top-soiled grass swale at maximum design shear stress greater than 2 pounds per square foot (96 Pascals) and less than or equal to 6 pounds per square foot (287 Pascals)
Type 7. Top-soiled grass swale at maximum design shear stress greater than 6 pounds per square foot (287 Pascals) and less than or equal to 8 pounds per square foot (383 Pascals)

Construction Methods. The soil retention blanket mulch, shall be placed immediately after seeding operations have been completed or as approved by the Engineer, but in no case shall this period exceed 24 hours from the completion of the seeding operation. Prior to seeding and mulching, the area to be mulched shall be tracked,

free of ruts, rocks or clods over 1 1/2 inches (40 millimeters) in maximum dimension and all sticks or other foreign materials which will prevent the close contact of the blanket with the soil. If as a result of rain, the prepared bed becomes crusted or eroded or if any eroded areas, ruts or depressions exist for any reason, the Contractor shall retrack and reseed the eroded areas.

Except for sprayed blanket mulch installation and anchorage of the soil retention blanket mulch shall be in accordance with notes and details in the Plans and the following DelDOT Standard Construction Details:

Standard No. E-9 for rolled blankets under Types 1 through 5
Standard No. E-25 for blankets under Types 6 and 7

Should the installation requirements of the manufacturer be more stringent than the above, the manufacturer's requirements shall govern.

Sprayed blanket mulches shall be applied as per the manufacturer's instructions and recommended rate. No application shall be permitted if rain is anticipated within 24 hours as determined by the Engineer.

Method of Measurement:

The quantity of soil retention blanket mulch will be measured in square yards (meters) of each type soil retention blanket mulch installed and accepted. Measurements for calculating the number of square yards (meters) will be made along the surface of the area covered. Overlaps of materials of any kind will not be measured.

Basis of Payment:

The quantity of soil retention blanket mulch will be paid for at the contract unit price per square yard (meter) per each type. Price and payment will constitute full compensation for furnishing and placing all materials; for all methods of anchorage and securement; for repairing any loose or raised pins or pegs or any loose, torn, or undermined fabric; and for all labor, equipment, tools, and incidentals required to complete the work.

01/24/01

737523 - PLANTING

The requirements of Section 737 shall be followed except as modified below:

Subsection 737.07 Peat Moss and Peat Humus.

Add the following:

(c) Composed leaf mulch free of wood, metallic substances, glass or other contaminates may be used in lieu of peat moss or peat humus.

Subsection 737.10 Stakes, Guys, and Related Materials.

Delete paragraphs (e),(f) and (h).

Subsection 737.16 Planting.

Delete paragraph (d).

Add the following:

Wire baskets shall be cut away and removed from the top half of the root ball.

Section 737.17 Plant Establishment.

Delete this subsection in its entirety and add the following:

The plant establishment period for all planting shall begin immediately after all planting and replacements (as specified under Section 737.16, Planting) are complete and acceptable to the Engineer. The plant establishment period will consist of one full growing season during which time the Contractor shall be responsible for all work necessary to keep the plants in a live and healthy condition. A growing season is defined as the period from May 1 through September 30. If the Contractor completes all planting (as specified under Planting) by May 1, the inspection will be held on or about October 1 of that year. In the event the Contractor does not complete all planting by May 1, the inspection will be held on or about October 1 of the following year. All replacement plant material determined to be necessary at the inspection must then be approved at the replacement plant source by October 15. At this time, the Engineer will direct the Contractor to replace those plants determined to be dead or unhealthy by December 1. The Contractor will notify the Engineer in writing that all replacement planting has been accomplished. The Engineer will conduct an inspection within 15 days after such notification to determine the acceptability of the replacements. If all replacements are determined satisfactory by the Engineer, the Contractor will be relieved of all further responsibility for care and replacement.

All planting areas shall be kept free of weeds and grass during the life of the Contract. The Contractor may utilize a pre- or post-emergent herbicide to control such grass and broadleaf weeds incidental to the cost of planting and be totally responsible for the proper use and placement of any such herbicide. As requested in writing by the Engineer, the Contractor shall be responsible to weed within all plant beds and within the saucer limits of individual plants, beginning 10 calendar days after the date of notification. The Contractor shall prune and apply insecticides or fungicides as required, repair or replace stakes and guy wires, tighten guy cable or wire and repair plant saucer washouts when and as specified by the Engineer.

Any plants that settle below or rise above the desired finished grades shall be reset at the proper grades. All replacements shall be plants of the same kind, size and quality as originally specified in the Contract and they shall be furnished, planted, mulched, guyed, watered, etc. as specified herein for new plant material.

If dead or unhealthy plants are discovered, they shall be removed within 10 calendar days and replaced

with the next appropriate planting season.

The Contractor shall be responsible for all damage incurred to plant material, tree protection, wire or staking regardless of the cause.

The cost of the above described work shall be incidental to Section **737**, Planting.

The Contractor shall water all plants as required to sustain them in a healthy condition. The Contractor shall give 24 hours written notice to the Engineer prior to each watering.

Subsection 737.18 Method of Measurement.

Delete the paragraph in its entirety and insert the following:

The quantity of planting will not be measured.

Subsection 737.19 Basis of Payment.

Delete the first two paragraphs in their entirety and insert the following:

The quantity of planting will be paid for at the Contract lump sum. Price and payment will constitute full compensation for furnishing and placing all materials, including plants, soil mixes, and mulch; for protecting plants after digging and prior to planting; for staking, excavating plant pits, pruning, wrapping, and guying; for all watering until final acceptance, for the cultural care of the plants until the completion and acceptance of all landscape work; for disposing of excess and waste materials; for replacement planting; for cleanup; for repairs to plant material, tree protection, wire, or staking due to fire, theft, vehicular damage, or acts of vandalism; for repairs to damaged grassed, planted, or other landscaped area due to the Contractor's operations; for ensuring that topsoil meets the sieve analysis, acidity, and organic matter requirements; for applying sufficient materials to fertilizer that originally failed to meet the specified analysis; for using pre- or post-emergent herbicide to control grass and weeds; for the work outlined under Subsection 737.17; and for all labor, equipment, tools and incidentals required to complete the work.

The breakout sheet attached to the proposal shows all plant material proposed for this Contract. The Contractor shall fill in the per each unit price and the cost (unit price times the proposed quantity) for each species and size listed. The lump sum price bid for item 737523 - Planting shall be the sum of the total cost for all species and sizes listed. The completed typewritten breakout sheet shall be attached to the bid proposal. Failure to submit the breakout sheet with the Bid Proposal will result in the Bid Proposal being declared non-responsive and rejected.

The Department reserves the right to delete from the Contract the furnishing and installing of one or more of the species and/or sizes listed and the right to add or subtract from the quantity of each species and size listed. The lump sum to be paid will be adjusted in accordance with the Contractor's unit prices as required above. There will be no extra compensation to the Contractor if such additions and/or deletion are made.

Payment for the planting as described above may be processed if, in the opinion of the Engineer all work required, except that specified under Subsection 737.17 is satisfactorily completed. No partial payment will be made for any living plant until and unless planted in accordance with these specifications. No additional payment will be made for using plants larger than specified.

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

Description:

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

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

Materials and Construction Methods:

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

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

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

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

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

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

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

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

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

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

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

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

Certification:

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

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

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

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

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

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

Method of Measurement:

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

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

the Engineer.

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

Basis of Payment:

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

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

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

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

03/04/2010

744500 - CONDUIT JUNCTION WELL, TYPE 6, 17" x 30" PRECAST POLYMER CONCRETE
744506 - CONDUIT JUNCTION WELL, TYPE 7, 36" x 60" PRECAST POLYMER CONCRETE
744507 - CONDUIT JUNCTION WELL, TYPE 8, 30" x 48" PRECAST POLYMER CONCRETE
744509 - CONDUIT JUNCTION WELL, TYPE 10, 24" x 36" PRECAST POLYMER CONCRETE
744520 - CONDUIT JUNCTION WELL, TYPE 1, 20" x 20" PRECAST CONCRETE
744523 - CONDUIT JUNCTION WELL, TYPE 4, 20" x 42 ½" PRECAST CONCRETE
744524 - CONDUIT JUNCTION WELL, TYPE 5, 24" x 16" PRECAST CONCRETE

Description:

This work consists of supplying, constructing and installing conduit junction wells. Types 1, 4 and 5 are precast concrete and Types 6, 7, 8 and 10 are precast polymer concrete. Sizes shown for precast concrete junction wells represent inside dimensions, while those listed for precast polymer concrete junction wells are outer dimensions.

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.

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 (62 - 103 MPa), impact energy of 30-72 ft. lbs. (40 - 98 N-m) and a tensile strength of 800-1,100 psi (5.6 - 7.6 MPa). 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. (6.8 tonnes) over a 10" (255 mm) 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).

Construction Methods:

The conduit junction well shall conform to the dimensions shown on the Standard Construction Details, in these specifications, 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, 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 Standard Construction Details or these specifications. A stone base shall be built for all types of junction wells.

Method of Measurement:

The quantity of junction wells shall be the actual number of conduit junction wells by type, which are supplied, constructed, complete in place, and accepted, including frames and lids or precast polymer concrete covers and stone base. 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 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 and backfilling. Price and payment will constitute full compensation for all labor, equipment, tools, and incidentals required to complete the work.

01/29/03

744505 - ADJUST OR REPAIR EXISTING CONDUIT JUNCTION WELL

Description:

This work consists of adjusting or repairing existing conduit junction wells, including furnishing all materials, in accordance with this specification, notes and details on the Plans, the Standard Construction Details, and as directed by the Engineer.

Materials:

Portland cement concrete shall conform to the requirements of Section 812, Class B.
Mortar shall conform to the requirements of Section 611.
Brick shall conform to the requirements of Section 611.
Concrete block shall conform to the requirements of Section 819.

Construction Methods:

Repair of conduit junction wells includes repairing/patching the masonry walls and replacing damaged or missing frames and lids or precast polymer concrete covers.

Adjusting involves raising the elevation of the frame and lid to match the grade of the surrounding area.

Method of Measurement:

The quantity of conduit junction wells adjusted or repaired will be measured as the actual number of conduit junction wells adjusted or repaired and accepted. If a new frame and lid or precast polymer concrete cover is needed, it will be supplied under a separate item.

Basis of Payment:

The quantity of conduit junction wells will be paid for at the Contract unit price per each junction well. Price and payment will constitute full compensation for excavating, backfilling, compacting and disposing of excess materials, for furnishing and placing all materials and for all labor equipment, tools and incidentals required to complete the work.

02/20/03

744519 - RELOCATION OF EXISTING JUNCTION WELL

Description:

This work consists of relocating an existing Type 1, Type 4, Type 5, Type 6, Type 7, Type 8, or Type 10 junction well to clear utilities or other construction work. This item may consist of moving a junction well from a few inches (centimeters) to no more than six feet (1.8 m) in any direction in sodded or dirt areas only. Moves of more than six feet (1.8 m) shall be paid under other items in this contract.

Construction Methods:

The junction well shall be relocated in a manner so as not to damage the junction well, frame and lid, or precast polymer concrete cover. Any conduit or cables that need to be removed or installed shall be paid under separate items in this contract.

If the conduit that is connected to the junction well needs to be moved with the junction well, the conduit is to be exposed to the distance necessary to move the junction well, caution is to be used as not to place excessive stress on the conduit or its couplings.

The entire work area where the junction well and conduits are relocated shall be backfilled and tamped as directed by the Engineer. Any extra fill needed to complete the backfill shall be considered part of this item.

Method of Measurement:

The quantity of relocated junction wells to be measured under this item shall be the actual number of junction wells relocated complete, in place, and accepted.

Any conduits that need to be added to extend into the junction well shall be paid for under "Supply of Conduit".

Basis of Payment:

The number of junction wells relocated, as determined above, shall be paid for at the Contract unit price per each. Price and payment will constitute full compensation for all labor, equipment, tools, and incidentals required to complete the work.

01/15/03

744525 - REMOVAL OF EXISTING JUNCTION WELL

Description:

This work consists of removing a Type 1, Type 2, Type 3, Type 4, Type 5, Type 6, Type 7, Type 8, or Type 10 conduit junction well presently in place and returning it to the Department at the Dover Sign Shop.

Construction Methods:

The conduit junction well shall be removed in a manner as to not damage the junction well, frame and lid, or precast polymer concrete cover. The conduits that enter into the junction well shall be abandoned and capped off or connected together as directed by the Engineer. Removal of cables that enter into the well and any conduit used to tie into existing conduits, shall be paid under a separate item.

The areas left open after removal of the junction well shall be backfilled with Type C borrow or suitable fill material as directed by the Engineer. The fill shall be tamped in 6 inch (150 mm) lifts, graded, top soil placed (6 inch (150 mm) minimum) seeded and mulched.

Method of Measurement:

The quantity of junction wells to be measured under this item shall be the actual number of junction wells removed and returned to the Department at the Dover Sign Shop. Excavation around junction well to remove it and the backfilling of the area where junction well was removed are to be included in this price.

Backfill material will be paid for separately if required and as directed by the Engineer.

Any extra conduit used to reconnect the conduits that entered the well are to be paid for under another item of this contract.

Basis of Payment:

The number of junction wells removed, as determined above, shall be paid for at the Contract unit price bid per each. Price and payment will constitute full compensation for all labor, equipment, tools, and incidentals required to complete the work.

01/15/03

745500 - GALVANIZED CONDUIT IN/ON STRUCTURE, 1" (25 mm)
745501 - GALVANIZED CONDUIT IN/ON STRUCTURE, 1 1/2" (38 mm)
745502 - GALVANIZED CONDUIT IN/ON STRUCTURE, 2 1/2" (63 mm)
745505 - GALVANIZED CONDUIT IN/ON STRUCTURE, 3" (75 mm)
745506 - GALVANIZED CONDUIT IN/ON STRUCTURE, 2" (50 mm)
745516 - GALVANIZED CONDUIT IN/ON STRUCTURE, 4" (100 mm)

Description:

This work consists of furnishing all materials and installing rigid galvanized steel conduits of the specified size(s) in/on structures in accordance with the notes and details on the Plans and as directed by the Engineer.

Materials:

The materials shall conform to the requirements of Subsection 745.02 of the Standard Specifications.

Construction Methods:

Install conduit in accordance with the details shown on the Plans, with conduit connections made as required in Subsection 745.03.

Method of Measurement:

The quantity of galvanized conduit will be measured in linear feet (meters) of conduit, complete in place and accepted. Measurement will be made along the conduit.

Basis of Payment:

The quantity of galvanized conduit will be paid for at the Contract unit price per linear foot (meter) for the size used. Price and payment will constitute full compensation for furnishing and installing the conduit and hangers and all materials, labor, equipment, tools and incidentals necessary, including coupling for attachment of conduit, to complete the work.

8/15/05

745520 - SUPPLY OF 4" SCHEDULE 40 HDPE CONDUIT
745521 - SUPPLY OF 4" SDR-13.5 HDPE CONDUIT
745522 - SUPPLY OF 3" SCHEDULE 80 PVC CONDUIT
745523 - SUPPLY OF 4" SCHEDULE 40 PVC CONDUIT
745524 - SUPPLY OF 4" SCHEDULE 80 PVC CONDUIT
745525 - SUPPLY OF 4" GALVANIZED STEEL CONDUIT
745526 - SUPPLY OF 3" GALVANIZED STEEL CONDUIT
745527 - SUPPLY OF 2 1/2" GALVANIZED STEEL CONDUIT
745528 - SUPPLY OF 2" GALVANIZED STEEL CONDUIT
745529 - SUPPLY OF 1 1/2" GALVANIZED STEEL CONDUIT
745530 - SUPPLY OF 1" GALVANIZED STEEL CONDUIT
745531 - SUPPLY OF 3/4" GALVANIZED STEEL CONDUIT
745532 - SUPPLY OF 3" SCHEDULE 40 PVC CONDUIT
745533 - SUPPLY OF 2 1/2" SCHEDULE 40 PVC CONDUIT
745534 - SUPPLY OF 2" SCHEDULE 40 PVC CONDUIT
745535 - SUPPLY OF 1 1/2" SCHEDULE 40 PVC CONDUIT
745536 - SUPPLY OF 3/4" ALUMINUM RIGID CONDUIT
745537 - SUPPLY OF 3/4" FLEXIBLE METALLIC-LIQUIDTIGHT CONDUIT
745538 - SUPPLY OF 1 1/2" FLEXIBLE METALLIC-LIQUIDTIGHT CONDUIT
745539 - SUPPLY OF 2" NONMETALLIC POLE RISER SHIELD
745540 - SUPPLY OF 3" NONMETALLIC POLE RISER SHIELD
745541 - SUPPLY OF 4" NONMETALLIC POLE RISER SHIELD

Description:

This work consists of supplying a conduit or shield, of the type required and as specified in the contract documents or as directed by the Engineer.

Materials:

All conduits shall be UL listed and nonmetallic pole risers shall be Rural Utility Service (RUS) listed.

4" (100 mm) high density polyethylene (HDPE) schedule 40, or SDR-13.5 smooth wall conduit with permanently pre-lubricated lining, meeting ASTM D247, ASTM D3035 and NEMA TC7 specifications.

4" (100 mm) through 1-1/2" (38 mm) schedule 40 or 4" (100 mm) through 3" (75 mm) schedule 80 rigid polyvinyl chloride (PVC) conduit, meeting Commercial Standard CS-272-65 (PVC), ASTM D-1785 and U.C. Standard 651 specifications.

4" (100 mm) through 3/4" (19 mm) rigid galvanized steel conduit meeting National Electric Code 2002, Article 344.

3/4" (19 mm) aluminum rigid conduit meeting National Electric Code 2002, Article 344

3/4" (19 mm) and 1-1/2" (38 mm) liquidtight flexible metallic conduit meeting National Electric Code 2002, Article 350.

2" (50 mm), 3" (75 mm), and 4" (100 mm) nonmetallic pole riser shield with belled ends meeting NEMA TC-19 specifications.

In addition to any normal markings provided by the manufacturer, HDPE and PVC conduit shall have the following longitudinally printed on it in white letters: "DelDOT Traffic Fiber Optic Cable."

Method of Measurement:

The quantity of conduit or shield will be measured as the number of linear feet (meters) of conduit or shield supplied and accepted. The length of liquidtight flexible metallic conduit shall be measured including all fittings; no additional request for payment will be accepted based upon liquidtight fittings of 90-degrees, 45-degrees, straight, or swivel.

The length of any conduit that is reduced or divided (with a junction box or conduit body) shall be measured as part of the larger conduit. The nonmetallic pole riser shield length shall include any adapter required.

Basis of Payment:

The quantity of linear feet of conduit or shield will be paid for at the Contract unit price per linear foot (meter). Price and payment shall include full compensation for all materials and labor, and incidentals including fittings and bushings, necessary to complete the item.

08/18/09

745542 - INSTALLATION OF CONDUIT UNDER EXISTING PAVEMENT - DIRECTIONAL BORE
745543 - INSTALLATION OF CONDUIT UNDER EXISTING PAVEMENT - OPEN CUT
745544 - INSTALLATION OF CONDUIT IN UNPAVED TRENCH
745545 - INSTALLATION OF CONDUIT ON WOOD POLE
745546 - INSTALLATION OF CONDUIT ON STRUCTURE
745547 - INSTALLATION OF ADDITIONAL CONDUITS IN TRENCH OR OPEN CUT PAVEMENT
745548 - INSTALLATION OF ADDITIONAL CONDUITS IN DIRECTIONAL BORE

Description:

This work consists of installing trade sized rigid galvanized, PVC or HDPE conduit with all necessary fittings, under existing pavement either by directional bore or open cut, in unpaved trench, on wood pole, or on structure other than bridge or overpass. Installation of additional conduit in trench or open cut pavement or in a directional bore shall also be covered under this item.

The structure can be sign structure, tower, building or other type of structure. Installation of conduit on a bridge, highway and railroad overpass is not included in this payment item, and shall be covered under other items of these specifications.

The Contractor shall be responsible for correcting any existing conduit which is disturbed during installation.

Materials:

Weatherhead for galvanized or PVC conduit.
Insulated grounding bushing with knockouts.
Condulets for conduit sizes.
Anchors.
One hole conduit hangers: Steel City Series 6H or 6H-B, Grainger Industrial Supply Item # 6XCXX, Dale Electric Supply Co.- Conduit Hangers, Arlington Industries - Pipe Hangers Series 2000 or 2200, Raco/Hubbell Inc. - Conduit Hangers or Approved Equal.
End caps.
LONG sweep sections for conduit sizes.

Construction Methods:

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 900 feet (275 m) for fiber optic conduit or no more than 300 feet (90 m) for copper conduit, or as directed by the Engineer. If bends are required during installation, they must be 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 (600 mm) and a maximum cover of 48 inches (1.2 m).

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 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 (600 mm) 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 (75 mm) inside a junction well. See Standard Construction Details for typical methods of termination.

All underground conduits shall be marked in the ground with a warning tape. The marking tape shall be buried directly above the conduit run that it identifies, at a depth of approximately 12 inches (300 mm) below final grade. The tape identifying ALL conduits shall be at least 6 inches (150 mm) wide, and have a minimum thickness of 3 mils and 500 percent elongation.

The color of the 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 by 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 (5560 N) shall be installed in each conduit for future use. In instances where the Contractor installs the cable, the fish wire may be eliminated.

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" (38 mm). The size of a bore shall not exceed the outside diameter of the conduit by more than 1 inch (25 mm). If it does, cement grout shall be pumped into the void.

Installation Of Conduit Under Existing Pavement - Open Cut:

Installation by cutting a slot in the existing pavement with masonry saw shall be used for conduits not

less than 1-1/2" (38 mm) diameter. The Engineer must first approve all open cutting of roadways. The minimum size of open cut for a paved roadway shall be 18 inches (450 mm). The Contractor shall be responsible for the removal of all cut pavement and the replacement and correction of any damaged pavement once the conduit(s) are installed.

Installation Of Conduit In 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 either be removed by the use of an approved sod cutter and then replaced or 6 inches (150 mm) 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.

Installation Of Conduit On Wood Pole:

Conduit installed on wood pole shall be installed in a straight vertical line. The conduit shall be attached to the wood pole with 2 hole straps spaced not more than 36 inches (1 m) apart with the top-most strap being 12 inches (300 mm) from the weatherhead and the lower-most being 12 inches (300 mm) from the condulet. A weatherhead matching the diameter of the conduit shall be installed on the upper end of the conduit. A condulet of the same size as the conduit being installed, but not smaller than 2 inches (50 mm) shall be placed 48 inches (1.2 m) above finished grade. Install two, 2 hole straps of the proper size, evenly spaced below the condulet. Nonmetallic pole risers (U-guard) shall be installed on wood 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 is not the same size as the conduit, an adapter shall be used at no additional cost to the Department. The nonmetallic pole riser shall be attached to the wood pole with 1/4" (6 mm) x 1-1/2" (38 mm) galvanized lag bolts with washers. Lag bolts will be used every 36 inches (1 m) on BOTH sides of the nonmetallic pole riser, and in the top most and bottom most set of slots.

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 (1 m) apart. Any 90-degree turns in the conduit run shall be accomplished by placing the proper size and type sweeping bends for the application needed.

Installation Of Additional Conduit In Trench Or Open Cut Pavement:

In the case of slotted or trenched installations, the Contractor shall install additional conduits at the same time as the initial installation. The Engineer shall indicate the quantity of conduits to be installed during a build. Additional conduits may be stacked one on top of the other, side by side or in a matrix. The orientation shall be at the Contractor's discretion, but conduits shall not twist around one another or be allowed to deviate from straight line paths except in the case of bend installations. Conduits installed at the same time in the same trench or slot shall remain oriented the same in relation to one another throughout the conduit run.

Installation Of Additional Conduits In Directional Bore:

In the case of a directional bore that more than one conduit shall be installed, the Contractor shall, at the same time as the initial installation, install one (1) or more additional conduits. The Engineer shall indicate the quantity of conduits to be installed during a build. The additional conduits may be stacked one on top of the other, side by side or in a matrix. The orientation shall be at the Contractors discretion, but conduits shall not twist around one another or be allowed to deviate from straight line paths except in the case of a gentle bend. Conduits installed at the same time, in the same bore shall remain oriented in the same relation to one another throughout the conduit run.

Method of Measurement:

The quantity of conduit installed as specified, shall be measured as the number of linear feet (meters) of conduit installed as specified, complete in place, and accepted.

The length of conduit installed under existing pavement by a directional bore shall be measured along the path of the bore from the point that cannot be trenched to the point that trenching can resume. The length of conduit installed by cutting a slot in the existing pavement, in unpaved trench or under new pavement, on wood pole, or on structure shall be measured along the conduit.

Basis of Payment:

The quantity of conduit will be paid for at the Contract unit price per linear foot (meter). Price and payment shall include full compensation for all materials and labor, topsoil and seed if needed, and incidentals necessary to complete the item.

6/6/11

745551 - REMOVAL OF CONDUIT FROM WOOD POLE

Description:

This work consists of removing trade sized conduit with all necessary fittings from a wood pole.

Construction Methods:

The conduit may be rigid galvanized, aluminum, PVC or HDPE type, or nonmetallic pole riser in a wide range of sizes. The conduit and all straps, nails, and/or lag screws shall be removed in a manner so as not to damage or disturb the pole, or surrounding conduits. All materials shall be properly disposed of in a legal manner.

Method of Measurement:

The quantity of conduit removed will be measured as the number of linear feet (meters) of conduit completely removed in an acceptable manner.

Basis of Payment:

The quantity of conduit removed will be paid for at the contract unit price per linear foot (meter). Price and payment will constitute full compensation for all labor, equipment, tools, and incidentals required to complete the work.

01/15/03

746511 - CABLES, 1/#4 AWG
746512 - CABLES, 1/#6 AWG
746513 - CABLES, 1/#8 AWG
746514 - CABLES, 1/#10 AWG
746515 - INSULATED GROUND CABLE, 1/#6
746527 - CABLES, 1/#2 AWG
746543 - CABLES, 1/#9 AWG
746546 - CABLES, 1/#12 AWG
746564 - INSULATED GROUND CABLE, 1/#4
746565 - CABLES, 1/#3/0 AWG
746566 - CABLES, 1/#1 AWG
746567 - CABLES, 1/#1/0 AWG
746577 - INSULATED GROUND CABLE, 1/#8
746598 - INSULATED GROUND CABLE, 1/#2
746605 - INSULATED GROUND CABLE, 1/#10
746622 - CABLES, 1/#4/0 AWG
746658 - INSULATED GROUND CABLE, 1/#1/0
746690 - INSULATED GROUND CABLE 1/#12
746817 - CABLES, 1/#2/0 AWG

Description:

This work consists of furnishing all materials and installing cables of the size(s) required by the Contract in accordance with the notes and details shown on the Plans and/or as directed by the Engineer.

Materials and Construction Methods:

All wire(s) to be used in this contract shall be manufactured in conformance with the National Electrical Code, insulated for 600 volts, and be of the type USE and/or RHW.

The Contractor shall provide adequate equipment satisfactory to the Engineer for installation of wire; and shall pull all wires through conduits in a manner which will not overstress, or stretch any wire, and shall use precautions so as not to score, cut, twist or damage the insulation and/or the jacket. In pulling the wire into conduits, where the strain on the wires is likely to be excessive, the Contractor shall use soapstone powder as a lubricant. Without exception, all wires in junction or fuse boxes, transformer bases, and service panels shall be provided with a sufficient slack; and shall be arranged in a neat and orderly manner. After wires have been installed, and pending permanent connection or splicing, the end of each wire shall be carefully sealed using rubber tape, and painted with a sealing type of waterproof compound. All wiring shall be finished to give a neat and orderly appearance. Wires in meter cabinets shall be neatly arranged and laced with cable ties. Wires shall be supported on cable rack assemblies in all junction boxes and junction box foundations.

Where two or more wires are to occupy the same conduit, they shall be drawn in together and kept parallel to each other by means of a pulling head. Phase legs shall be arranged circumferentially and in sequence around the neutral wires.

Splices in junction wells shall be barrel (unless specified otherwise in the Plans) type, mechanically secured by means of a standard tinned copper pressure type connector. Splices shall then be wrapped with half-lapped layers of insulating tape installed in opposite directions. Several layers of half-lapped jacket tape shall be applied over the insulating tape. Two coats of waterproofing sealant shall be applied over the completed splice.

The insulating tape shall be of the self-bonding type and shall be 3M Company, Inc., Cat. No. 130C, 2228; or Plymouth Rubber, Cat. No. 2212; or Permacel, Cat. No. 253, P280; or approved equal.

The jacket tape shall be of the waterproof type and shall be 3M Company, Inc., Cat. No. 33; or Plymouth Rubber, Cat. No. 3117; or Permacel, Cat. No. P29; or approved equal.

Method of Measurement:

The quantity of cables will be measured as the number of linear feet (linear meters) of each size along the longitudinal axis of each cable installed and accepted.

Basis of Payment:

The quantity of cables will be paid for at the Contract price per linear foot (linear meter). Price and payment will constitute full compensation for furnishing and installing the cables in conduits, junction boxes, or lighting standard bases, connecting, splicing, rodding conduits with mandrel and wire brush, and all materials, labor, equipment and incidentals necessary to complete the work.

No separate payment will be made for furnishing and installing the connector kits with #10 AWG wiring of the type as indicated on the plan for the lighting standards as shall be included in the items for lighting standards.

8/28/01

746525 - ALUMINUM LIGHTING STANDARD

Description:

This item shall consist of furnishing and installing lighting standards, and foundations, in accordance with these specifications and as detailed on the drawings. The foundation provided as part of this item shall be a Pole Base, Type 6 constructed in accordance with Section 746 and details on these Plans.

Materials:

Lighting standards shall meet or exceed the requirements of the latest edition of AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals" based on 90 mph wind loads, luminaire weight of 70 pounds and luminaire projected area of 3 square feet. Computations confirming conformance with AASHTO Specifications shall be submitted to the Delaware Department of Transportation.

The aluminum shaft, shall be spun from one piece of extruded tubing meeting the requirements of ASTM B 241, 6000 series alloy. The shaft shall be cold worked to form the specified taper. Aluminum castings shall conform to ASTM B 108, alloy 356-T6. All welding shall be of the metallic-arc-consumable-electrode-inert-gas-shielded-process. After welding, the entire assembly shall be precipitation heat treated to the T6 temper using an approved method and rotary sand finished.

Breakaway support systems (transformer bases), when required, shall be provided with each pole, and shall not be paid for separately, but will be considered incidental to this item. Transformer bases will meet the breakaway requirements of ASSHTO and FHWA.

A grounding lug shall be provided at each pole, integral with either the pole shaft or the transformer base. Included in the foundations will be ground rods which shall be copper clad steel 3/4 inch in diameter and 20 feet long.

Each lighting standard shall be provided with a permanent tag which shall be 2-inch by 4-inch fabricated from clear anodized 1/16" thick aluminum. The edge shall be smooth and corners rounded and the tag shall be curved to fit the light standard shaft. Tags shall be secured to shafts by means of four (4) 1/8 inch diameter 18-8 stainless steel round head drive screws of self-tapping screws. The embossed identifying letters and/or numerals shall be not less than 3/4 inch high with stroke of not less than 3/16 inch. Identifying letters and/or numerals shall be designated on the Plans.

Method of Measurement:

The number of Aluminum Lighting Standards to be measured under this item shall be the actual number of poles erected in accordance with these special provisions and the drawings, complete in place and accepted.

Basis of Payment:

The number of Aluminum Lighting Standards, as determined above, shall be paid for at the Contract unit price per Each for "Aluminum Lighting Standard", required by the Contract, complete in place, which price and payment shall constitute full compensation for excavation, furnishing and placing/erecting all materials; and for all labor, equipment, tools and incidentals necessary to complete the item.

746594 - LUMINAIRE (HPS) 250 WATT

Description:

This work consists of furnishing and installing Type A and Type B 250 watt high pressure sodium fixtures on poles, in accordance with these specifications and as shown on the Plans.

Materials:

The complete Type A or Type B luminaire shall be a 250 watt high pressure sodium type powered from a nominal 240 or 277 volt, 60 hertz source. The luminaire shall have a heavy-duty die-cast aluminum housing with an electrocoat gray finish and a hinged and removable door assembly with a heat/impact resistant glass prismatic lens. The luminaire shall be provided with internal two-inch slipfitter mounting and photocell control. The ballast shall be a multi-tap (120/208/240/277 volt) auto-regulating type, capable of starting and operating the lamp down to temperatures of 78 F (28 C). The optical assembly shall be sealed with a perimeter gasket and activated charcoal filter.

The Type A fixture shall have medium, semi-cutoff NEMA Type 3 distribution and shall be General Electric Catalog Number M4AR-25-S-0-M-2-G-MS3-2, Lithonia Lighting CHLD-250S-R3-DLG-TB-MRB-PEU-CF or approved equal.

The Type B fixture shall have medium, non-cutoff NEMA Type 4 distribution and shall be General Electric Catalog Number M4AR-25-S-0-M-2-G-MN4-2-F or Holophane Vector Model No. HL2A250HPMTKGR-PR approved equal.

Method of Measurement:

The quantity of 250 watt (HPS) luminaires will be measured as the actual number of luminaires provided complete in place and accepted.

Basis of Payment:

The quantity of 250 watt (HPS) luminaires will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing all materials, and for all labor, tools, equipment, and incidentals necessary to complete the item installation.

12/21/10

746692 - SUPPLY OF WOODEN ELECTRICAL POLE, CLASS II, 40'
746693 - SUPPLY OF WOODEN ELECTRICAL POLE, CLASS II, 45'

Description:

This work shall consist of supplying Class II wood poles as specified in the contract documents or as directed by the Engineer.

All poles shall be in accordance with the American National Standard titled Specifications and Dimensions for Wood Poles (ANSI 05.1-1992) and American Wood-Preservers Association (AWPA) Standards as indicated herein, except as modified or supplemented in the following paragraphs.

Materials and Design Requirements:

The poles shall comply with the minimum quality and dimension requirements for furnishing Southern Pine Poles, 40' (12.2 m) and 45' (13.7 m) in length, which are to be preservative-treated by pressure processes.

(a) Definitions.

(1) The following definitions shall apply to this Specification and are either additions, or modifications, to ANSI 05.1-1992.

(a) Bark Knot - A knot that is undergrown and partially encased with outer bark.

(b) Groundline Section - That portion of a pole between 1' (.3 m) above and 2' (.6 m) below the groundline [6' (1.8 m) above the pole bottom].

(c) Ring Knots - A ring of knots consisting of four or more knots in a 3" (76 mm) section of the pole.

(d) Short Crook - A localized deviation from straightness which, within any section 5' (1.5 m) or less in length, is more than 1/4 the mean diameter of the crooked section.

(b) Material Requirements.

(1) Poles shall be Southern Pine as per ANSI 05.1-1992 Treatment Group C (steam conditioned) or treatment Group D (kiln-drying).

(2) All surfacing and trimming shall be done prior to treatment. Some minor trimming is allowed after treatment.

(3) Poles shall be flat roofed.

(4) Pole Seasoning

(a) Air-seasoning, kiln-drying, steaming, heating in the preservative, or a combination is permitted.

(b) Air-seasoned poles shall be held in storage in the stacks until the amount of moisture in the wood will not prevent adequate penetration and retention of the preservative as described in section (6) Pole Treatment.

(c) Boulton drying is not permitted.

(5) Pole Conditioning

(a) Poles shall not be cut more than 90 days prior to time of treating.

(b) Poles shall be conditioned in accordance with the standard "All Timber Products - Preservative Treatment by Pressure Processes" (AWPA Cl-79, latest revision).

(c) The steam temperature employed in steam conditioning for Southern Pine Poles shall not exceed 245ºF (118ºC). The time duration (the total of initial plus final steaming) shall not exceed 17 hours for poles with specified circumferences smaller than 37.5" (950 mm) at 6' (1.6 m) from the butt, and 20 hours for poles with specified circumferences larger than 37.5" (950 m) at 6' (1.8 m) from the butt.

(6) Pole Treatment

(a) Preservative materials shall meet either of the following Standards.

(1) Standards for Oil-Borne Preservatives (AWPA P8, Pentachlorophenol, latest revision).

(2) Standard for Hydrocarbon Solvents for Organic Preservative Systems (AWPA P9, Hydrocarbon Solvent, Type A, latest revision).

(b) Poles can be heated in oil-type preservatives at atmospheric pressure to facilitate penetration of preservative.

(c) Poles to be impregnated with the preservative by application of the standard empty cell (Rueping) process shall be performed in accordance with the standard "Poles - Preservative Treatment by Pressure Processes" (AWPA C4, latest revision).

(d) No material other than poles shall be treated with poles.

(e) Only one group of poles is permitted to be treated in any given charge, that is; Group A poles are not to be treated with Group B poles.

(f) The minimum net retention of Pentachlorophenol, as determined from 20 boring samples taken from any charge, shall not be less than the following.

Minimum Retention:	lbs. Penta/cu. ft. (Kg Penta/cu. m)
Zone Assayed	0.5 - 2.0 in (13 - 50 mm)
Retention	.45 (7.21)

Retention of Pentachlorophenol shall be determined by the Standard Methods for Analysis of Oil-Borne Preservatives (AWPA A5, latest revision).

(g) Penetration shall be determined by an increment borer core which shall be taken from each pole at a point approximately 8' (2.4 m) from the butt on all poles. The preservative shall penetrate at least 3" (75 mm), unless 90% of the sapwood is penetrated.

(1) If 4 or more of the first 20 poles bored fail to meet the requirements, all poles in the charge may be rejected at the option of the DelDOT.

(2) If more than 15% of the poles fail to meet the penetration requirement, poles that have met the penetration requirement shall be rotated 180° and re-bored. Those poles which fail to meet the second penetration test shall be rejected.

(h) The defects after treatment (checks, shakes and splits) in excess of those permitted in Section 5 of ANSI 05.1-1992 shall be cause for the rejection of treated poles.

(i) Poles not conforming to the stipulated minimum penetration and retention requirements may be retreated only once and may be re-offered for acceptance.

(j) Re-treatable poles in a charge of untreated poles shall not exceed 5% of the total quantity in the charge. In the computation of the required minimum net retention of preservative, all material in the charge shall be considered as untreated.

(k) Identification of Re-treated Poles - Each re-treated pole shall be identified in the top of the pole by means of a marking nail (galvanized, aluminum or copper) with the letter "R" on the head of the nail.

(l) The surface appearance of all poles shall be reasonably free of exudate and surface deposits.

(7) The following defects are prohibited.

(a) Cross Breaks (cracks)

(b) Decay, except as permitted under "decayed knots"

(c) Dead streaks

(d) Holes, open or plugged, except holes for test purposes, which shall be plugged.

(e) Hollow butts or tops, except as permitted under hollow pith centers and defective butts.

(f) Marine borer damage

(g) Nails, spikes, and other metal not specifically authorized by this specification. All other foreign material is prohibited.

(h) Ring knots

(i) Bark knots, in excess of 3" (75 mm) diameter.

(j) Knot cluster

(8) The following defects shall be accepted, given the below indicated limitations are met.

(a) Knot - The diameter of any single knot and the sum of knot diameters in any 1' (.3 m) section shall not exceed the limits of Table 2 of ANSI 05.1-1992.

(b) Decayed Knots -Type II "decayed Knots" are permitted provided that the

depth of decay does not exceed 1/2" (13 mm). In the event the decayed knot is explored to determine its type, the depth of exploration is limited to 1/2" (13 mm), and the trimmed area shall not exceed 20% the circumference of the pole at a maximum length of 12" (300 mm) to provide drainage.

(c) Shape - Poles shall be free from short crooks (redefined). A pole may have sweep, where sweep is in one plane and one direction only for all pole lengths, a straight line joining the surface of the pole at the groundline and the edge of the pole at the top shall not be distant from the surface of the pole at any point by more than 1" (13 mm) for each 10' (3 m) of length between these points.

(d) Spiral Grain - Spiral grain (twist grain) is permitted and not to exceed one complete twist in any 20' (6 m).

(c) Dimensions.

(1) The minimum circumferences at 6' (1.8 m) from the butt and at the top, for each length and class of pole, are listed in ANSI 05.1-1992, Table 8. The circumference at 6' (1.8 m) from the butt of a pole shall not be more than 7" (175 mm) or 20% larger than the specified minimum, whichever is greater. The top dimensional requirement shall apply at a point corresponding to the minimum length permitted for the pole. The circumference at this point on the pole shall not be more than 25% larger than the specified minimum.

(2) Classification shall be determined by the true circumference as follows: Measure the circumference at 6' (1.8 m) from the butt. This dimension will determine the true class of the pole, provided that its top (measured at the minimum length point) is large enough. Otherwise, the circumference at the top will determine the true class provided that the circumference at 6' (1.8 m) from the butt does not exceed the specified minimum by more than 20% or 7" (175 mm), whichever is greater.

Basis of Payment:

Class II wood poles shall be measured and paid for at the contract unit price each. The payment will be full compensation for the poles, labor, tools, materials, and incidentals necessary to complete this work.

10/10/02

746697 - INSTALLATION OF WOOD POLE

Description:

This work consists of installing wood poles with a butt plate and #6 bare copper ground wire from the butt plate to the top of the pole. A ground rod may be used in place of the butt plate. The pole shall be located as shown on the Plans and as directed by the Engineer.

Materials:

The wood pole shall be furnished by the Department or by the Contractor under another item of this contract. If supplied by the Department, wood pole and hardware can be obtained at the Department's Dover Sign Shop. The Contractor shall inform the Department two working days prior to picking up the pole.

The Contractor will supply:
Hardware for wood pole.
Ground rod or butt plate.
Ground rod clamp.
#6 bare copper wire.
Copper coated fasteners.

Construction Methods:

The pole shall be erected in a hole at least 6 feet (1.8 m) deep or the height of the pole divided by 6, whichever is larger. The hole shall be dug in such a manner as to preclude over-sizing the diameter.

Sufficient earth shall be placed in the hole to fill it completely and provide a ridge around the hole after it has been properly filled. During refill, the earth shall be placed in layers not to exceed one foot and shall be well tamped with a power tamper.

The pole shall be set vertically in all directions, unless otherwise specified.

Copper coated fasteners shall be placed not more than 3 feet (0.9 m) apart on the ground wire.

Ground rod shall be driven vertically into the ground, shall extend 4 inches (100 mm) above ground level and shall be fastened to ground wire with ground clamp. Ground rods shall be a minimum of 10 feet (3 m) in length.

Method of Measurement:

The quantity of poles will be measured as the number of poles installed as specified, complete and accepted.

Basis of Payment:

The quantity of poles will be paid for at the Contract unit price per each pole. Price and payment shall include full compensation for transporting and setting the poles, all materials and for all labor, equipment, and incidentals necessary to complete the item.

01/15/03

746698 - REMOVAL OF WOOD POLE

Description:

This work consists of removing a wood pole and ground rod and backfilling the resulting hole. The salvaging of all parts, the backfilling of the hole, and transportation of the pole and all parts to the Department at the Dover Sign Shop shall be included in this item.

Construction Methods:

The pole and ground rod shall be stripped of all hardware and connections. It shall be extracted using a crane or other approved method.

Borrow Type F shall be placed in the accordance with Section 209 in the hole to fill it and to match the existing elevation of the surrounding area. During refill, the borrow shall be placed back in layers not to exceed 8 inches (200 mm) loose depth and shall be well tamped with a power tamper.

Topsoil will be furnished and placed in accordance with Section 732. Seeding will be done in accordance with Section 734. Mulching will be done in accordance with Section 735.

The pole and ground rod shall be delivered to the Department at the Dover Sign Shop in a legal manner. If a butt plate is used, it will be left intact.

Method of Measurement:

The quantity of wood poles will be measured as the number of poles removed as specified and returned to the Department at the Dover Sign Shop.

Basis of Payment:

The quantity of wood poles will be paid for at the Contract unit price per each pole. Price and payment shall include full compensation for removing and transporting the pole and parts, for backfill, backfilling, grading, topsoil, seeding and mulching, and for all labor, equipment, tools, and necessary incidentals to complete the work.

01/15/03

746716 - ELECTRIC SERVICE ON PEDESTAL
746717 - ELECTRIC SERVICE ON PEDESTAL WITH SERVICE RISER

Description:

This work consists of the installation of an electrical service, aerial or underground, on a pedestal board or on a pedestal board with service riser.

Materials:

Meter pan (Supplied by Contractor - utility company approved)
3/4" (19 mm) "LB" condulet, Crouse-Hinds (C.H.) #LB-29, Killark #OLB-2, or approved equal
3/4" (19 mm) and 2" (50 mm) two hole pipe straps
3/4" (19 mm) weatherhead, C.H. #F75, Sepco # 401, or approved equal
2" (50 mm) galvanized conduit (5 feet (1.5 m) ±)
3/4" (19 mm) aluminum conduit (20 to 40 feet (6 to 12 m) ±)
2" (50 mm) "C" condulet, C.H. with cover and gasket, Killark #OC-6 or approved equal
2" (50 mm) to 3/4" (19 mm) reducer
2" (50 mm) conduit ground clamp
3/4" (19 mm) and 2" (50 mm) offset nipples, Steel City HO-222 and HO-226, Arlington #6A-3 and #6A-7, or approved equal
60 amp fuse disconnect, Elastanold #65U with 30 amp fuse #KTK, Ideal #65U or approved equal
#8TW or THWN stranded copper wire (50 to 100 feet (15 to 30 m) ±):
- black and/or red for power
- white for neutral

#4 split bolt connector, Burndy #KSU20, Ilsco #SK-4 or approved equal
#8/2 UF with ground
#8/3 UF with ground
#6 bare copper wire
3/4" (19 mm) Ground rod
3/4" (19 mm) Ground rod clamp
Copper covered staples
Service wedge clamp
Pressed steel channel clevis
Screw In Insulator
2" x 12" x 8' (50 mm x 300 mm x 2.4 m) pressure treated pine board
Anti-oxidant joint compound, Ideal #30-030 NOALOX, Ilsco #DE80Z or approved equal

All electrical materials shall conform to the requirements of the National Electric Code of the National Fire Protection Association, to all local and special laws, and/or to ordinances governing such installation. When these requirements do not govern, and where not otherwise specified, electrical materials shall conform to the Standardization Rules of the Institute of Electrical and Electronic Engineers. Shop drawings and catalog cuts for all electrical and related materials shall be submitted by the Contractor for approval.

Construction Methods:

Electric Service on Pedestal without Service Riser:

All work shall comply with NEC and NESC standards and comply with utility company minimum requirements.

All conduits and hardware connections shall be tightened with the appropriate wrenches or tools.

The meter pan shall be wired for 240 V single phase on the line side.

All service wires shall be #8 stranded copper.

All connections made within a meter pan shall include an anti-oxidant joint compound.

Install a 2" x 10" x 8' (50 mm x 250 mm x 2.4 m) pressure treated board with 3 feet (0.9 m) of the board placed in the ground at the service location as directed by the Engineer.

Install an appropriate length of 2" (50 mm) galvanized conduit (threaded and reamed on both ends) on the end of the 90-degree sweeps (installed by others or under other items in this contract) at the base of the pedestal board so that the condulet will be 3 feet (0.9 m) above the finished grade of the area.

Install the 2" (50 mm) "C" condulet on the top of the 2" (50 mm) galvanized conduit.

Place the meter pan 4 to 6 inches (100 to 150 mm) above the condulet and install a 2" (50 mm) chase or close nipple between them using approved methods. Place the meter pan on the pedestal to allow room for the line side conduit and connection (installed under other items in this contract) to be made.

Install #8/2 UF cable from the meter pan to the signal cabinet or the load location. The #8/2 UF cable and its installation shall be paid separately under other items in this contract.

The white wire shall be connected to the white wire of the #8/2 UF cable by the use of split bolt connector. The insulation should be removed from the ends of the wire to expose only 3/4" (19 mm) of stranded wire. The connection shall be completely taped. The bare copper wire from the #8/2 UF shall be attached to the "LB" condulet with a ground screw or clamp. The bare copper wire shall not enter the meter pan.

The black wire shall have a fused disconnect installed as per the manufacturer's installation instructions. Place all wires inside the condulet and install the cover(s) with gasket(s).

Install the ground rod under the condulet, driving rod within 6" (150 mm) of final grade. Using the appropriate ground rod clamps, attach enough #6 bare copper to reach and be connected to the 2" (50 mm) conduit ground clamp, to within 6" (150 mm) of the ground rod. Staple the #6 ground wire to the pedestal leaving enough slack to drive ground rod flush with final grade. Staples shall be placed every 6" (150 mm) and the #6 bare copper will be placed in a neat manner.

Electric Service on Pedestal with Service Riser:

Install the pedestal as described above. The pedestal will be installed within 10 feet (3 m) of the utility company's wood pole. If the distance from the pedestal to the utility company's wood pole exceeds 10 feet (3 m), the additional work and material will be covered under other items of this contract. Install a length of 2" (50 mm) galvanized conduit under the meter pan, so that the conduit will have 2 feet (0.6 m) of cover after a 2" (50 mm) galvanized elbow is installed. Connect the required length of 2" (50 mm) conduit to the elbow and install a second 2" (50 mm) galvanized elbow so that it is in direct contact with the utility company's wood pole. Install a 2" x 3' (50 mm x 0.9 m) nipple to the elbow. Reduce the 2" (50 mm) conduit to 3/4" (19 mm) with an approved reducing bushing. Install 30 feet (9 m) of 3/4" (19 mm) aluminum conduit above the conduit reducer, securing it to the wood pole within 12" (300 mm) of the conduit reducer and then at intervals not exceeding 3 feet (0.9 m). On the top of the 3/4" (19 mm) aluminum conduit install a 3/4" (19 mm) weatherhead, and secure the conduit to the wood pole within 12" (300 mm) of the weatherhead.

Install 3 (three) # 8 THHN stranded conductors {1 red, 1 black and 1 white} from the line side of the meter pan to the weatherhead, leaving 5 feet (1.5 m) coiled and taped outside for connection by others. Connect the other end inside the meter pan using an anti-oxidation

Method of Measurement:

The quantity of electrical services will be measured as the number of services installed in accordance with these specifications, complete in place, and accepted.

Basis of Payment:

The quantity of electrical services will be paid for at the Contract unit price per each. Price and payment shall include full compensation for installing the service, all utility permits, all materials and for all labor, tools, equipment, and incidentals necessary to complete the item.

12/21/10

746774 - SUPPLY AND INSTALLATION OF LOOP DETECTOR WIRE

Description:

This work consists of sawing a cut in existing pavement, furnishing and installing loop detector wire in the saw cut and sealing the saw cut with an approved sealer, in accordance with the Standard Details, these specifications, or as directed by the Engineer.

Materials:

The loop detector wire shall be a shielded four-conductor controlled capacitance cable with conductors twisted 6 turns per foot and enclosed in an aluminized polyester shield within a polyethylene jacket, rated to 600 volts. The interior of the cable is filled with a water blocking material. The four conductors are AWG # 18 stranded copper with color-coded polypropylene insulation. Color rotation is black, red, white, and green. The loop detector wire shall have an UV stable high-density polyethylene outer cover that is chemical resistant and waterproof with a wall thickness of 0.032 inches (0.8 mm). The cable shall have a temperature tolerance range of -65 to +176 degrees Fahrenheit (-54 to +80 degrees Celsius). Outside diameter of the cable is 0.25 inches (6 mm).

Flexible embedding sealer shall be a cold poured, resilient type epoxy joint sealer, Bondo P-606 or Duracote - D115 for concrete or asphalt pavement or E-Poxy Industry 36-1 for concrete or E-Poxy Industry11-1 for asphalt pavement, or approved equal.

A sealer accelerant or retarder may be added at the discretion of the Contractor.

3/8" (10 mm) closed cell foam backer rod

Construction Methods:

The saw cut shall be 1/4" (6 mm) wide and 3" (76 mm) deep. It shall be cut in the directions and sizes specified on the 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.

A 3/8" (10 mm) backer rod will be placed into the bottom of the saw cut. 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"). 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. Loop detectors also should be checked for continuity between the four conductors with an ohm-meter. If there is any resistance between colors or there is an open flow from color to color, 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.

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 Standard Details). Wires shall be parallel and taped every 12" (305 mm) to 18" (457 mm) from the end of the saw cut to a junction well. A conduit may need to be installed between the end of the saw cut and junction well as directed by the Engineer. In this case the loop detector wire shall be installed in the conduit.

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

Method of Measurement:

The quantity of loop detector wire to be measured under this item shall be the number of linear feet (meters) of saw cut in which loop detector wire is installed, sealed, tested, and accepted.

The additional loop detector wire needed beyond the saw cut to reach the junction well and sealer accelerant or retarder shall be incidental to this item and there shall be no separate measurement or payment. Any required conduit will be paid under a separate item.

Supply and installation of the conduit from the end of the saw cut to the junction well shall be covered under other items of this Contract. Installation of the loop detector wire in this conduit shall be incidental to this item and there shall be no separate measurement or payment.

Splicing of the loop detector wire to a lead-in cable in a junction well shall not be covered under this item and shall be paid separately under another item of this Contract.

Basis of Payment:

The quantity of detector wire supplied and installed will be paid for at the Contract unit price per linear foot (meter) of sawcut. Price and payment shall constitute full compensation for furnishing and placing all materials including loop detector wire, backer rod, sealer, labor, equipment, tools, and incidentals necessary to complete this item.

5/7/10

746778 - SPLICING OF ELECTRICAL CABLE, ABOVE GROUND
746779 - SPLICING OF ELECTRICAL CABLE, UNDERGROUND

Description:

This work consists of splicing various types and sizes of electrical cables not including Fiber Optic types.

Materials:

Underground:

AMP Butt Splice #34071 Terminal, Ideal #83-9291, or approved equal
Soldering iron
Rosin core solder
One 3M Splicing Kit #82A-1, ILSCO #USPA350SSDB, or approved equal

Overhead:

Wire nuts - Ideal 74B or 76B, 3M #R/Y, or approved equal
Plastic tape
Rubber tape

Construction Methods:

The minimum size and type is 4 conductor #18 wire and maximum is 26 conductor #14. The number and color code of the conductors to be spliced shall be designated by the Engineer.

The splicing may be in an underground installation or on span wire or messenger wire. If a splice is found to be faulty within 90 days of installation, it shall be the contractor's responsibility to remake the splice at his own expense.

Each conductor to be spliced shall have sufficient insulation removed, with wire strippers or other approved tool, to expose 1/2 inch (12 mm) of the copper conductor. The use of any tool or method which might nick the conductor is specifically prohibited.

Each conductor not to be spliced shall be inspected and trimmed as necessary to ensure that the copper conductor does not extend beyond the insulation.

Mechanical connection of conductors shall be accomplished by the use of the specified crimp-type terminal, as directed by the Engineer, so that a good mechanical connection shall be effected.

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 effected. The splice shall be coated with flux, heated with a soldering iron, and soldered in a manner which minimizes insulation damage. After each soldered connection is completed it shall be properly insulated.

After each conductor to be spliced is connected in the proper fashion, all conductors both used and not used shall be returned to their original configuration as before the sheath was removed.

Underground:

The sheath of each cable to be removed shall be limited so that the splicing kit will extend beyond the sheaths. After the electrical and mechanical connection is completed and before the splicing kit is applied, a test

shall be made to ensure that all circuits are complete and operable. A 3M Scotchcast Kit #82A-1, ILSCO #USPA350SSDB, or approved equal shall be installed as per manufacturer's instructions.

The splice will not be accepted and shall be replaced at the contractor's expense if there are any air bubbles or voids inside the splicing kit after the resin has cured. The funnels shall be removed as per the manufacturer's instructions.

Overhead:

Conductors to be electrically connected shall be placed side by side with the exposed copper aligned. The copper shall then be twisted clockwise with pliers until a good mechanical connection shall be effected.

A proper size wire nut shall be installed and hand tightened. If necessary to cover all the copper, minor trimming may be done. The copper splice shall be 5/16 of an inch (8 mm) long when trimmed. Care shall be taken to ensure that no insulation is caught up in the copper area of the splice.

It is essential that the splice be kept dry. Therefore, care must be taken during taping and by placement of the completed splice to prevent water from entering the splice between or around the cables.

1. Termination of Cable Run (Butt Splice)

The sheath of each cable shall be removed as necessary. When all conductors to be joined have been completed, the splice shall be prepared for taping. The cables shall be placed in a butt position and all wires and wire nuts shall be positioned to ensure that no shorts exist and that the splice area is reduced to as small a diameter as possible. Taping shall begin with rubber tape two inches over the intact sheath. Taping shall proceed toward the other cable overlapping half of the tape width until a point two inches on the other cable sheath has been reached. Taping shall then be repeated in the other direction starting one tape width wider than the previous wrap. Where necessary to cover all areas of the splice, overlapping shall be increased as necessary. Every area of the splice shall have rubber tape at least four layers (two fully overlapped passes) deep. The rubber tape shall be covered with plastic tape applied in the same fashion.

2. Taps or Tee Splices

The sheath of the through cable shall be removed for a distance of 8 inches (200 mm) centered on the point of splice. The sheath of the branch cable(s) shall be removed for a distance of 4 inches. (100 mm) The through cable conductors which are to be joined to the conductors of the branch cable(s) are to be separated out from the others and cut. No other conductors shall be cut for any purpose. Depending upon the need, the branch cable(s) may be placed beside one of the through cables and the splicing proceed or the through cable may be doubled back so that the parts of the through cable and the branch cable(s) are placed side by side. When all conductors to be joined have been completed, the splice shall be prepared for taping. The cables shall be placed in approximately their final position and an inspection for shorts shall be made. After all wire nuts and wires are properly positioned, taping shall begin on the through cable 2 inches (50 mm) from the end for the sheath. It shall proceed with 1/2 inch (12 mm) width overlap across the splice area and onto the other through sheath for a distance of 2 inches (50 mm). The taping shall start at the end point and return back across the splice to the branch cable(s). It shall proceed along the branch cable(s) and onto the sheath for a distance of one inch (25 mm).

A return along the branch back to the main cable shall be made and the remaining part of the splice shall be taped continuing as before.

Every area of the splice shall have rubber tape at least four layers (two fully overlapped passes) deep. The cables shall be placed in their final position and taped with two fully overlapped passes of plastic tape. Plastic tape need not cover the interior areas covered by the rubber tape.

The splice shall be placed so that the branch cable(s) enters the splice from below to prevent water from flowing along the branch cable(s) into the splice area.

Method of Measurement:

The quantity of splices will be measured as be the actual number of above ground or underground splices made in accordance with these specifications, complete in place, and accepted.

Basis of Payment:

The quantity of splices will be paid for at the Contract unit price bid per each splice depending upon type. Price and payment will constitute full compensation for all labor, equipment, tools, and incidentals required to complete the work.

12/22/2010

746830 - REMOVAL OF CONCRETE POLE BASES AND CABINET FOUNDATIONS

Description:

This work consists of the removal of concrete pole bases and concrete cabinet foundations.

Materials:

Equipment as required to remove concrete pole bases and concrete cabinet foundations.
Material as necessary to match the area surrounding the removed or graded masonry.

Construction Methods:

The masonry shall be removed to a depth of six inches below final grade.

Backfill remaining hole with material that matches the surrounding area in accordance with the appropriate items.

Method of Measurement:

The quantity of concrete will be measured as the number of cubic yards (cubic meters) of concrete removed including anchor bolts, reinforcing bars, conduits and any other hardware within the concrete.

Concrete or other materials moved or removed which is not a part of the item being removed, shall not be measured for the purpose of payment under this item.

Basis of Payment:

The quantity of concrete will be paid for at the unit price per cubic yard (cubic meter). Price and payment will constitute full compensation for all labor, equipment, tools, and incidentals required to complete the work.

02/03/03

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 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 and tamped on all sides in layers not to exceed 6 inches (150 mm).

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. Excavation and backfilling around the base and the two conduit sweeps in the base are included in this item.

Any increase in the vertical dimension required herein shall be paid for separately under another item of this contract.

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:

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; for 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.

01/15/03

747506 - CABINET BASE

Description:

This work consists of installing a Cabinet Base.

Materials:

Class B Concrete
2 – 3/4" (19 mm) x 10' (3 m) sectional copperclad steel ground rods
6 - 5/8" (16 mm) Hilti Drop-in Anchors, Concrete Fastening Systems, or approved equal
6 - 5/8" (16 mm) x 1-1/2" (38 mm) galvanized hex bolts
2 - 3/4" (19 mm) acorn type ground clamps
2 – 2" (50 mm) x 24" (610 mm) PVC conduit lengths

Construction Methods:

The base shall conform to the dimensions as indicated in the cabinet base detail on the Standard Construction Details. 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 (50 mm) between conduits and the ground rods.

A minimum of 8 foot (2.5 m) of the ground rods must be driven into undisturbed soil through the 2 inch (50 mm) 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.

Payment for all conduits extending into the cabinet base shall be included in the items for installation of conduit.

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 labor, equipment, tools, and incidentals required to complete the work.

12/21/2010

747507 – LIGHTING CONTROL CENTER – 60A
747508 - LIGHTING CONTROL CENTER – 100A

Description:

This work consists of providing and installing load center cabinets with pad with all necessary conduits, underground facilities, equipment, and wiring as indicated on the Plans or as directed by the Engineer.

Materials:

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

Galvanized steel conduits and fittings shall be as specified under Section 745 of the Standard Specifications.

Meter Pan for 120/240 Volt, single phase, 3 wire service meeting the requirements of the utility company

Ground Rod shall be sectional, copper-clad 3/4 DIA by 10 feet long.

Service wire between the disconnect and the meter pan and between meter pan and the utility company shall be sized for 100 amp service (minimum) and meet utility company requirements.

Service conduit - Provide 2" rigid galvanized steel conduit from meter pan to nearest utility facility as indicated on plan or directed by the Engineer. Conduit will include mounting to utility pole and weather head. Installation is to meet utility company requirements.

60 Amp Lighting Control Center

Use of the 60 Amp Lighting Control Center is limited installations with six (6) or less luminaires at the given location.

Meter Pan and Disconnect shall be mounted on a 0.125" thick (minimum) aluminum or stainless steel backplate. The backplate shall be adequately sized to mount the equipment such that the meter pan and disconnect housing do not extend beyond the plate. Mount equipment utilizing stainless steel hardware. Equipment shall be able to be removed without removing the backplate from the posts.

The plate shall be bolted to two (2)- 4"x4" pressure treated wood post. Use four (4)- 1/4" stainless steel bolts. Posts shall be place flush with each end of the plate and shall have two (2) bolts each. The post shall extend three feet below finished grade and shall extend to be flush with the top of the backplate. The bottom edge of the equipment shall be three (3) feet above finished grade.

When placed with in a clear zone of the roadway posts shall have a 1" hole drilled perpendicular to the direction of traffic. The hole shall be no higher than four inches above finished grade or as directed by the Engineer.

Conduit – Provide a two inch conduit between the meter pan and disconnect. The conduit shall be straight with no bends, elbows, or condulets.

Lighting Disconnect – Provide fused heavy duty enclosed safety switch disconnect. Disconnect shall be 100 Amp, 2 pole, rated for 120/240 volt service. Disconnect shall be service entrance rated. Provide 2 sets of 60 Amp Class H Fuses, one set installed and one set in box as spares. Disconnect enclosure shall be NEMA 3R rated. Provide Neutral and Ground bus bar assemblies as necessary to make for a complete installation.

Photocell control shall be integral to each installed luminaire.

100 Amp Lighting Control Center

Cabinet

The cabinets and doors shall be constructed form 5052-H32 sheet aluminum alloy with a thickness of 0.125". External welds shall be made by using Heliarc welding method, internal weld, may be made by the wire welding method. All welds shall be neatly formed and free of cracks, flow holes and otherwise irregularities.

The outside surface of the cabinet shall have a smooth uniform, natural aluminum finish. The cabinets shall have a sloped top to prevent accumulation of water on its top surface.

The enclosure door frame shall be double flanged out on all four sides. These flanges increase strength of opening and keep dust and liquids from dropping into enclosure when door is opened. The cabinet door shall be hinged on the right side when facing the cabinet and shall be a minimum 80% of the front surface area. The door shall be gasketed to satisfy requirements of NEMA 4X enclosure.

The door shall have a heavy gauge continuous hinge with ¼" diameter stainless steel hinge pin. Hinge shall be secured with 1/4-20 stainless steel carriage bolts and stainless steel nylock nuts.

Cabinets shall be provided with a 5052-H32 aluminum alloy metal back panel of 0.125" minimum thickness. All mounting hardware shall be furnished. All internal hardware shall be either stainless steel or cadmium pressed steel Type II, Class I.

Cabinets finish shall be natural aluminum mill finish for Fed. Spec. QQA-250/8.

Main Disconnect - Provide a 100 AT/AF, 2 pole, molded-case circuit breaker. The circuit breaker shall be service entrance rated. It shall be rated for 120/240 volt single phase, three-wire. It shall have a minimum 10,000 RMS symmetrical ampere short circuit current rating. The circuit breaker shall be UL listed and comply with NEMA Standards and Federal Specification W-C-375B.

The main disconnect shall be separately enclosed external to the service cabinet. The main disconnect Enclosure shall be NEMA 3R rated.

Panelboards shall be rated for 120/240 volt single phase, three-wire operation. The panel board shall be UL listed and have a minimum of 100 amp rated main busses and main lugs only. It shall have a minimum of 12 spaces for branch circuit breakers. It shall have a minimum 10,000 RMS symmetrical ampere short circuit current rating. It shall conform to Federal Specification W-P-115C, Type 1, Class 1.

A solidly bonded equipment ground bar and neutral bar shall be provided.

The panel board shall be mounted within its own enclosure. It shall be of dead front construction and be rated NEMA Type 1. Finnish to be gray baked enamel.

Branch Circuit Breakers

Provide Circuit beakers of quantity and current rating as required by the plans for proper circuiting and provide two spare breakers of like current rating as the other lighting circuit breakers. Circuit breakers shall be UL listed and comply with NEMA Standards and Federal Specification W-C-375B. Circuit breakers shall be rated for 10 KAIC

Lighting Contactor, Photocell and override control

Provide a central lighting contactor. Lighting contactor shall be two or three pole as required for the given service type. Contacts shall be rated for 100 amps at the given service voltage. Coil shall be rated for 120 volts.

Provide a remote photoelectric light control (photocell) mounted at the top of the closest light standard in the lighting system. Photocell shall be a cadmium-sulphide type with fail-safe in the "on" position. It shall be enclosed in a weatherproof housing, not susceptible to distortion, discoloration, cracking or crazing. It shall include pole mounting hardware and be a plug-in, locking type for mounting in a receptacle meeting UL Specification 773. It shall be rated of 1800 VA for ballast type loads and used to energize a contactor. It shall be designed to operate at 105-130 volts and at -20F ambient temperature. It shall have a turn-off time delay to prevent false turn-off due to lightning, stray lighting or flashing lights.

Provide DPST toggle Switch for manual override of photocell control.

Construction Methods:

Service conduit shall be installed in accordance with DelDOT standard specification and utility company requirements.

Wood posts shall be placed within one (1) foot diameter by 3.5 feet deep concrete footing. Where the post will be within the concrete it shall be wrapped with 1/8 inch thick foam sheeting prior to placement of post or concrete. Concrete footing shall extend no greater than 1" above finished grade.

The concrete pad shall be a cast-in-place monolithic slab, with sides formed to a minimum 30" depth below the final ground surface. Concrete shall not be poured until the forming, position of conduits and grounding facilities are approved by the Engineer. Appropriate provisions shall be used to support conduit, grounding facilities and anchor bolts during concrete pouring and curing. All conduits shall be provided with temporary pipe caps during the placement of concrete. A minimum distance of 1" shall be maintained between conduits. Install 2" Conduit for to act a sleeve for the ground rod. The pad will include all conduits within the pad, grounding bushings on conduits coming out of top of pad, and anchor bolts as shown on the contract drawings.

Forms shall not be removed from the concrete pad until twenty-four (24) hours after the concrete has been poured and the pad is to be kept moist for a period of seven (7) days after pouring. The concrete surface shall be level and have a broom finish.

All excavation material shall be stockpiled on the site until backfilling has been completed. Backfill may be placed after the first 24 hours and is to be accomplished in 6" layers, with each lift mechanically tamped. All excess material is to be removed and used elsewhere on the project as approved by the Engineer.

Cabinets shall be installed on the concrete pad using the method of attachment as noted on the Plan details.

Electrical equipment shall be installed as indicated on the plans.

Method of Measurement:

The quantity of load centers will be measured as the actual number of load centers, each consisting of the cabinets, all equipment, conduit and wiring, complete in place, operational and accepted.

Basis of Payment:

The quantity of load centers will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing all materials, excavation and backfilling for the pad or footing, excavation and backfilling for service conduit and for all labor, equipment, tools and incidentals necessary to complete the item.

08/02/05

748502 - RAISED/RECESSED PAVEMENT MARKER

Description:

This work consists of furnishing and installing raised/recessed pavement markers in accordance with the Plans and these specifications.

Materials:

The cast iron housing shall meet the requirements of ASTM A 536-84, Grade 72-45-84.

The reflectors shall meet the requirements of ASTM D 4383-03.
For installation on interstates, freeways, and principal arterials, the pavement marker shall have red reflectorized material on the back side (the side not facing the direction of traffic).

Epoxy shall meet the requirements of AASHTO M237, Type IV.

The followings models have been tested and approved by the Department and shall be used:

1. (Ennis Paint) Stimsonite - Avery Dennison Model 101LPCR Snow Plowable Marker.

2. Ray-O-Lite Model 300 Snow Plowable Marker with Model 2004 Reflector.

3. Or Approved Equal.

Construction Methods:

Pavement shall be saw cut to match the bottom contour of the marker housing using a saw and blade suitable for the pavement material being sawed. The depth of the cut slot must allow the housing to be set in epoxy, with leveling lugs resting on the pavement surface, so that the front edge of marker is at or below the surface of the pavement. Excessive saw cuts must be repaired to the satisfaction of the Engineer. When cutting is complete, the slot shall be cleaned as recommended by the manufacturer of the epoxy material. The epoxy and pavement marker will be installed in the prepared contour slot in the pavement per the manufacturer's recommendations.

After installation, the Striping and Markings Section shall be notified for inspection and approval of acceptance of the raised pavement markers.

Method of Measurement:

The quantity of raised/recessed pavement markers will be measured as the actual number installed and accepted.

Basis of Payment:

The quantity of raised/recessed pavement markers will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing all materials, installation, saw-cutting, cleaning, disposal of discarded materials, for all labor, tools, equipment, all necessary incidentals associated with the item to complete the work.

03/13/08

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"

Description:

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

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

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)	Med. Chrome Yellow - 23% Min. (ASTM D211, Type III)
Epoxy Resin	75% Min., 82% Max.	70% Min., 77% Max.

The entire pigment composition shall consist of either titanium dioxide or medium

chrome yellow. No extender pigments are permitted. The white pigment upon analysis, shall contain a minimum of 16.5% TiO_2 (100% purity). The yellow pigment upon analysis, shall contain a minimum of 20% $PbCrO_4$ (100% purity).

Epoxy Content-WPE (Component A) - The epoxy content of the epoxy resin will be tested in accordance with ASTM D1652 and calculated as the weight per epoxy equivalent (WPE) for both white and yellow. The epoxy content will be determined on a pigment free basis. The epoxy content (WPE) shall meet a target value provided by the manufacturer and approved by the Department's Material and Research Section (from now on will be addressed as Department). A $\pm$ 50 tolerance will be applied to the target value to establish the acceptance range.

Amine Value (Component B) - The amine value of the curing agent shall be tested in accordance with ASTM D2074-66 to determine its total amine value. The total amine value shall meet a target value provided by the manufacturer and approved by the Department. A $\pm$50 tolerance will be applied to the target value to establish the acceptance range.

Toxicity - Upon heating to application temperature, the material shall not exude fumes which are toxic or injurious to persons or property.

Viscosity - Formulations of each component shall be such that the viscosity of both components shall coincide (within 10%) at a recommended spray application.

2. Physical Properties of Mixed Composition:

Unless otherwise noted, all samples are to be prepared and tested at an ambient temperature of 73 ± 5ºF. (23 ± 3ºC).

a. Color. The white epoxy composition when applied at a minimum wet film thickness of 20$\pm$1 mils (500 µm) as applicable and allowed to dry, shall be a reasonable visual match to Munsell Book Notation PB 9/1 (ASTM D1535).

The yellow epoxy composition when applied at a minimum wet film thickness of 20$\pm$1 mils (500 µm) as applicable and allowed to dry, shall be a reasonable visual match to Munsell Book Notation, 10YR 8/14 (ASTM D1535).

b. Directional Reflectance. The white epoxy composition (without glass spheres) shall have a daylight directional reflectance of not less than 84% relative to a magnesium oxide standard when tested in accordance with Method 6121 of Federal Test Method Standard No. 141.

The yellow epoxy composition (without glass spheres) shall have a daylight directional reflectance of not less than 55% relative to a magnesium oxide standard when tested in accordance with Method 6121 of Federal Test Method Standard No. 141.

c. Drying Time (Laboratory). The epoxy composition, when mixed in the proper ratio and applied at a 20$\pm$1 mils (500 µm) minimum wet film thickness, and immediately dressed with large reflective glass spheres (Federal Spec. Type 4)at a rate of 12 lb/gal (1.4 kg/l) of epoxy pavement marking materials, immediately followed by a second drop of AASHTO M-247 Type 1 glass spheres applied at a rate of 12 lb/gal (1.4 kg/L) of epoxy pavement marking material, shall exhibit a no-track condition in 15 minutes or less (ASTM D711). A Bird Applicator or any other doctor blade shall be used to produce a uniform film thickness.

d. Drying Time (Field). When installed at a minimum wet film thickness of 20±1 mils (500 or 625 um) and reflectorized with glass spheres, the maximum drying times shall correspond to these temperatures:

80°F (27°C)	10 minutes
70°F (21°C)	10 minutes
60°F (16°C)	15 minutes
50°F (10°C)	25 minutes
40°F (4°C)	45 minutes
35°F (2°C)	60 minutes

The composition shall dry to no-tracking in approximately 10 minutes, and after thirty (30) minutes shall show no damaging effect from traffic. Dry to no-tracking shall be considered as the condition where no visual deposition of the epoxy marking to the pavement surface is observed when viewed from a distance of 100 feet (30 meters), after a passenger car is passed over the line. Regardless of the temperature at the time of installation, the installation contractor shall be responsible for protection of the markings material until dry to a non-tracking state.

e. Abrasion Resistance. The wear index of the composition shall not exceed 82 when tested in accordance with ASTM C501 using a CS-17 wheel and under a load of 1000 grams for 1000 cycles.

f. Tensile Strength. The tensile strength of the epoxy composition shall not be less than 6000 psi (41 MPa) when tested in accordance with ASTM D638 using a Type IV specimen [0.125" ± 0.010" (3.18 ± 0.25 mm) thick]. Tests shall be conducted at an ambient temperature of 75 ± 5 F (24 ± 3 C). The testing machine shall operate at a speed of 0.20" (5.1 mm) per minute.

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

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

A 1/8 inch (3 mm) thick sheet of epoxy material is cast from a reservoir-type mold, fabricated from polyterrafluorethylene (PTFE), 1/8" deep x 10" x 10" (3 mm deep x 250 mm x 250 mm).

Prior to casting, the mold is sprayed with a suitable release agent. A sufficient amount of epoxy composition is mixed in the proper proportions (A:B) and poured level with the top of the mold. Care should be taken so as not to decrease or exceed the 1/8" (3 mm) thickness.

After a period of 1 to 4 hours, the material will have set into a semi-rigid sheet that is flexible enough to die-cut yet rigid enough to retain its shape. While the material is in this plastic state, five (5) specimens shall be die-cut and then placed on a flat, smooth, PTFE surface for the completion of the specified conditioning period.

g. Compressive Strength. The compressive strength of the epoxy composition shall not be less than 12,000 psi (83 MPa) when tested in accordance with ASTM D695 except that a compression tool shall not be necessary. The test specimen shall be a right cylinder [0.50 inch diameter by 1.0 inch length (12 mm diameter by 25 mm length)]. Tests shall be conducted at an ambient temperature of 75 ± 5°F (24 ± 3°C).

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

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

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

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

B. Reflective Glass Spheres/Beads

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

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

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

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

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

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

M247 AASHTO Type 1 Glass Spheres

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

Type 4 Large Spheres

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

The AASHTO M247 Type 1 glass spheres shall be treated with a moisture-proof coating. They shall show no tendency to absorb moisture in storage and shall remain free of clusters and hard lumps. They shall flow freely from dispensing equipment at any time when surface and

atmosphere conditions are satisfactory for marking operations. The moisture-resistance of the glass spheres shall be determined in accordance with AASHTO M247 test method 4.4.1.

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

C. Black Epoxy Contrast Markings

Epoxy Resin Requirements: The two-component, 100% solids, paint shall be formulated and designed to provide a simple volumetric mixing ratio (e.g. 2 part component A to 1 part component B) specifically for service as a hot-spray applied binder for black aggregate in such a manner as to produce maximum adhesion. The material shall be composed of epoxy resins and pigments only.

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

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

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

D. Black Aggregate

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

Sieve Size	Percent Retained
#30	18-28%
#40	60-80%
#50	2-14%

The moisture resistant aggregate shall have a ceramic coating. The aggregate shall be angular with no dry dispensement pigment allowed.

Hardness:	The black aggregate hardness shall be 6.5-7 on Moh's Mineral Scale.
Porosity:	The black aggregate porosity shall be less than two (2) percent.
Moisture Content:	The black aggregate moisture content shall be less than a half (.5) percent.

E. Packaging and Shipment

Epoxy pavement marking materials shall be shipped to the job site in strong substantial containers. Individual containers shall be plainly marked with the following information:

a. Name of Product
b. Lot Number
c. Batch Number
d. Test Number
e. Date of Manufacture
f. Date of expiration of acceptance (12 months from date of manufacture)
g. The statement (as appropriate)
   Part A - Contains Pigment & Epoxy Resin
   Part B - Contains Catalyst
h. Quantity
i. Mixing proportions, Application Temperature and Instructions
j. Safety Information
k. Manufacturer's Name and Address

Reflective glass spheres shall be shipped in moisture resistant bags. Each bag shall be marked with the name and address of the manufacturer and the name and net weight of the material.

F. The Department reserves the right to randomly take a one-quart sample of white, yellow and hardener, of the epoxy material or glass spheres without prior notice for testing to ensure the epoxy material meets specifications.

Epoxy Application Equipment:

Application equipment for the placement of epoxy reflectorized pavement markings shall be approved by the Department, prior to the start of work.

At any time throughout the duration of the project, the Contractor shall provide free access to his epoxy application equipment for inspection by the Engineer or his authorized representative.

In general, the application equipment shall be a mobile, truck mounted and self contained pavement marking machine, specifically designed to apply epoxy resin materials and reflective glass spheres in continuous and skip-line patterns. The application equipment shall be maneuverable to the extent that straight lines can be followed and normal curves can be made in a true arc. In addition, the truck mounted unit shall be provided with accessories to allow for the marking of legends, symbols, crosswalks, and other special patterns.

The Engineer may approve the use of a portable applicator in lieu of truck mounted accessories, for use in applying special markings only, provided such equipment can demonstrate satisfactory application of reflectorized epoxy markings in accordance with these specifications.

The applicator shall be capable of installing up to 20,000 lineal feet (6,100 lineal meters) of epoxy reflectorized pavement markings in an 8-hour day and shall include the following features:

1. The applicator shall provide individual material reservoirs, or space, for the storage of Part A and Part B of the epoxy resin composition; for the storage of water; and for the storage of reflective glass spheres.

2. The applicator shall be equipped with heating equipment of sufficient capacity to maintain the individual epoxy resin components at the manufacturer's recommended temperature for spray application and for heating water to a temperature of approximately 140ºF (60ºC).

3. The glass spheres shall be gravity dropped upon 20 mils (500 um) of epoxy pavement markings to produce a wet-night-reflective pavement marking. The large spheres (Federal Spec. Type 4) shall be applied at a rate of 12 pounds per gallon (1.4 kg/L) of epoxy pavement marking material, immediately followed by a second drop of AASHTO M-247 Type 1 glass spheres applied rate of 12 pounds per gallon (1.4 kg/L) of epoxy pavement marking material. This application rate and the following gradation shall conform to FHWA's FP-96: Standard

Specifications for Construction of Roads and Bridges on Federal Highway Projects (pages 757-761 Type 3 and Type 4 Beads).

4. The applicator shall be equipped with metering devices or pressure gauges, on the proportioning pumps. Metering devices or pressure gauges shall be visible to the Engineer.

5. The applicator shall be equipped with all the necessary spray equipment, mixers, compressors, and other appurtenances to allow for the placement of epoxy reflectorized pavement markings in a simultaneous sequence of operations as described below in Construction Details, D. Applications of Epoxy Reflectorized Pavement Markings of this Special Provisions.

Construction Details.

A. General: All pavement marking and patterns shall be placed as shown on the Plans or as directed by the Engineer.

Before any pavement markings work is begun, a schedule of operations shall be submitted for the approval of the Engineer. This schedule shall be submitted 2 weeks prior to the application of the striping.

At least five (5) days prior to starting striping the Contractor shall provide the Engineer with the epoxy manufacturer's written instructions for use. These instructions shall include but not be limited to: mixing ratios, application temperatures, and recommendations for use of water spray.

The application of pavement markings shall be done in the general direction of traffic. Striping against the direction of traffic flow shall not be allowed.

The Contractor shall be responsible for removing, to the satisfaction of the Engineer, tracking marks, spilled epoxy or epoxy markings applied in unauthorized areas.

The hot water spray shall not be used in conjunction with markings applications on any pavement surface, or on any existing durable type marking, unless specifically recommended by the manufacturer of the epoxy material.

B. Atmospheric Conditions: Epoxy pavement markings shall only be applied during conditions of dry weather and on substantially dry pavement surfaces. At the time of installation the pavement surface temperature shall be a minimum of 35 F (2 C) and the ambient temperature shall be a minimum of 35 F (2 C) and rising. The Engineer shall be the sole determiner as to when atmospheric conditions and pavement surface conditions are such to produce satisfactory results.

C. Surface Preparations: The Contractor shall clean the pavement or existing durable marking to the satisfaction of the Engineer.

Surface cleaning and preparation work shall be performed only in the area of the epoxy markings application.

At the time of application all pavement surfaces and existing durable markings shall be free of oil, dirt, dust, grease and similar foreign materials. The cost of cleaning these contaminants shall be included in the bid price of this item. Also, the item shall include the cost of removal of the curing component in the area of the epoxy markings application, if concrete curing compounds on new portland cement concrete surfaces have been used. Waterblasting will not be permitted for removal.

D. Application of White/Yellow Epoxy Reflectorized Pavement Markings: White/yellow epoxy reflectorized pavement markings shall be placed at the widths and patterns designated on the Contract Plans.

Markings operations shall not begin until applicable surface preparation work is completed, and approved by the Engineer.

White/yellow epoxy pavement markings shall be applied at a minimum uniform thickness of 20 mils (500 µm) on all Portland cement concrete and bituminous concrete pavement, including Stone Matrix Asphalt.

Large reflective glass spheres (Federal Spec. Type 4) shall be applied at the rate of 12 pounds per gallon (1.4 kg/L) of epoxy pavement marking material, immediately followed by a second drop of AASHTO M-247 Type 1 glass spheres applied at a rate of 12 pounds per gallon (1.4 kg/L) of epoxy pavement marking material. Glass spheres shall uniformly cover the length and width of the pavement marking.

E. Application of Black Epoxy Contrast Pavement Markings: Black epoxy contrast pavement markings shall be placed at the widths designated on the Contract Plans.

Markings operations shall not begin until applicable surface preparation work is completed, and approved by the Engineer.

Black epoxy contrast pavement markings shall be applied at a minimum uniform thickness of 20 mils (500 µm) on all Portland cement concrete surfaces followed by a single drop of graded black aggregate.

The width of black epoxy line shall be applied for the following situations:

Center Skip Line - On Portland cement concrete pavements a black contrast skip line shall be 10 feet (3 m) in length of the same width as the white epoxy reflectorized skip. It is to lead the white skip and stop at the beginning of the white skip. The black contrast skip is to have a single application of graded black aggregate.

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

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

1. Insufficient film thickness [(less than 20±1 mils (500 µm) as applicable] and line widths; insufficient glass bead coverage or inadequate glass bead retention.

   Repair Method: Prepare the surface of the defective epoxy marking by shot blasting, sand blasting, or water blasting. No other cleaning methods will be allowed. Surface preparation shall be performed to the extent that a substantial amount of the reflective glass spheres are removed and a roughened epoxy marking surface remains.

   Immediately after surface preparation remove loose particles and foreign debris by brooming or blasting with compressed air.

   Repair shall be made by re-striping over the cleaned surface, in accordance with the requirements of this specification and at a full 20±1 mils (500 µm) minimum line thickness as applicable.

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

existing durable marking).

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

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

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

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

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

3. Reflectivity for epoxy resin paint.

After satisfactory completion of all striping work and written notification from the Contractor, the Department shall test the striping to ensure it has the minimum reflectivity. The testing will be completed within 30 calendar days from notification. The Contractor may request that tests be conducted on completed phases or portions of the work. Approval of such a request will be at the discretion of the Engineer. Testing will be done using a Delta LTL 2000 Retrometer (30 meter geometry). Five readings will be taken per line per mile (1.6 km). Projects less than 1 mile (1.6 km) in length will have a minimum of 5 readings per line. These readings will then be averaged for the overall project average.

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

White 450
Yellow 325

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

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

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

Method of Measurement:

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

Basis of Payment:

The quantity of permanent pavement striping (white, yellow, or black epoxy resin paint) payment will

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

NOTE:

For information only:

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

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

2. IPS - Ennis Paint
   P.O. Box 13582
   Research Triangle Park, North Carolina 27709
   Tel. 1-877-477-7623

3. Epoplex
   One Park Avenue
   Maple Shade, NJ 08052
   Tel. 1-800-822-6920

4. Or an approved equal.

4/08/08

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, burning 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, approved flat black paint or 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.

4/5/11

749500 – SIGN PANEL
749578 - EXTRUDED SIGN PANEL GROUND MOUNTED TYPE III SHEETING (FEDERAL)

Description:

This work consists of furnishing all materials, fabrication, and erection of new extruded aluminum sign panels, complete with demountable copy, connections to supports, and other incidentals as are shown on the Plans, or described in the special provisions to be used for all federally funded projects.

The item shall also include removing and transporting of the existing sign panels before fabricating and erecting new sign panels, if such requirement is specified on the Plans.

Design:

Sign panels and their connections to supports shall be designed for applicable loadings and allowable stresses specified for supports. All panels, stiffeners and subframing shall conform with any pertinent requirements set forth in the AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals" with subsequent revisions. No method of stiffening will be allowed which would require rivets, bolts, screws, or nuts perforating the message face. The Contractor shall submit detail drawings showing the details for fabrications of the panels and support connections for prior approval.

Extruded Aluminum:

Extruded aluminum sign panels shall have demountable copy. After installation of the signs is completed, they will be inspected. If specular reflection is apparent on any sign, its positioning shall be adjusted by the Contractor, as directed by the Engineer.

Sign Panel Size: Sizes of sign panels having demountable copy have been based on the 3M Company spacing charts. All letters shall be placed in accordance with manufacturer's spacing charts. Overall horizontal and vertical dimensions shall be in 6" (150 mm) increments.

Materials:

The overhead sign sheeting shall be wide angle, prismatic, retroreflective sheeting. The coefficients of retroreflection, Ra, shall not be less than the minimum values specified in the following table when tested in accordance with ASTM E 810. This table contains “core” values as found in ASTM D 4956. The 0.1 observation angle is not required for this item.

Minimum Coefficient of Retroreflection R_A
(Candelas per lux per square meter)

TABLE 3 Type IX Sheeting[A]							
Observation Angle	Entrance Angle	White	Yellow	Orange	Green	Red	Blue
0.1 [A]	-4	660	500	250	66	130	30
0.1 [B]	+30	370	280	140	37	74	17
0.2	-4	380	285	145	38	76	17
0.2	+30	215	162	82	22	43	10
0.5	-4	240	180	90	24	48	11
0.5	+30	135	100	50	14	27	6.0
1.0	-4	80	60	30	8.0	16	3.6

TABLE 3 Type IX Sheeting[A]							
Observation Angle	Entrance Angle	White	Yellow	Orange	Green	Red	Blue
1.0	+30	45	34	17	4.5	9.0	2.0

[A] Minimum Coefficient of Retroreflection(R_A)$cd \cdot lx^{-1} \cdot m^{-2}$
[B] Values for 0.1 observation angles are supplementary requirements that shall apply only when specified by the purchaser in the contract or order.

The ground mounted sign sheeting shall meet or exceed the following values. The coefficients of Retroreflection shall be determined in accordance with ASTM E-810. This table contains "core" values as found in ASTM D 4956. The 0.1 observation angle is not required for this item.

TABLE 7 Type III Sheeting[A]								
Observation Angle	Entrance Angle	White	Yellow	Orange	Green	Red	Blue	Brown
0.1 [B]	-4	300	200	120	54	54	24	14
0.1 [B]	+30	180	120	72	32	32	14	10
0.2	-4	250	170	100	45	45	20	12
0.2	+30	150	100	60	25	25	11	8.5
0.5	-4	95	62	30	15	15	7.5	5.0
0.5	+30	65	45	25	10	10	5.0	3.5

[A] Minimum Coefficient of Retroreflection(R_A) $cd/fc/ft^2$($cd \cdot lx^{-1} \cdot m^{-2}$)
[B] Values for 0.1 observation angles are supplementary requirements that shall apply only when specified by the purchaser in the contract or order.

WARRANTY

The sheeting manufacturer shall submit with each lot or shipment, a certification that states the material supplied will meet all the requirements listed herein.

Field Performance Requirements:

The retroreflective sheeting will be considered unsatisfactory if it has deteriorated due to natural causes to the extent that: (1) the sign is ineffective for its intended purpose when viewed from a moving vehicle under normal day and night driving conditions; or (2) the coefficient of retroreflection is less than the minimum specified for that sheeting during that period listed.

85% of values listed in Table 7 Type III after 10 years
80% of values listed in Table 3 Type IX after 12 years.

All measurements shall be made after sign cleaning according to sheeting manufacturer's recommendations.

Sheeting Manufacturer's Replacement Obligation:

Where it can be shown that retroreflective signs supplied and used according to the sheeting manufacturer's recommendations, have not met the performance requirements of this specification the sheeting manufacturer shall cover restoration costs as follows for sheeting shown to be unsatisfactory during:

The entire 12 years (Type IX) and 8 years (Type III): the sheeting manufacturer will replace the sign in it's entirety inclusive of the sign panel, sign sheeting, labor, and M.O.T required to restore the sign surface to its original effectiveness.

Extruded Aluminum:

Extruded Aluminum Sign Panels and Edge Strip. Extruded aluminum sign panels and edge strip shall conform to B221, alloy 6063 T6.

Hardware: hardware shall be clear anodized, conforming to one of the following: B209, alloy 2024 T4; B211, alloy 2024 T4, 6262 T9, 6061 T6, 7075 T6 or 2017 T4.

Extruded Aluminum:

The front faces of the sign panels shall be degreased by one of the following methods:

1. Vapor degreasing by total immersion in a saturated vapor of trichlorethylene or perchloroethylene. Trademark printing shall be removed with lacquer thinner or by a controlled alkaline cleaning system.

2. Alkaline degreasing by total immersion in a tank containing alkaline solutions controlled and titrated to the solution manufacturer's specification. Rinse thoroughly with clean running water.

Immersion time shall depend upon the amount of grease or dirt present and the gage of the metal, and shall be sufficient to effect complete removal of all corrosion, white rust, and dirt.

Following degreasing, the front faces shall be etched by one of the following methods:

1. Acid etching in a 6 to 8 percent phosphoric acid solution at 100 F (38 C), or proprietary acid etching solution. Rinse thoroughly with cold, then hot running water.

2. Alkaline etching in an approved alkaline etching material that is controlled by titration. The etching time, temperature, and concentration shall be as specified by the solution manufacturer. Smut shall be removed with an acidic chromium compound type solution as specified by the solution manufacturer, and shall be rinsed thoroughly with clean running water.

The surface etch shall provide a clean mat, or non-glare finish, suitable for the application of the retroreflective sheeting. This finish shall also be suitable for the uncovered reverse sides of the signs. Any protective film or coating applied to resulting from chemical action on the aluminum surface shall be light, tight, and free from all powdery residue.

As an alternate to the above etching systems, any one of the following metal preparation systems, employing a chemical conversions coating, may be used providing it complies fully with the recommendations and specifications furnished by the respective preparation manufacturer:

1. "Alodine" 1200 or 1200S, by Amchem Products, Inc.

2. "Bonderite" 723 with Process Specification No. 249, by Parker Rust Proof Company.

3. "Chromicoat", by Oakite Products, Inc.

4. Other approved system(s), producing a conversion coat meeting the requirements of Military Specification MIL-C-5541.

Alternate coats shall be light, tight, and free from any powdery residue.

After degreasing and etching, the panels shall be dried by the use of forced, hot air.

Panels shall not be handled except by device or clean canvas gloves, from the time degreasing is started to the time of application of retroreflective sheeting, nor shall contaminants be permitted to come into contact with the panels during that period.

Construction Methods:

Sign Face Finishing: All retroreflective sheeting, backgrounds, letters, numerals, symbols, and borders shall be clean-cut and sharp, and the messages on all signs shall be as indicated on the plans. Application of retroreflective sheeting to aluminum panels shall be in accordance with sheeting manufacturer's recommendations. Retroreflective sheeting shall be color matched and marked. The height of characters and the alphabet series to be employed for the signs shall conform to the Plans and their references. The alphabet series used on the sign panels shall be those of the publication titled "Standard Alphabets for Highways Signs" of the Federal Highway Administration.

The working drawings prepared by the Contractor shall clearly indicate the proposed spacing of the letters and the locations and arrangements of symbols and borders.

After the panel has been degreased and etched, the retroreflective sheeting shall be applied by a method described elsewhere in these Special Provisions.

No sheeting shall be applied when the temperature is less than 50 F (10 C).

Whenever it is necessary to construct the background of a sign face with two or more pieces of retroreflective sheeting, they must be carefully matched for color prior to application and sign fabrication, to provide uniform appearance and brilliance, day and night. Each full width section of retroreflective sheeting mounted adjacent to another full width section taken consecutively from the same roll shall be rotated and mounted 180 degrees with respect to that adjacent section. This rule shall also be observed as a guide when partial width sheets of retroreflective sheeting are used.

Non-conformance may result in non-uniform shading and an undesirable contrast between adjacent widths of applied sheeting which will render signs unacceptable. The entire background of each sign shall be uniform in color, brilliance, texture, and general appearance as seen in the daytime and under typical automobile illumination at night. No more sections of retroreflective sheeting shall be used for backgrounds than is necessary; remnants, scraps, and odd sized pieces of sheeting shall not be used in the fabrication of any signs manufactured for this contract. Joints between retroreflective sheeting sections shall either butt or overlap no more than 3/8" (9.5 mm). Horizontal joints between retroreflective sheeting sections shall not be allowed.

Sign Panel Erection: Signs shall be slip-sheeted, packed, and shipped in such manner as to ensure arrival at their respective places of erection in an undamaged condition. All signs arriving at the erection site(s) in a condition which in the opinion of the Engineer, renders them unsuitable for use, shall be removed and replaced by the Contractor at his sole expense. Sign Panels shall not be shipped for erection in such a manner that results in horizontal joints of the retroreflective sheeting.

It is not anticipated that there will be any sign panels which are required to be mounted whose messages will be inappropriate to the guiding of traffic at the time of sign erection. However, in the event that the Engineer determines that certain sign messages are inappropriate, the panels of such signs shall be covered by an opaque material, until such time as the sign messages become appropriate. The covering material and the manner of securing the material to the sign panel(s), shall meet with the approval of the Engineer. The Engineer will indicate to the Contractor which signs, if any, must be covered, and when to remove the covers.

Sign Covers: Sign covers shall be 10 ounce (280 g) cotton duck conforming to ASTM D-320, Army Duck, and dyed to a dark green approximating the green for sign backgrounds.

Identification Tags: The Contractor shall furnish and place identification tags or decals which state the

Contract number, month and year of erection on the lower reverse side of the panel, near the point closest to the roadway shoulder.

Method of Measurement:

The quantity of sign panels will be measured as the actual number of square feet (meters) of front sign face surface area of all sign panels construction, installed and accepted. The area will be computed from the maximum width and height dimensions of each sign panel, as shown on the Plans, or on the approved sign panel shop drawings, (verified by field measurements). All sign panels will be considered either square or rectangular in shape, as the case may be, and no area deductions will be made for rounding of corners.

Basis of Payment:

The quantity of sign panel will be paid for at the Contract unit price per square foot (meter). Price and payment will constitute full compensation for furnishing, fabricating, and erecting sign panels complete in place and accepted, with retroreflective materials, copy, symbols, borders, connections to supports, degreasing, etching, covering and uncovering sign messages where necessary, and for all labor, materials, tools, equipment, and incidentals required to complete the item.

Unless otherwise indicated on the Plans, the cost of removing and transporting to the nearest highway maintenance yard the existing sign panels and accessories shall also be included under this item if such requirement is indicated on the Plans.

4/11/07

749502 - SIGN PANEL OVERLAYS ON EXISTING SIGN

Description:

This work consists of furnishing, fabrication, and installation of sign panel overlays, complete with copy, attaching hardware, and other incidentals as are shown on the Plans, and described herein.

The Contractor shall verify all panel sizes in the field before fabrication of the overlays. Such field verification shall be considered as an incidental expense to this item.

Materials:

Sign panels shall be of the aluminum sheet type conforming to ASTM Designation B209 (Alloy 6061-T6). The minimum panel sheet thickness shall be 0.080 (2.0 mm). Stringers or horizontal structural sign supporting members and vertical connections shall be fabricated of 6061-T6 or 6062 ASTM B221 aluminum alloy.

Sign panel sections shall be fabricated standard width of not less than 4 - 0 (1.2 m) wide.

Sign panel sections 12 (3.6 m) and under in height shall run from the top edge to the bottom edge of the sign face without horizontal joints in the aluminum sheets.

Sign panel sections over 12 (3.6 m) in height may be fabricated from two (2) or more sheets. The bottom sheet(s) shall be 12 (3.6 m) in height, except that the smaller top sheet shall not be less than 2 (0.6 m) in height. Adjustment in sheet heights is permitted to avoid conflict with direct applied sign face copy.

The working drawings prepared by the Contractor shall clearly indicate the proposed spacing of the letters and the locations and arrangements of symbols and borders.

After the panel has been degreased and etched, the reflective sheeting shall be applied by a method described elsewhere in these Special Provisions.

No sheeting shall be applied when the temperature is less than 50 F (10 C).

Whenever it is necessary to construct the background of a sign face with two or more pieces of reflective sheeting, they must be carefully matched for color prior to application and sign fabrication, to provide uniform appearance and brilliance, day and night. Each full width section of reflective sheeting mounted adjacent to another full width section taken consecutively from the same roll shall be rotated and mounted 180°, with respect to that adjacent section. This rule shall also be observed as a guide when partial width sheets of reflective sheeting are used.

Non-conformance may result in non-uniform shading and an undesirable contrast between adjacent widths of applied sheeting which will render signs unacceptable. The entire background of each sign shall be uniform in color, brilliance, texture, and general appearance as seen in the daytime and under typical automobile illumination at night. No more sections of reflective sheeting shall be used for backgrounds than is necessary; remnants, scraps, and odd-sized pieces of sheeting shall not be used in the fabrication of any signs manufactured for this Contract. Joints between reflective sheeting sections shall either butt or overlap no more than 3/8 (10 mm).

Any logo as specified on the Plans shall be attached to the sign panel overlay by the Contractor as directed by the Engineer.

Construction Methods:

Signs shall be slip-sheeted, packed, and shipped in such a manner as to ensure arrival at their respective

place of erection in an undamaged condition.

All signs arriving at the erection site(s) in a condition which in the opinion of the Engineer, renders them unsuitable for use, shall be removed and replaced by the Contractor at his/her sole expense.

Any sign panel which shall receive an overlay, shall be removed and mounted on a vehicle with a frame which shall allow the panel to remain in a vertical alignment while the overlay is installed. The sign panel shall remain in a vertical position during all phases of the overlay operation.

All aluminum sheet-type overlays shall be anchored to the existing panel a maximum of 3 (80 mm) from the edge of the sign panel, each corner, at a maximum spacing of 1 (0.3 m) around the edge of the sign panel and at 2 (0.6 m) maximum spacing on the interior of the sign panel, or as directed by the Engineer. Overlays shall be anchored to the base panel with aluminum rivets as approved by the Engineer.

Identification Tags: The Contractor shall furnish and place identification tags or decals which state the Contract number, month and year of the erection on lower reverse side of panel, near the point closest to the roadway shoulder.

Sign Covers: It is not anticipated that there will be any sign panel overlays which are required to be mounted whose messages will be inappropriate to the guiding of traffic at the time of sign erection. However, in the event that the Engineer determines that certain sign messages are inappropriate, the panels of such signs shall be covered by an opaque material until such time as the sign messages become appropriate. The covering materials and the manner of securing the material to the sign panel(s) shall meet with the approval of the Engineer. The Engineer will indicate to the Contractor which signs, if any, must be covered and when to remove the covers.

Sign covers shall be 10 ounce (0.3 kg) cotton duck conforming to ASTM D-320, Army Duck, and dyed to a dark green approximately the green for sign backgrounds.

Method of Measurement:

The quantity of sign panel overlays will be measured as the actual number of square feet (square meters) of front sign face surface area of all sign panels overlaid, installed and accepted. The area will be computed from the maximum width and height dimensions of each sign panel, as shown on the Plans, or on the approved sign panel shop drawings (verified by field measurements). All sign panels will be considered either square or rectangular in shape, as the case may be, and no area deductions will be made for rounding of corners.

Basis of Payment:

The quantity of sign panel overlays will be paid for at the Contract unit price per square foot (square meter). Price and payment will constitute full compensation for furnishing, fabricating, and erecting sign panel overlays, copy, symbols, borders, connections to supports, degreasing, etching, covering and uncovering sign message where necessary, preparing the existing sign for the overlay, including removal and remounting the sign, and for all labor, materials, tools, equipment, and incidentals required to complete the item.

10/23/01

749504 - INSTALLATION OR REMOVAL OF BREAKAWAY I BEAM SIGN MOUNTS

Description:

This work consists of installing or removing breakaway I-beam sign mounts on sign bases previously installed or installed under other items in this contract.

Materials:

The Department will supply the I-beams and all mounting hardware to be used. The I-beams will be cut to the correct length and marked by the Department for the area they are to be installed.

Construction Methods:

The I-beams are to be installed in a manner as not to damage the base that the I-beam is to be installed on and care taken to not interfere with overhead utility lines.

When re-installing an existing sign mount, removal of broken couplings and bolts in existing I-beams and removal of broken anchor bolt in existing bases shall be considered part of this item.

Where an existing sign has been knocked down, this item will pay for the repair of breakaway couplings and standing up the existing sign. No additional compensation will be made for installation of sign unless a new sign is required.

In the removal of the I-beams, all hardware is to be returned to the Department at the Dover Sign Shop.

Method of Measurement:

The quantity of breakaway mounts will be measured as the number of breakaway mounts installed as specified, complete in place, and accepted or removed and returned to the Department at the Dover Sign Shop.

Basis of Payment:

The quantity of breakaway mounts will be paid for at the contract unit price per each. Price and payment will constitute full compensation for all labor, equipment, tools, and incidentals required to complete the work.

12/9/02

749510 - INSTALLATION OR REMOVAL OF SIGN ON OVER HIGHWAY STRUCTURE
749511 - INSTALLATION OR REMOVAL OF SIGN ON ROADSIDE I-BEAM STRUCTURE
749512 - INSTALLATION OR REMOVAL OF SIGN ON SPAN WIRE OR MAST ARM

Description:

This work consists of installing or removing a sign on an over-highway structure, roadside I-beam structure, span wire, or mast arm. The sign may be mounted to an existing structure or one installed under this contract.

The largest sign panel or single sign to be installed on over-highway structures will be 96 square feet (9 square meters) to be raised to a height not to exceed 35 feet (11 meters) measured from ground to top of sign.

Materials:

The Department will supply the signs to be installed. The signs may be supplied with pre-drilled holes for use in mounting the sign.

The Contractor will supply:
Galvanized 3/8"(9 mm) U-bolts
Galvanized washers
Galvanized nuts
For signs 15 SF (1.4 sq m) and less, four to six U-bolts will be needed.

Construction Methods:

Sign installation shall be performed as specified by the Engineer. Care shall be taken to prevent any damage to the sign panel, span wire, mast arm, over-highway structure, roadside I-beam structure, or any electrical cable attached to the span wire, or any lights attached to the sign panel.

Sign installation on over-highway structure or roadside I-beam structure may require the sign to be assembled in panels. The sign may be made from several panels to make one complete sign. Signs on roadside I-beam structures shall be installed at a height of 7 feet (2.1 m) from the bottom of the sign to the near edge of pavement.

Sign removal shall be performed as specified by the Engineer. Care shall be taken to prevent any damage to the sign panel, span wire, mast, any electrical wire attached to the span wire or any lights attached to the sign panel. If the panel has lights attached to the sign panel, the contractor will be required to disconnect the wiring prior to removing the sign panel. Removal of the wiring that operates the lights will be at the direction of the Engineer and paid for under other items of this specification. All materials removed shall be returned to the Department at the Dover Sign Shop.

Method of Measurement:

The quantity of overhead and roadside signs will be measured as the number of square feet (meter) of complete signs installed as per these specifications, complete, in place, and accepted or removed and returned to the Department at the Dover Sign Shop.

Basis of Payment:

The quantity of overhead and roadside signs will be paid for at the contract unit price per square feet (meter). Price and payment will constitute full compensation for all labor, equipment, tools, and incidentals required to complete the work.

04/02/04

749516 – REINFORCED CONCRETE SIGN FOUNDATION, W-6
749517 – REINFORCED CONCRETE SIGN FOUNDATION, W-8
749518 – REINFORCED CONCRETE SIGN FOUNDATION, W-10
749519 – REINFORCED CONCRETE SIGN FOUNDATION, W-12
749520 – REINFORCED CONCRETE SIGN FOUNDATION, W-14

Description:

This work consists of furnishing all material and installing sign foundations.

Materials:

Bar Reinforcement shall conform to the requirements of Subsection 603.02 of the Standard Specifications.

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

Anchors shall be fabricated from 304 Stainless Steel for the threaded ferrule portion, and 1058 steel rod and coil for cage portion of anchor.

Nuts, Bolts and Cap Screws shall meet AASHTO M 164 (m 164M). All nuts, bolts and cap screws shall be within a hardness range of Rockwell C23 to C31 prior to hot dip galvanizing per AASHTO M232/M 232M.

Construction Methods:

The bases shall conform to the dimensions and details as indicated on the Plans.

Excavation for the foundation may not exceed the dimension of the foundation by more than 1 foot (300 mm) in any one direction. If a form is used in the excavation more than 18 inches (460 mm) below the ground surface, it is necessary that the excavation be filled and tamped on all sides inlayers not to exceed 6 inches (150 mm).

The excavated material shall be disposed of and the area shall be properly graded. After grading, the area shall be returned to its original condition around the supports with mulching, seeding or other landscaping as necessary or as directed by the Engineer.

Anchor bolts shall be set to template for alignment and elevation and shall be secured in position to prevent displacement while concrete is being placed. The steel reinforcement and conduit elbows shall have been placed and secured before the placing of concrete.

Method of Measurement:

The quantity of sign foundations will be measured as the number of foundations for the specified size of beam constructed in accordance with these specifications, complete in place, and accepted.

Basis of Payment:

The quantity of sign foundations will be paid for at the contract unit price per each foundation of the type specified. Price and payment will constitute full compensation all materials and sign foundation installation complete in place and for all labor, equipment, tools, and incidentals required to complete the work. Payment will also include returning the area around the sign post to its original conditions by mulch, seeding or other landscaping necessary.

10/27/2009

749521 - SUPPLY OF BREAKAWAY I-BEAM SIGN POSTS, W-6
749522 - SUPPLY OF BREAKAWAY I-BEAM SIGN POSTS, W-8
749523 - SUPPLY OF BREAKAWAY I-BEAM SIGN POSTS, W-10
749524 - SUPPLY OF BREAKAWAY I-BEAM SIGN POSTS, W-12
749525 - SUPPLY OF BREAKAWAY I-BEAM SIGN POSTS, W-14
749563 - SUPPLY OF BREAKAWAY I-BEAM SIGN POSTS, W-4

Description:

This work consists of furnishing all materials for ground mount breakaway type sign posts and breakaway assemblies to the job order site in conformance with the details and notes shown on the Plans, and as directed by the Engineer.

Materials:

Structural Steel shall meet the applicable requirements of Subsection 605.02 of the Standard Specifications and AASHTO M 270/M 270M, GR36 (GR250), GR50 (GR345), or GR50W (GR 345W) as detailed on the plans. Steel posts shall be galvanized in accordance with the requirements of AASHTO M 111/M 11M.

Breakaway Couplings shall be made from alloy steel which conforms to AISI 4340, 4130 or an equivalent material, and shall have a minimum tensile yield stress of 175,000 psi (1200 MPa). The Rockwell C hardness shall be 26 minimum. The couplings shall have tensile breaking strength ranges as noted below; and shall be of the type as shown on the Plans:

Type A	17,000 – 21,000 lb (75 – 93 kN)
Type B	47,000 – 57,000 lb (209 – 253 kN)

This steel shall conform to the requirements of the current ASTM designation A-370.

The couplings shall be clean, dry and free from any foreign material and shall be primed and coated with a suitable paint which shall be baked or fused with a polyurethane additive. The color of the coating shall be as follows:

Type A	Yellow
Type B	Red

Chipped areas on the coating surface shall be repaired. All threaded surfaces, after coating, shall be cleaned to all them to function properly.

Brackets shall be made from aluminum alloy 6061 T-6 or an equivalent material. Upper brackets shall incorporate the load concentrating member or bass which shall be made from the following material:

Type A	Aluminum alloy 6061 T-6 or equivalent as part of brackets
Type B	Stainless steel 416 or equivalent ASTM A582-Rockwell C35-C45

The type of bass shall be as shown on the Plans.

Location holes for the breakaway coupling shall be accurately positioned relative to the load concentrating member in accordance with the Engineer's requirements. All Brackets shall be permanently labeled with bracket number to reflect the hole positioning.

Hinge Plates shall be made from alloy steel which conforms to AISI 4340, 4130 or an equivalent

material and shall have a minimum tensile yield stress of 90,000 psi (620 MPa). The hinge plates shall have tensile breaking strength ranges as follows:

HI-10	11,450 – 13,900 lb (50.9 – 61.8 kN)
HI-1	16,400 – 19,700 lb (72.9 – 87.6 kN)
HI-2	6,700 – 8,100 lb (29.8 – 36.0 kN)

Nuts, Bolts and Cap Screws shall meet AASHTO M 164 (m 164M). All nuts, bolts and cap screws shall be within a hardness range of Rockwell C23 to C31 prior to hot dip galvanizing per AASHTO M232/M 232M.

Construction Methods:

Working Drawings. Working drawings shall be submitted in accordance with subsection 105.04 of the Standard Specifications. Minor variations in details may be permitted; however, any major departure from the design will not be accepted.

Fabrications. Loading, transporting, unloading and erection of structural materials shall be done so that the metal will be kept clean and free from injury in handling.

Structural materials shall be stored above the ground upon platforms, skid or other supports and shall be kept free from accumulation of dirt, oil, acids or other foreign matter.

Structural material which has been deformed shall be straightened before being laid out, punched, drilled or otherwise worked upon in the shop. Sharp kinks or bends will be cause for rejection.

When sign support structures are subcontracted, the subcontract shall be in accordance with Subsection 108.01 of the Standard Specifications except that the value of the subcontract will be based on the value of the work for fabrication.

Repair Galvanizing. Galvanized areas damaged during shipping or erection shall be repaired by any of the three methods specified under ASTM A780. In all cases, the repair shall achieve the minimum coating thickness specified.

Erection. Material shall not be dropped, thrown or dragged over the ground. The Contractor shall supply detailed, written instructions and drawings for the erection of all sign structure components.

Method of Measurement:

The quantity of supplying ground mount breakaway type sign posts and breakaway assemblies will be measured as linear feet for the length and size of ground mount breakaway sign post furnished as specified and accepted.

Basis of Payment:

The quantity of supplying ground mount breakaway type sign posts and breakaway assemblies will be paid for at the Contract unit price per linear feet for the length and size of ground mount breakaway sign post specified. Price and payment will constitute full compensation for furnishing hinge plates, breakaway couplings, nuts, bolts and cap screws and all other materials for the sign posts and breakaway assemblies in accordance with the details and notes shown on the Plans, and as directed by the Engineer; and for all labor, equipment, tools and incidentals necessary to complete the work.

3/6/08

749535 - SUPPLY AND INSTALLATION OF BOLT KIT FOR BREAK AWAY COUPLING
. 749536 - SUPPLY AND INSTALLATION OF HINGE PLATE FOR BREAK AWAY COUPLING
749537 - SUPPLY AND INSTALLATION OF BREAK AWAY COUPLING SYSTEM

Description:

This work consists of the supply and installation of bolt kit, hinge plate or a break away coupling system to be used on I-beam sign structures previously installed or installed under other items in this contract.

Materials:

Breakaway Couplings shall be made from alloy steel which conforms to AISI 4340, 4130 or an equivalent material, and shall have a minimum tensile yield stress of 175,000 psi (1200 MPa). The Rockwell C hardness shall be 26 minimum. The couplings shall have tensile breaking strength ranges as noted below; and shall be of the type as shown on the Plans:

Type A	17,000 - 21,000 lb (75 - 93 kN)
Type B	47,000 - 57,000 lb (209 - 253 kN)

This steel shall conform to the requirements of the current ASTM designation A-370.

The couplings shall be clean, dry and free from any foreign material and shall be primed and coated with a suitable paint which shall be baked or fused with a polyurethane additive. The color of the coating shall be as follows:

Type A	Yellow
Type B	Red

Chipped areas on the coating surface shall be repaired. All threaded surfaces, after coating, shall be cleaned to all them to function properly.

Brackets shall be made from aluminum alloy 6061 T-6 or an equivalent material. Upper brackets shall incorporate the load concentrating member or bass which shall be made from the following material:

Type A	Aluminum alloy 6061 T-6 or equivalent as part of brackets
Type B	Stainless steel 416 or equivalent ASTM A582-Rockwell C35-C45

The type of bass shall be as shown on the Plans.

Location holes for the breakaway coupling shall be accurately positioned relative to the load concentrating member in accordance with the Engineer's requirements. All Brackets shall be permanently labeled with bracket number to reflect the hole positioning.

Hinge Plates shall be made from alloy steel which conforms to AISI 4340, 4130 or an equivalent material and shall have a minimum tensile yield stress of 90,000 psi (620 MPa). The hinge plates shall have tensile breaking strength ranges as follows:

HI-10	11,450 - 13,900 lb (50.9 - 61.8 kN)
HI-1	16,400 - 19,700 lb (72.9 - 87.6 kN)
HI-2	6,700 - 8,100 lb (29.8 - 36.0 kN)

Nuts, Bolts and Cap Screws shall meet AASHTO M 164 (m 164M). All nuts, bolts and cap screws shall be within a hardness range of Rockwell C23 to C31 prior to hot dip galvanizing per AASHTO M232/M 232M.

Construction Methods:

None.

Method of Measurement:

The quantity of installation, removal, relocation and cutting of overhead I-beams will be measured as the number of overhead I-beams installed, removed, relocated and cut as specified, complete and in place, or removed and returned to the Department at the Dover Sign Shop.

Basis of Payment:

The quantity of installation, removal, relocation or cutting of overhead I-beams will be paid for at the contract unit price per each. Price and payment will constitute full compensations for all labor, equipment, tools, and incidentals required to complete the work.

10/26/05

749540 - REMOVAL OF OVERHEAD I-BEAM
749541 - INSTALLATION OF OVERHEAD I-BEAM
746542 - RELOCATION OF OVERHEAD I-BEAM
746544 - CUTTING OF OVERHEAD I-BEAM

Description:

This work consists of installing, removing, relocating or cutting an overhead I-beam on sign structures previously installed or installed under other items in this contract.

Materials:

Steel I-beams and all mounting hardware to be used will be paid for under other items of this contract or may be furnished by the Department. The supply of the material will be designated in the job order. All I-beams will be cut to the correct length and marked for the area they are to be installed.

Construction Methods:

The I-beams are to be contacted in a manner as not to damage or interfere with overhead utility lines or the integrity of the structure.

Method of Measurement:

The quantity of installation, removal, relocation and cutting of overhead I-beams will be measured as the number of overhead I-beams installed, removed, relocated and cut as specified, complete and in place, or removed and returned to the Department at the Dover Sign Shop.

Basis of Payment:

The quantity of installation, removal, relocation or cutting of overhead I-beams will be paid for at the contract unit price per each. Price and payment will constitute full compensations for all labor, equipment, tools, and incidentals required to complete the work.

10/26/05

749550 - INSTALLATION OF BREAKAWAY I-BEAM SIGN POSTS
749551 -REMOVAL OF BREAKAWAY I-BEAM SIGN POSTS

Description:

This work consists of installing or removing breakaway I-beam sign posts and breakaway assemblies on sign bases previously installed or installed under other items in this contract.

Materials:

Steel I-beams and all mounting hardware to be used will be paid for under other items of this contract or may be furnished by the Department. The supply of the material will be designated in the job order. All I-beams will be cut to the correct length and marked for the area they are to be installed.

Construction Methods:

The I-beams are to be installed in a manner as not to damage the base that the I-beam is to be installed on and care taken to not interfere with overhead utility lines.

When re-installing an existing sign post and breakaway assemblies, removal of broken couplings and bolts in existing I-beams and removal of broken anchor bolts in existing bases shall be considered part of this item.

Where an existing sign has been knocked down, this item will pay for the repair of breakaway couplings and standing up the existing sign. No additional compensation will be made for removal or installation of sign unless a new sign is required.

In the removal of the I-beams, all hardware is to be returned to the Department at the Dover Sign Shop.

Method of Measurement:

The quantity of installation or removal of breakaway posts and breakaway assemblies will be measured as the number of breakaway posts and breakaway assemblies installed as specified, complete and in place, or removed and returned to the Department at the Dover Sign Shop.

Basis of Payment:

The quantity of installation or removal of breakaway posts and breakaway assemblies will be paid for at the contract unit price per each. Price and payment will constitute full compensations for all labor, equipment, tools, and incidentals required to complete the work.

10/26/05

749687 – INSTALLATION OR REMOVAL OF TRAFFIC SIGN ON SINGLE SIGN POST

Description:

This work consists of installing or removing traffic sign(s) on a single post at the locations indicated on the Plans or as directed by the Engineer. This specification also includes installation of posts in boring holes constructed under other items.

Signs totaling more than 9 square feet shall be installed on multiple sign posts under Item 749690 – Installation or Removal of Traffic Sign on Multiple Sign Posts.

Materials:

The Department will provide all sign materials to be used on this project. The Contractor shall contact the DelDOT Sign Shop Supervisor with project plans and quantity sheets at 302-760-2581. Sign fabrication orders require a minimum of four (4) weeks for completion. Orders placed with less than 4 weeks lead-time will result in a delay. Any delay caused by inadequate lead-time due to a late order will be the sole responsibility of the Contractor. The Contractor shall pick-up the sign materials from the DelDOT Sign Shop and deliver them to the job site without any damage to the sign materials.

Construction Methods:

The Contractor shall pick-up necessary signs, sign posts, hardware, and extensions from the Department and install the signs in the locations indicated on the Plans in accordance with the DelDOT MUTCD or as directed by the Engineer. The Contractor shall be responsible for obtaining all necessary utility clearances before the signs may be installed. For sign removals, the sign posts shall have all nuts, bolts, and other connectors removed. The disturbed ground shall be graded and backfilled accordingly. All signing materials removed from the project shall be returned to the DelDOT Sign Shop without any damage to the sign materials.

Method of Measurement:

The number of single sign installations or removals will be measured as the actual number of sign posts installed or removed and accepted.

Basis of Payment:

The quantity of single sign post installations or removals will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for installing or removing signs and sign materials, pick-up and delivery of sign materials, grading disturbed areas, and for all labor, equipment, tools, and incidentals required to complete the work. Signs that are not installed in accordance with the DelDOT MUTCD or signs installed in the incorrect location shall be moved at no additional cost to the Department.

6/22/09

749688 - INSTALLATION OF 4" DIAMETER HOLE, LESS THAN OR EQUAL TO 6" IN DEPTH
749689 - INSTALLATION OF 4" DIAMETER HOLE, GREATER THAN 6" IN DEPTH

Description:

This work consists of boring a hole 4" in diameter averaging 6" in depth into bituminous concrete or P.C.C. surfaces for installing single or multiple sign posts at the locations indicated on the Plans or as directed by an Engineer.

Materials:

The Contractor shall provide the equipment necessary to bore a 4" hole into paved surfaces, while maintaining the stability of the surrounding paved or P.C.C. surfaces. The depth of the bored hole shall be to the top of the subbase material.

Construction Methods:

The holes shall be bored into pavement or P.C.C. islands, medians, or sidewalk using a mechanical hole borer for such work or other methods approved by the Engineer. The hole shall be 4" in diameter. Holes bigger or smaller than 4" shall be corrected at the Contractor's expense.

Method of Measurement:

The number of 4" holes in diameter bored will be measured as the actual number of holes bored and accepted.

Basis of Payment:

The quantity of holes bored as required above will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for boring holes at the required depth, and for all labor, equipment, tools, and incidentals required to complete the work.

Note:

The cost for installing holes and PVC sleeves for sign posts in newly constructed P.C.C. islands, medians, or sidewalks shall be incidental to the P.C.C. item.

3/23/09

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.

Signs with any dimension, length or width, greater than 48 inches shall be mounted on two (2) posts. Signs with a length greater than or equal to 78 inches shall be mounted on three (3) sign posts.

Materials:

The Department will provide all sign materials to be used on this project. The Contractor shall contact the DelDOT Sign Shop Supervisor with project plans and quantity sheets at 302-760-2581. Sign fabrication orders require a minimum of four (4) weeks for completion. Orders placed with less than 4 weeks lead-time will result in a delay. Any delay caused by inadequate lead-time due to a late order will be the sole responsibility of the Contractor. The Contractor shall pick-up the sign materials from the DelDOT Sign Shop and deliver them to the job site without any damage to the sign materials.

Construction Methods:

The Contractor shall pick-up necessary signs, sign posts, hardware, and extensions from the Department and install the signs in the locations indicated on the Plans in accordance with the DelDOT MUTCD or as directed by the Engineer. The Contractor shall be responsible for obtaining all necessary utility clearances before the signs may be installed. For sign removals, the sign posts shall have all nuts, bolts, and other connectors removed. The disturbed ground shall be graded and backfilled accordingly. All signing materials removed from the project shall be returned to the DelDOT Sign Shop without any damage to the sign materials.

Method of Measurement:

The number of sign installations or removals will be measured as the total square foot of the sign(s) installed or removed and accepted.

Basis of Payment:

The quantity of sign installations or removals will be paid for at the Contract unit price per square foot. Price and Payment will constitute full compensation for installing or removing signs and sign materials, pick-up and delivery of sign materials, grading disturbed areas, and for all labor, equipment, tools, and incidentals required to complete the work. Signs that are not installed accordance with the DelDOT MUTCD or signs installed in the incorrect location shall be moved at no additional cost to the Department.

3/23/09

759502 - FIELD OFFICE, SPECIAL I

Description:

This Field Office, Special II item is a field office complex the work of which consists of erecting, furnishing, equipping, maintaining, and removing one (1) double wide modular field office unit, its entrance, and its adjacent parking area and one (1) single wide modular field office unit, its entrance, and its adjacent parking area. These field office units may be situated in different locations. The Contractor shall submit a specific location layout drawing and construction details for each field office, its entrance, and its parking area for approval by the Engineer. Each field office and its parking area shall be for the exclusive use of Department Officials, Engineers, Consultants, and Inspectors.

Each field office structure shall be free of asbestos and/or other hazardous materials. Each field office, its entrance, and its parking area shall be constructed and installed in accordance with all applicable city, county, state, and federal codes. The Contractor shall be responsible for obtaining all required licenses and permits for installation and placement of each field office, its entrance, and its parking area. The costs of obtaining such licenses and permits are to be incidental to the "Field Office, Special I" Item. Each field office shall be available for use by the Department continuously throughout the duration of the project.

Construction of and Equipment for the Field Offices:

The double wide field office shall be new and have a minimum floor space of 1,200 square feet with minimum exterior dimensions of 50'-0" length by 24'-0" width and the single wide field office shall be new and have a minimum floor space of 600 square feet with minimum exterior dimensions of 50’-0” length by 12’-0” width. The floor to ceiling height of each field office shall be nominal 8'-0". The exterior walls, ceiling, and floor of each field office shall be insulated. Each field office shall be of weather-proof construction, tightly floored and roofed, constructed with an air space above the ceiling for ventilation, supported above the ground, safely secured to its support if the support is an inground anchored foundation or otherwise by tie-downs to the ground, and fully skirted with rigid watertight covering overlapping the bottom of the exterior siding to the existing ground.

The Contractor shall provide entries to each field office by constructing a stair and deck platform with canopy at each exterior door. These entries shall be fabricated using treated dimension lumber, be constructed with hand and safety railing, be designed to last the life of the Contract, and conform to the requirements of the Architectural Accessibility Board and other federal, state and local boards, bodies and/or courts having jurisdiction in the Contract limits.

The Contractor shall construct and maintain an all weather parking area adjacent to each field office of at least 6000) square feet and having a minimum of 12 functional parking spaces striped for full size cars. An entrance shall be constructed to each field office from its point of access to its parking area as determined by its approved location layout drawing and construction details, the cost to be incidental to the "Field Office, Special I" Item. All weather pathways from the parking area to the entrances of each field office shall also be constructed and maintained. This parking area and entrance pathways shall have a minimum of 2" type "C" hot mix on top of minimum 6" graded aggregate subbase. Snow and/or ice shall be removed from the entrance, the parking area, and the entrance pathways of each field office within 12 hours after each occurrence. Costs for furnishing, placing, and maintaining the aggregate base and hot mix, and for snow and/or ice removal, to be incidental to the "Field Office, Special I" Item.

The ground area 30'-0" from around the perimeter of each field office shall be landscaped and maintained. If the earthen grounds do not have a stand of weed free grass, the surface of this area shall be loosened to a depth of 4" and a satisfactory seedbed shall be prepared free of debris and extraneous matter. The area shall be seeded to a healthy stand of grass or sodded, after which the area shall be watered, mowed, and trimmed a minimum of three times a month during the growing seasons. Cost for this landscaping and maintenance is incidental to the "Field Office, Special I" Item.

Each field office shall have full carpeting, kitchenette facilities, and interior and exterior paneling, lighting, and plumbing fixtures. Each field office shall have a minimum of two (2) exterior doors, each door having a passage and a deadbolt lock. These door locks shall be keyed and at least 2 complete sets of keys shall be supplied to the Engineer's representatives. The exterior doors of each field office shall be insulated or have storm doors. Each field office shall have a minimum of six (6) windows, each window having a minimum glass area of 1,150 square inches and a horizontal mini-blind covering the full glass area. The windows of each field office shall be insulated or have storm windows, shall be equipped with a locking device, and shall have screens installed and repaired when damaged.

At least two (2) outside water service connections shall be provided at each field office. Each water connection shall have a 3/4" frost proof hose bib with vacuum breaker and shall include 100 linear feet of 5/8" minimum diameter reinforced, industrial or commercial grade, soft rubber hose per connection.

Each field office shall be provided with sufficient natural and artificial light and shall be adequately heated and cooled to provide comfortable working conditions.

Each field office shall have satisfactory lighting, electrical outlets, heating equipment, and exhaust fan and air-conditioning connected to an operational power source. Plan and drawing areas shall have individual fluorescent lights situated over their worktables. Replacement fluorescent lights shall be furnished as required. Electrical current, water, and any fuel for heating equipment shall be furnished and the cost of such shall be borne by the Contractor. Maintenance of the heating, exhaust fan, and air-conditioning equipment for each field office shall be provided for by validated service contracts for the length of the Contract. These service contracts shall allow a Department authorized project person to deal directly with the service organization to request repair.

The Contractor shall furnish and maintain two fire extinguishers and provide one lighted "Exit" sign for each exterior passage door of the field offices. Fire extinguisher(s) may be chemical or dry power and shall be UL Classification 10-B:C(min.) and shall be suitable for Types A:B:C fires. A commercial or industrial type first aid and safety kit suitable for project conditions and hazards (including snakebite) shall be provided and maintained to full capacity on a monthly basis in each field office.

The Contractor shall provide an alarm system in each field office for security with electronic, direct connection to a security service provider. The security systems shall have interior motion, window, and entrance detectors and built in manual fire alarms. All windows of each field office shall be covered with steel bar grids as a deterrent to forced entry. The Contractor shall provide validated monitoring and service contracts for the length of the Contract for each field office. These contracts shall allow a Department authorized project person to deal directly with the security service provider to request service and/or repair.

The Contractor shall furnish and maintain in each field office an adequate supply of cold potable water, a minimum 23 cubic foot new refrigerator, and a minimum 900-watt new microwave oven. Maintenance of the potable water supply equipment, refrigerator, and microwave shall be provided for by validated service contracts for the length of the Contract. These service contracts shall allow a Department authorized project person to deal directly with the service organization to request repair.

Suitable indoor toilet facilities, conforming to the requirements of the State and Local Boards of Health or of other bodies or courts having jurisdiction in the area, shall be provided for each field office. When separate facilities for men and women are not available or required, a sign with the wording "Rest Room" {letter heights of 1" minimum} shall be placed over the doorway and an adequate positive locking system shall be provided on the inside of the doorway to insure privacy. The facility(s) shall be maintained by the Contractor to be clean and in good working condition and shall be stocked by the Contractor with adequate lavatory and sanitary supplies at all times during the period of the Contract.

For each field office the Contractor shall be responsible for performing or for making arrangements for all necessary telephone connections and/or for their maintenance; for providing a new telephone equipment system, for payment of all connections and the new telephone system equipment and its installation; and for final disconnection of the telephones.

The telephone system for the field offices shall have a total of 9 lines consisting of 8 direct single lines with call forward busy feature and 1 dedicated facsimile line and have 8 key sets consisting of 1 master key set having privacy feature, and 7 six-button key sets having privacy feature (1 set which may be for wall mounting), all for the official and exclusive use of the Engineer and other representatives of the Department. Location of telephone lines shall by as directed by the Engineer. Arrangement shall be made to allow a Department authorized project person to deal directly with the telephone company to report outages and/or request repair. The Contractor shall arrange for the installation and initial setup of the specified telephone system. Initial installation and setup costs shall be the responsibility of the Contractor as well. All subsequent monthly billings, after initial installation and setup, for each field office telephone system shall be received and paid by the Contractor. A copy of each of these subsequent bills shall be forwarded to the Project Resident for reimbursement on the contract pay estimate and the reimbursement will be for the amount of the bill only and shall not include any additional mark-up or profit.

For all other utilities, the Contractor shall be responsible for performing or for making arrangements for all necessary utility connections and/or for their maintenance; for payment of all utility connections, installations, service fees and bills; and for final disconnection of utilities.

The field office interiors shall be furnished by the Contractor. The Contractor shall provide new and maintain the following office furnishings, all which are to be approved by the Engineer prior to installation in the field office complex. Placement of these furnishings shall be as directed by the Engineer. These furnishings consist of 4 drafting tables with sufficient drawers for standard size plans, either attached to the tables or in cabinet form, each drafting table to have an ergonomic design spring back stool with five leg base having wheel casters, 9 full size office desks each with filing drawer and fully adjustable ergonomic design swivel chair with armrests and five leg base having wheel casters, 1 computer station with acoustical panels having minimum 60 NRC rating for privacy screen and fully adjustable ergonomic design swivel chair with armrests and five leg base having wheel casters, 1 large conference table for a minimum of 12 people with surrounding chairs with armrests, 4 folding tables minimum 6'-0" by 3'-0" each with ergonomic design straight back chair with armrests, 1 work table, 1 supply cabinet, 1 or more clothes closets of ample size to meet inspection manpower requirements, 4 rough plan racks, 4 legal size filing cabinets with 4 drawers, 2 legal size fire-resistant filing cabinets with lock and key with 4 drawers and meeting fire underwriters' approval for not less than one hour test, 2 stackable steel flat file cabinets for 43" by 32" size plan sheets each cabinet having 5 drawers with full suspension, rear hood, and hinged front depressor, 2 book shelves minimum 3'- 6" by 4'- 6" each, 3 vertical surface legal size three compartment pockets, 2 dry erase boards minimum 4' by 3' each with markers and erasers, and 2 cork bulletin boards minimum 3' by 2'. These office furnishings will remain the property of the Contractor at the conclusion of the project.

For each field office, the Contractor shall also furnish new and maintain the following office equipment, all which are to be approved by the Engineer prior to installation. The required equipment will enable the Department to synchronize project record keeping and office functions. The equipment shall be delivered in working and useable condition:

4 heavy-duty calculators having extra large 12-digit fluorescent display, full size keyboard with contoured keys, two-color ribbon printer, and AC powered;

1Muratec MFX-2855D or Toshiba e-STUDIO 2330c or approved equal all-in-one copier which includes scanner, printer, and fax. Copier to have high speed wireless and network capability. Copier shall have all necessary software and cables for proper operation and shall be connected to high speed wireless and connected for use to share on a local network. Copier to have zoom and preset reduction and enlargement features, automatic two (2) sided copying, automatic document feeder with minimum 30 sheet capacity with automatic stapling capacity;

1 micro cassette recorder, having fast playback, voice-activated system, three-digit tape counter, silent auto-stop and pause, two tape speeds, one-touch and follow-up, built-in condenser microphone, cue and review, and rechargeable with combination battery charger/AC adapter;

1 telephone answering machine having all-digital recording, 14 minute message capacity, selectable

message time, voice prompt assistance, day/time stamp, call screening, two-digit LED message indicator, toll saver, power failure memory back-up, and message interrupt from any station; and

2 digital cameras with minimum 1/2.7" 4.0 mega pixel, 3X optical / 6X precision digital zoom, 12-bit DXP A/D conversion, 2.5" 123K pixel LCD display, 5-mode program AE and each with dual media slots, SXGA/XGA/VGA image resolution, E-mail mode. Also intelligent flash with red-eye protection, MPEG movie mode, clip motion, light metering, TEXT mode (GIF), playback zoom and resize, white balance, lithium battery system and in-camera picture effects, memory stick (minimum 256MB) capability, and storage case.

Consumables as required to manage the business of the project for each field office shall be provided for all office equipment for the length of the Contract. These consumables shall be furnished on request and shall include but not be limited to paper, tapes, ribbons, rolls, toner, cleaning kits, microcassette tapes and batteries, answering machine cassettes, camera batteries and memory sticks and/or discs, DVD and CD R/RW media, etc.

Maintenance of all office equipment in each field office shall be provided for by a validated service contract for the length of the Contract. This service contract shall allow a Department authorized project person to deal directly with the service organization to request repair.

Computer Requirements for Each Field Office:

Each field office shall have two (2) IBM compatible Microcomputer Systems both which will be furnished and maintained by the Contractor for use by the Engineer, the cost to be incidental to the "Field Office, Special I" Item. The specified computer systems will synchronize the construction management functions of the Department to monitor, report, and perform the accounting of the project work. The computer systems and all their related equipment specified below shall be furnished new and remain the property of the Contractor at the conclusion of the Contract. A detailed listing of the proposed computer systems and all their related equipment to be provided by the Contractor shall be submitted for approval by the Engineer prior to furnishing the Microcomputer Systems. The Microcomputer Systems shall be Laptop Computer Systems each with docking station, unless otherwise determined by the Engineer. In each field office both of the two (2) Microcomputer Systems shall consist of:

Central Processing Unit (CPU) – Lap Top

Intel Core 2, Duo processor and wireless networking capability included,

Minimum 2.0 GB RAM with expansion capability to at least 4.0 GB and clock/calendar card equivalent, and

Microsoft "Windows® XP Professional" or Windows® license downgrade to “Windows® XP Professional” operating system;

Memory (Storage)

CD/DVD +/- RW with double layer write capability, and 120GB hard drive minimum, integrated Ethernet 10/100, and internal modem. Included software shall support double layer media writing and automatic backup of data;

Monitor (Cathode Ray Tube)

Monitor for docking station and docking station - Super Video Graphics Adapter (SVGA) minimum. 19" minimum diagonal visual area flat panel with .26 dot pitch capable of multiple frequency 256 color graphics and at least 1024 pixel resolution. Swivel base with low radiation and eyestrain protection, brightness and contrast control and

Laptop - shall have 15.4” display minimum;

Color Graphics Card

PCIe video card or integrated video;

Keyboard

Keyboard shall be ergonomic, enhanced layout minimum with keyboard interface cable;

Printers

2 HP Color LaserJet CP3525n or Xerox Phaser 6280 or approved equal color printers with high speed wireless and network capability. Printers shall have all necessary software and cables for proper operation and shall be connected to high speed wireless and connected for use to share on a local network:

Software

The latest version programs for application management (operating system), word processing, spreadsheet, and anti-virus shall be provided with all user manuals. Upgrades, maintenance, and full technical support by the manufacturer shall be provided for the length of the Contract. The required software will enable the Department to synchronize accounting and record keeping functions between the project, District, and Department offices. A list of programs to be provided shall be submitted to the Engineer for approval. Software, other than for application management and anti-virus, is to be delivered unopened to the Department's administrative office. All software is to be compatible with and for use to run on "Windows® XP Professional". The required applications software follows and is to be latest version unless noted:

spreadsheet - "Lotus 1-2-3®",
suite - "Microsoft® Office XP Professional",
tracking - "Expedition®",
antivirus - "Norton Systemworks™ 2004, and
software supporting creation of DVD +/- R/RW disks (supporting double layer media writing) and DVDR and DVDRW disks using DVDRW drive, for example: Ahead Nero, Roxio DVD/CD Creator, or some equivalent product. Note: software commonly included as part of the standard CDRW upgrade/standalone package is acceptable if included with the unit;

Related Equipment

Wireless networking hub/router, 802.11g or better, (or other high speed internet access) with all associated hardware (adapters, cables, etc) and software to enable wireless networking (or other high speed internet access) and internet connection sharing for all office computers and printers,

An electrical outlet with dedicated circuit for the main computer unit,

An optical mouse with proper driving software having complete Microsoft emulation,

An internal 56/28.8/14.4 fax modem with MNP5 error checking and complete Hayes emulation having high-speed 14.4 fax capability and regular data transmission between 2400 and 56 baud, with the latest version proper driving software,

Necessary cables for proper operation,

An uninterruptible power supply (UPS) units for protection from power loss or fluctuation, minimum of 6 outlets, adequate to provide a minimum of 30 minutes backup power for an orderly shut down of

the computer system with software and connections for automatic system shutdown,

24 bit Sound Blaster compatible PCI soundcard with quality desktop speakers,

A combination surge, spike, and noise protection device with receptacles for all peripherals (may be in combination with the UPS power supply),

A wrist rest suitable for use with the furnished keyboard,

Cleaning kits for disk drives,

An anti-glare filter with grounding wire suitable for use with the furnished monitor, and

All cards, hardware, and operating, anti-virus, and equipment software to be fully installed and operational;

Maintenance and Service

Maintenance of all specified equipment and components shall be provided for by a validated service agreement for the length of the Contract. Maintenance (upgrades, replacement, full technical support) for each software application shall be provided for by validated maintenance agreement for the length of the Contract. These agreements shall allow an authorized project person to deal directly with the service organization to request repair or the maintenance organization to request assistance; and

Supplies
Consumables as required to manage the business of the project shall be provided for the Microcomputer Systems in each field office for the length of the Contract. These consumables shall be furnished on request and include but not be limited to 3-1/2" double sided high density micro floppy diskettes, compatible diskettes for provided digital cameras and memory stick media, DVDR and DVDRW media compatible supporting operational minimum to maximum speed of the DVD/RW drive unit, cut sheet paper and labels compatible with the printers, hardware and screen cleaners, and toner cartridges.

Maintenance Requirements for Each Field Office:

Maintenance of each field office including its entrance and adjacent parking area, for the time required, shall consist of maintenance and/or replacement of all provided items, security system, furniture and equipment, computer systems, providing lavatory supplies, providing trash containers and waste baskets, providing entrance mats at each door, providing replacement items for lighting fixtures, maintaining all utilities, providing vermin and pest control by professional exterminator(s), providing satisfactory and sanitary janitorial and waste disposal services twice a week, providing cleanup of trash and debris on the parking lot and landscaped area once a week, and shall be included in the monthly unit cost.

The Contractor shall provide and deliver for each field office a current copy of all validated field office equipment and computer maintenance, service, assistance and/or monitoring agreements and/or contracts as mentioned hereinabove to the Department's administrative office on or before the first day each field office is ready for use.

Method of Measurement:

This item will not be measured but will be paid for on a monthly basis. Partial months will be paid at the rate of 0.033 months per day.

Basis of Payment:

The field office complex will be paid for on a unit price bid per month, which price shall be full compensation for performing the work specified and the furnishing of all materials, labor, tools, equipment and

incidentals necessary to maintain each field office, their entrance, and their adjacent parking area and restore each field office area, entrance, and adjacent parking area to match their original site condition. No separate payment will be made for costs involved for removing hazardous material or underground tanks to install these field offices, their entrances, and their parking areas. One (1) unit of payment will constitute erecting, furnishing, equipping, maintaining, and removing one (1) double wide field office and one (1) single wide field office and their entrances and parking areas.

Payment will be made only for the actual number of months that the field office complex is acceptably provided by the Contractor.

The field offices, their entrances, and their parking areas shall be ready for use not later than forty-five (45) calendar days after the date of the fully executed Contract or before construction operations begin.

10/28/10

760504 - RUMBLE STRIPS, HOT MIX
760506 - RUMBLE STRIPS, CONCRETE

Description:

This work consists of furnishing a pavement cutting machine and cutting rumble strips in bituminous concrete pavement or P.C.C. concrete pavement in accordance with the details and notes on the Plans and as directed by the Engineer.

Construction Methods:

The machine shall be one with a proven record for use in cutting strips in bituminous concrete pavement or P.C.C. concrete pavement. The strips shall be cut in accordance with the dimensions as detailed on the Plans, and materials resulting from cutting the pavement shall be disposed of and the slots shall be properly cleaned. The machine shall produce a smooth cut without tearing or snagging and be equipped with guides to provide uniformity and consistency in alignment of each cut with respect to the roadway.

Method of Measurement:

The quantity of rumble strips will be measured longitudinally along edge of pavement in linear feet (meters) of rumble strip cut in the pavement and accepted.

Basis of Payment:

The quantity of rumble strips will be paid for at the Contract unit price per linear feet (meter). Price and payment will constitute full compensation for furnishing the machine and operator as described herein and cutting the strip slots, for disposing of satisfactorily the discarded materials and cleaning the rumble strip area for all labor, tools, equipment and necessary incidentals to complete the work.

11/8/01

760507 - PROFILE MILLING, HOT-MIX
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.

5/02/02

763500 - MAINTENANCE OF TRAFFIC

Description:

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

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

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

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

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

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

2. The Contractor's operations are unsafe.

Construction Methods:

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

The Contractor shall be required to have an American Traffic Safety Services Association (ATSSA) certified Traffic Control Supervisor on the project during all working hours. The working hours for an ATSSA supervisor is limited to a 12 hour shift. After working 12 consecutive hours, a new ATSSA certified Control Supervisor shall replace him/her. The ATSSA certified Traffic Control Supervisor's sole responsibility shall be the maintenance of traffic throughout the project. This responsibility shall include, but is not limited to, the installation, operations, maintenance and service of temporary traffic control devices. Also required is the daily maintenance of a log to record maintenance of traffic activities, i.e. number and location of temporary traffic

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

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

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

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

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

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

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

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

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

- Local 911 Center
- Local schools
- Local post offices
- DelDOT's Transportation Management Center (TMC)
- Town Managers

- Local Police
- Local Fire Department and Emergency Medical Services
- DelDOT's Public Information Center
- Delaware Transit Corporation (DTC)

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

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

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

1. If work is being conducted within 200 feet in advance or up to 200 feet beyond an intersection that is controlled by a traffic signal, the Flagger shall direct the flow of traffic in concert with the traffic signal to avoid queuing unless active work prohibits such action. The Flagger shall direct traffic to prevent traffic from queuing through an intersection (i.e., blocking an intersection).

2. If work is being conducted within a signalized intersection or series of signalized intersections, the Engineer shall notify the DelDOT TMC no less than 24 hours in advance of the operation. If work is being conducted within a signalized intersection, a Traffic Officer may direct traffic against the operation of the traffic signal only until the operation occurring within the intersection is completed. When the operation within the intersection is complete, the Engineer shall notify the DelDOT TMC that the intersection is no longer impeded by construction activities.

3. Work in the vicinity of traffic signals shall be scheduled to minimize the time during which the signal is operated without detectors. Prior approval of the Engineer shall be required for such work to be scheduled. The Contractor shall submit a schedule to the Engineer for approval seven (7) days in advance of the proposed start date of this work. The DelDOT Transportation Management Center (TMC) requires 48 hours advance notice of the cutting of a loop detector, and immediate notification once the loop detector has been reinstalled. The Contractor shall coordinate with the Engineer sufficiently in advance of loop detector work to ensure that these requirements are met.

4. When a lane adjacent to an open lane is closed to traffic, the temporary traffic control devices shall be set 2' (0.61 m) into the closed lane from the edge of the open lane, unless an uncured patch exists or actual work is being performed closer to the open lane with minimum restriction to traffic.

5. Except for "buffer lanes" on high volume and/or high speed roadways, lanes shall not be closed unless construction activity requiring lane closure is taking place or will take place within one hour. Lanes shall be reopened immediately upon completion of the work. For moving operations the lane closure shall be shortened as work progresses and as traffic conditions warrant to keep the length of the closure to a minimum. The Contractor shall conduct construction operations in a manner so as to minimize disruption to traffic during peak hours and periods of heavy flow. The Department reserves the right to stop the Contractor's operations if, in the opinion of the Engineer, such operations are impeding traffic unnecessarily.

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

requirement.

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

At the end of each workday, the Contractor shall correct all pavement edge drop-offs in accordance with Table 6G-1 in the Delaware MUTCD. This corrective work shall be accomplished with Temporary Road Material (TRM) unless an alternate method is specified in the Plans. All ruts and potholes shall be filled with TRM as soon as possible, but no later than by the end of each workday. Placement of TRM shall be completed in accordance with the applicable sections of the Delaware Standard Specifications and shall be incidental to the appropriate item in the Contract. If temporary elimination of a drop-off hazard cannot be accomplished, then the area shall be properly marked and protected with additional temporary barriers, barricades, warning signs, flashing lights, etc. as required by Section 6G.21 of the Delaware MUTCD.

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

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

At the end of each day's operation and before traffic is returned to unrestricted roadway use, temporary striping shall be applied to locations that require permanent striping. Temporary pavement striping shall match permanent pavement striping as shown on the Plans or as directed by the Engineer. Prior to the start of any activity which will affect the pavement surface and require the placement of temporary striping, the Contractor shall show the Engineer proof that he has scheduled placement of the necessary temporary striping to ensure that the temporary striping can be completed prior to fully opening the roadway to traffic. The Contractor is responsible for maintaining the temporary markings in good condition such that the pavement is properly delineated at all times. The Contractor shall refresh the temporary pavement markings as required or as directed by the Engineer.

The Contractor shall apply temporary pavement markings in accordance with the requirements of Section 748 of the Delaware Standard Specifications and Part 3 of the Delaware MUTCD. Payment for temporary pavement striping shall be made at the unit price bid for the applicable temporary striping or symbol items. Payment for final striping will be included in the applicable striping item. Temporary pavement markings shall match the Plan dimensions and layout or the approved drawings of the "permanent markings"

and shall be installed in accordance with Part 3 of the Delaware MUTCD. All conflicting striping is to be removed as directed by the Engineer according to the specifications for Item 748530 – Removal of Pavement Striping. Painting over the conflicting striping will not be accepted unless specifically allowed by the Plans.

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

- December 24 through December 27 (Christmas Day)
- December 31 through January 3 (New Years Day)
- Friday prior to Easter through Easter Sunday
- Thursday prior to Memorial Day through the Tuesday following Memorial Day
- Dover International Speedway Race Weekends (Thursday prior to the race event through the day after the race event)
- July 3 through July 5 (Independence Day)
- Thursday prior to Labor Day through the Tuesday following Labor Day
- Wednesday prior to Thanksgiving Day through the Monday following Thanksgiving Day

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

Certification:

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

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

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

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

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

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

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

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

Basis of Payment:

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

NOTE:

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

8/2/10

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.

Engineering/Survey Staff:

The Contractor shall provide and have available for the project an adequate engineering staff that is competent and experienced to set lines and grades needed to construct the project. The engineering personnel required to perform the work outlined herein shall have experience and ability compatible with the magnitude and scope of the project. Additionally, the Contractor shall employ an engineer or surveyor licensed in the State of Delaware to be responsible for the quality and accuracy of the work done by the engineering staff. When individuals or firms other than the Contractor perform any professional services under this item, that work shall not be subject to the subcontracting requirements of Subsection 108.01 of the Standard Specifications. The Contractor shall assume full responsibility for any errors and/or omissions in the work of the engineering staff described herein. If construction errors are caused due to erroneous work done under Construction Engineering the Contractor accepts full responsibility, no matter when the error is discovered. Consideration will not be given for any extension of contract time or additional compensation due to delays, corrective work, or additional work that may result from faulty and erroneous construction stakeout, surveying, and engineering required by this specification.

Construction Methods:

Performance Requirements:

(a) Construction Engineering shall include establishing the survey points and survey centerlines; finding, referencing, offsetting the project control points; running a

horizontal and vertical circuit to check the accuracy of given control points. Establishing plan coordinates and elevations marks for culverts, slopes, subbase, subsurface drains, paving, subgrade, retaining walls, and any other stakes required for control lines and grades; and setting vertical control elevations, such as footings, caps, bridge seats and deck screed. The Contractor shall be responsible for the preservation of the Department's project control points and benchmarks. The Contractor shall establish and preserve any temporary control points (traverse points or benchmarks) needed for construction. Any project control points (traverse points) or benchmarks conflicting with construction of the project shall be relocated by the Contractor. The Contractor as directed by the Engineer must replace any or all stakes that are destroyed at any time during the life of the contract. The Contractor shall re-establish centerline points and stationing prior to final cross-sections by the Engineer. The Vertical Control error of closure shall not exceed 0.05 ft times [Square root of number of miles in the level run] (0.01 m times [square root of number of kilometers]). The Horizontal Control accuracy ratio shall not exceed an error of closure of 1 foot per 20,000 feet (1 meter per 20,000 meters or 1:20,000) of distance traversed prior to adjustment.

(b) The Contractor shall perform construction centerline layout of all roadways, ramps and connections, etc. from project control points set by the Engineer. The Contractor using the profiles and typical sections provided in the plans shall calculate proposed grades at the edge of pavement or verify information shown on Grades and Geometric sheets.

(c) The Contractor shall advise the Engineer of any horizontal or vertical alignment revisions needed to establish smooth transitions to existing facilities. The Contractor shall immediately bring to the attention of the Engineer any potential drainage problem within the project limits. The Engineer must approve any proposed variation in profile, width or cross slope.

(d) The Contractor shall establish the working points, centerlines of bearings on bridge abutments and on piers, mark the location of anchor bolts to be installed, check the elevation of bearing surfaces after they are ground and set anchor bolts at their exact elevation and alignment as per Contract Plans. Before completion of the fabrication of beams for bridge superstructures, the Contractor shall verify by accurate field measurements the locations both vertically and horizontally of all bearings and shall assume full responsibility for fabricated beams fitting and bearing as constructed. After beam erection and concurrently with the Department project surveyors, the Contractor shall survey top of beam elevations at a maximum of 10-ft (3.0-meter) stations and compute screed grades. These shall be submitted to the Engineer for review and approval before the stay in place forms are set. Construction stakes and other reference control marks shall be set at sufficiently frequent intervals to assure that all components of the structure are constructed in accordance with the lines and grades shown on the plans. The Contractor will be responsible for all structure alignment control, grade control and all necessary calculations to establish and set these controls.

(e) The Contractor, using contract plans, shall investigate proposed construction for possible conflicts with existing and proposed utilities. The Contractor shall then report such conflicts to the Engineer for resolution. All stakes for advanced utility relocation, which will be performed by others, shall be paid for under item 763597 – Utility Construction Engineering.

(f) The Contractor shall be responsible for the staking of all sidewalk and curb ramp grades in accordance with the plans and the Departments Standard Construction Details. The Contractor shall review the stakeout with the Engineer prior to

construction. The Engineer must approve any deviation from plans, Department Standard Construction Details and Specifications in writing. The Contractor shall be responsible for any corrective actions resulting from problems created by adjustments if they fail to obtain such approval.

(g) If wetland areas are involved and specifically defined on the Plans the following shall apply:

i. It is the intent of these provisions to alert the Contractor, that he/she shall not damage or destroy wetland areas, which exist beyond the construction limits. These provisions will be strictly enforced and the Contractor shall advise his/her personnel and those of any Subcontractor of the importance of these provisions.

ii. All clearing operations and delineation of wetlands areas shall be performed in accordance with these Special Provisions. Before any clearing operation commences the Contractor shall demarcate wetlands at the Limits of Construction throughout the entire project as shown on the Plans labeled as Limits of Construction or Wetland Delineation to the satisfaction of the Engineer.

iii. The material to be used for flagging the limits of construction shall be orange vinyl material with the wording "Wetland Boundary" printed thereon. In wooded areas, the flagging shall be tied on the trees, at approximate 20-foot (6.1 meter) intervals through wetland areas. In open field and yard areas that have been identified as wetlands, 3 foot (one meter) wooden grade stakes shall be driven into the ground at approximate 20 foot (6.1 meter) intervals and tied with the flagging.

iv. If the flagging has been destroyed and the Engineer determines that its use is still required, the Contractor shall reflag the area at no cost to the Department. If the Contractor, after notification by the Engineer that replacement flagging is needed, does not replace the destroyed flagging within 48 hours, the Engineer may proceed to have the area reflagged. The cost of the reflagging by the Engineer will be charged to the Contractor and deducted from any monies due under the Contract.

v. At the completion of construction, the Contractor shall remove all stakes and flagging.

vi. The Contractor shall be responsible for any damages to wetlands located beyond the construction limits, which occurs from his/her operations during the life of the Contract. The Contractor shall restore all temporarily disturbed wetland areas to their preconstruction conditions. This includes restoring bank elevations, streambed and wetland surface contours and wetlands vegetation disturbed or destroyed. The expense for this restoration shall be borne solely by the Contractor.

Submittals:

All computations necessary to establish the exact position of all work from the control points shall be made and preserved by the Contractor. All computations, survey notes and other records necessary to accomplish the work shall be made available to the Department in a neat and organized manner at anytime as directed by the Engineer. The Engineer may check all or any portion of the stakeout survey work or notes made by the Contractor and any necessary correction to the work shall be made as soon as possible. The Contractor shall furnish the Engineer with such assistance as may be required for checking all lines, grades,

and measurements established by the Contractor and necessary for the execution of the work. Such checking by the Engineer shall not relieve the Contractor of his/her responsibility for the accuracy or completeness of the work.

The Contractor shall submit any of the following at the Engineer's request:

(a) Proposed method of recording information in field books to ensure clarity and adequacy.

(b) A printout of horizontal control verification, as well as coordinates, differences and error of closure for all reestablished or temporary Control Points.

(c) A printout of vertical control verification, with benchmark location elevation and differences from plan elevation.

(d) Sketch of location of newly referenced horizontal control, with text printout of coordinates, method of reference and field notes associated with referencing control.

(e) Description of newly established benchmarks with location, elevation and closed loop survey field notes.

(f) All updated electronic and manuscript survey records.

(g) Stakeout plan for each structure and culvert.

(h) Computations for buildups over beams, screed grades and overhang form elevations.

(i) A report showing differences between supplied baseline coordinates and field obtained coordinates, including a list of preliminary input data.

(j) Any proposed plan alteration to rectify a construction stakeout error, including design calculations, narrative and sealed drawings.

(k) Baseline for each borrow pit location.

(l) Detailed sketch of proposed overhead ground mounted signs or signals showing obstructions that may interfere with their installation.

(m) Copies of cut sheets.

Method of Measurement:

The quantity of Construction Engineering will not be measured.

Basis of Payment:

Payment will be made at the Lump Sum price bid for the item "Construction Engineering". The price bid shall include the cost of furnishing all labor, equipment, instruments, stakes and other material necessary to satisfactorily complete the work as herein described under this item for all roads and structures that are a part of the contract. Adjustment in payment will be made for the deletion or addition of work not shown in the contract documents.

Monthly payment will be made under this item in proportion to the amount of work done as determined by the Engineer.

8/29/07

763503 - TRAINEE

Description:

The item shall consist of providing training in the construction crafts in accordance with the requirements stated in the General Notices of this proposal under the Standard Federal Equal Employment Opportunity Construction Contract Specifications (Executive Order 11246).

Basis of Payment:

The payment for the item shall be made at a fixed rate of $.80 per hour toward the hourly rate of the trainee.

5/2/02

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

Description:

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

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

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

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

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

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

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

hereinafter and in the Standard Specifications, Special Provisions, and on the Contract Plans as plan notes.

Development of the Project Control System (PCS):

The PCS development plan is as follows:

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

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

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

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

(b) Within fourteen (14) calendar days after the workshop meeting, the CPMC:

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

The Contractor should be aware that the Department's time frame for review of working drawings and other submittals properly submitted or resubmitted in accordance with Standard Specification Subsection 105.04 will be thirty (30) calendar days duration unless mutually agreed to by the CPMC and CPMA; this 30 day duration supercedes the time frame of the Subsection. If a working drawing or other submittal involves review by railroads, environmental agencies, municipalities, other states, federal agencies, or the U. S. Coast Guard the time

frame for review will be sixty (60) calendar days unless mutually agreed to by the CPMC and CPMA. The time frame will begin on the date of receipt of the drawings by the reviewer and will end on the date of transmittal returning the drawings to the Contractor by the Department. No drawings will be accepted for review until an initial working drawing schedule has been accepted unless agreed to by the Engineer.

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

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

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

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

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

(4) Shall prepare and provide a written narrative of the Contractor's work plan and an acceptable "look ahead" schedule database in CPM format. This schedule database shall reflect activities for the Contractor's overall work plan for the entire project detailing the “look ahead” period and shall be submitted to the CPMA for acceptance by the Engineer. The “look ahead” period shall be as determined by the Engineer. The “look ahead” schedule shall be maintained and updated until an Original CPM schedule is approved. The “look ahead” schedule shall also reflect the Sequence of Construction in the plans unless otherwise approved by the Engineer. This “look ahead” schedule, its updates and/or revised updates shall also be incorporated into the Original CPM schedule database. Issue of the Notice to Proceed is contingent upon receipt and acceptance of this schedule in accordance with Standard Specification Subsections 108.02 and 108.03; and

(5) Shall begin meeting with the CPMA at their office every third business day to prepare and provide a written narrative of the Contractor's work plan and a CPM schedule database until a useable, logical draft of the full CPM schedule network, responsive to the project requirements and correlated with the required schedules has been developed as determined by the Engineer. The CPMA will generate an initial CPM schedule from the CPMC's logical draft CPM schedule database for review by the Engineer. This initial schedule shall reflect the Sequence of Construction in the plans unless otherwise approved by the Engineer. This initial CPM schedule database, if acceptable, may be used to fulfill the Contractor's “look ahead” schedule requirements;

(c) If the initial CPM schedule is not acceptable to the Engineer, the CPMC shall continue to

meet with the CPMA on every third business day and prepare and provide the Contractor's written narrative and CPM schedule database as necessary until a generated CPM schedule is acceptable to the Engineer; and

(d) Within twenty-eight (28) calendar days after the workshop meeting, an initial CPM schedule must be generated having the requirements for the Engineer's approval. This schedule shall reflect a clear understanding of the Contractor's work plan, be adequate to determine the Department's staffing requirements, have correct physical logic, incorporate construction and traffic phases, and display clarity of presentation for review and processing. Upon approval the CPMA will furnish the Contractor a graphic and report output of this CPM schedule. This CPM schedule, or Original CPM schedule, is the Contractor's own work schedule and the Contractor's responsibility to maintain.

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

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

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

CPM schedule information and requirements:

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

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

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

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

1. Work at locations done at different times or requiring different crews,
2. Work requiring different materials,
3. Work requiring different crew or craft requirements,
4. Work requiring different equipment,
5. Work requiring different responsibility (subcontractors),
6. Structural work having distinct subdivisions,
7. Labor and equipment resource availability,
8. Work as reflected in the Contractor's estimating or accounting breakdown,
9. Work as reflected in the state's breakdown for bidding or payment,
10. Public, private, and/or Contractor utility work and limiting or outage schedules of public and/or private utility organizations, and
11. Maintenance of traffic.

Restraint factors affecting the start of other activities;

1. Preparation of working drawing and materials submittals,
2. Approval, return, and/or resubmittal of working drawings and materials,

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

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

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

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

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

All activities shall be identified by entry of their appropriate Calendar. A minimum of fourteen (14) shall be used and the first fourteen (14) shall be ordered and entitled as follows: 1) Full schedule, 2) Environmental, 3) Winter Condition, 4) Concrete Work, 5) Concrete Work Winter, 6) Concrete Deck, 7) Concrete Paving, 8) GABC, 9) Asphalt Base, and 10) Asphalt Surface, 11) SMA, 12) Night Paving Asphalt Base, 13) Night Paving Asphalt Surface, 14) Night Paving SMA. Calendar non-work periods shall reflect the average Delaware weather history of and the environmental regulations for the location of the Contract work. The Contractor may perform work during its calendar non-work period when favorable weather allows the work to be performed without compromising its specification and at no cost to the Department. When the Department provides a format database from which to develop the CPM schedule, the Contractor shall not modify the Calendars in the format database unless approved by the Engineer. The non-work periods of the calendars follow:

CALENDAR	NON-WORK PERIOD
1) Full schedule,	N/A
2) Environmental:	Varies; project specific,

3) Winter Condition:	December 1 thru March 15,
4) Concrete Work:	December 1 thru March 15,
5) Concrete Work Winter:	N/A (Protection provided at no cost to the Department)
6) Concrete Deck:	November 15 thru March 31,
7) Concrete Paving:	December 1 thru March 15,
8) GABC:	November 15 thru March 15,
9) Asphalt Base:	November 15 thru March 15,
10) Asphalt Surface:	November 15 thru March 15,
11) SMA	November 15 thru March 31,
12) Night Paving Asphalt Base:	October 15 thru April 30,
13) Night Paving Asphalt Surface:	October 15 thru April 30, and
14) Night Paving SMA:	October 15 thru April 30.

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

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

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

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

Activity resource loading shall be required only if the Contractor demonstrates the inability to maintain the CPM schedule. In this event, the Engineer shall have the authority to require resource information for all activities affecting project completion. Resource information includes manpower, equipment, materials, and/or services and has cost and has a range and amount of availability. Lack of sufficient resources will not be considered cause to extend durations when preparing the CPM schedule. By bidding to contract the work, the Contractor has ensured that sufficient resources are available or will be available in a suitable time frame to perform the work within the Contract Time, even if a resequencing of activities requires an activity or activities to shorten their Remaining Duration. In the event the Contractor demonstrates the inability to maintain the CPM schedule, the Engineer may require the Contractor to increase the number of shifts, begin overtime operations, work extra days including weekends and holidays,

supplement construction plant and equipment, or all or any of the foregoing as a step to improve the Contractor's work progress all without additional cost to the Department.

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

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

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

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

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

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

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

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

When multiple crews are performing an operation or a string of operations, each crew shall be logical connected and coded to reflect the crew performing the operation.

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

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

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

clarity or definitude if acceptable to the CPMA.

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

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

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

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

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

After the Original CPM schedule utilizing all the allocated Contract Time has been approved, job conditions or logic changes may occur which require revision to the schedule. Only an update may be revised. These revised updates must be reflective of the Contractor's actual intent in constructing the project. The revision may cause the project completion date to be earlier than the completion date of the current approved schedule. This is acceptable to the Department; but no claims will be considered for time-driven and/or time-dependent costs (such as delay and/or extended overhead expense) which are a result of not meeting this new project "early finish" date. Consideration for these costs would occur only for approved extensions that force actual project completion past the originally advertised Contract Time including authorized time extension(s). However, no credits for non-expended overhead will be requested should a Contractor successfully achieve completion of the project prior to the use of all the Contract Time.

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

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

Activity Log (memo) information is allowed, but must be factual; shall be removed, if redundant; and

shall not be masked, but indicated for printing to output reports. Punctuation is not required for activity and Activity Log information unless necessary for clarity.

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

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

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

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

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

Written narratives shall be included with each submission of initial or revised update databases. The narratives must conceptualize work plans, modifications, and/or corrections but may be summary unless otherwise directed by the Engineer. These narratives shall describe where and the crews and order of what is to be done; narratives that are a listing of the work will not be acceptable. The Department will only accept schedule databases that reflect the work plans, modifications, and/or corrections reflected by their respective written narratives.

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

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

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

Monthly CPM Schedule Updates:

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

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

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

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

CPM Schedule Revised Updates:

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

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

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

For activities using like resources, modification of activity relationships to be concurrent (run parallel) with each other will not be considered acceptable criteria for revision to bring the project back on

schedule unless the Contractor provides a narrative describing how their crews and/or resource allocation to perform the work shall increase.

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

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

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

Change Orders and adjustment of completion time:

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

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

If a change order represents issues for which the effect on contract time can be readily determined, then any time adjustment will be agreed upon by the CPMC and CPMA prior to final execution of the change order. Determination of time adjustment will be based on the effect of the issue on the CPM schedule, the current approved CPM schedule update or approved CPM revised update, and the Department's Time Evaluation Worksheet (TEW) submitted by the Contractor.

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

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

Issues involving potential time extensions must be addressed in the CPM schedule update period in which they occur or they cannot be considered. If the Contractor proposes a change to the Contract work, any time the Contractor spends in discussion and preparation, and any time the Department requires for

review in the approval or disapproval process for this proposed change to the Contract work will not be considered for granting of additional contract time. It is the obligation of the Contractor to complete the project on time according to the original contract documents including current approved changes notwithstanding any change submitted for approval that may or not be accepted. The Contractor is obligated to prosecute the work at any time according to the Contract Documents in covenant at that time.

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

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

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

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

When the total of weather days and lost days recorded in the field exceed the advertised Contract Weather Days, the Contractor will be awarded a day for each day weather or conditions due to previous weather events prevent progress of the current or next work activity on the critical path of the schedule. When weather affects an activity not on the critical path and the activity becomes the critical path, the allowable days of time extension will be only for the days the activity was on the critical path. The Contractor and the Department will record and agree on these weather days. Inability to prosecute work not shown as activities in progress on the most recent CPM schedule will not be considered when determining an extension of Contract Time. The Engineer will have the final decision as to the number of calendar days the Contractor's work was limited to because of weather.

Final (As Built) CPM Schedule Update:

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

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

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

Method of Measurement:

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

Basis of Payment:

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

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

10/28/2010

763626 - DIESEL FUEL COST PRICE ADJUSTMENT

I. Description: This section defines the criteria for payments to the Contractor to reflect increases or decreases in the cost of diesel fuel consumed in the performance of applicable construction work. To have the Diesel Fuel Cost Price Adjustment provisions apply to this project, a properly completed Diesel Fuel Cost Price Adjustment Option form must be submitted to the Department with the Bidder's bid proposal. If a properly completed Diesel Fuel Cost Price Adjustment Option form is not provided by the bidder, the Department will consider the option to apply the Diesel Fuel Cost Price Adjustment provisions for the project to be declined. No further opportunity to elect Diesel Fuel Cost Price Adjustment for the project will be made available.

a. General. These price adjustment provisions apply to contract items in the contract schedule of prices as grouped by category. Specific pay items to be adjusted are attached as an appendix to this Special Provision. General category descriptions and the fuel usage factors which are applicable to each are as follows:

1. Categories

1.a. Category A: Earthwork. The combined total of the applicable item plan quantities must exceed 5,000 CY.

1.b. Category B: Subbase and Aggregate Base Courses. The combined total of the applicable item plan quantities must exceed 500 tons.

1.c. Category C: Flexible Bases and Pavements. The combined total of the applicable item plan quantities must exceed 500 tons.

1.d. Category D: Rigid Bases and Pavements. The combined total of the applicable item plan quantities must exceed 5,000 CY.

1.e. Category E: Structures. Contract items will be based upon the total square foot price for each structure including any associated items of work, i.e. items not grouped under Categories A thru D.

2. Diesel Fuel Usage Factors – ENGLISH UNITS

Category	Factor	Units
A – Earthwork	0.34	Gallons per CY
B – Subbase and Aggregate Base Courses	0.62	Gallons per ton
C – Flexible Bases & Pavements	2.98	Gallons per ton
D – Rigid Bases & Pavements	0.98	Gallons per CY
E – Structures	8.00	Gallons per $1,000 of work performed

3. Quantity Conversion Factors – ENGLISH UNITS

Category	Conversion	Factor
B	SY to ton	90 lbs/Inch of depth/SY
C	SY to ton	112.5 lbs/Inch of depth/SY
D	SY to CY	Inches of depth/36

II. The posted index price will be the monthly price most recent data published by the U.S. Department of Energy, U.S. Energy Information Administration. The source information for the posted price for Delaware No 2 Diesel Retail Sales by All Sellers (Cents per Gallon) may be viewed at the following website:

http://tonto.eia.doe.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=D220612102&f=M

The release date for the U.S. Department of Energy, U.S. Energy Information Administration average price data occurs the first Monday of the month three months later, i.e. October prices are released the first Monday of January.

The price index, FB, is the index price posted by the Department, determined as specified above, on the project advertisement date.

PRICE INDEX (FB) FOR DIESEL FUEL

PER GALLON (PER LITER) = $ 3.013

The price index, FP, will be the index price posted by the Department, determined as specified above, for the month during which the Notice to Proceed (NTP) is issued, and every 90 calendar days thereafter.

III. Price Adjustment Criteria and Conditions. The following criteria and conditions will be considered in determining a price adjustment for diesel fuel cost fluctuations.

a. Price Adjustment Calculation. When the ratio FP/FB is calculated to be less than 0.95 or calculated to be greater than 1.05, the Department will adjust unit bid price prices in accordance with the following formula:

AUP = (FP-FB)(F)+(UBP)
where:

AUP = Adjusted Unit Price
FP = Fuel Price Index for the month in which prices are adjusted for applicable construction work.
FB = Fuel Price Index in the Bid Proposal
F = Diesel Fuel Usage Factor
UBP = Unit Bid Price specified in the Contractor's Bid Proposal

b. Payment of Adjusted Unit Prices. The unit bid prices of work items affected by the fuel escalation will be adjusted by work order, either up or down, at Notice to Proceed and every 90 Calendar Days thereafter.

c. Expiration of Contract Time. If the Contractor exceeds the authorized allotted completion time, the adjusted item prices on the last authorized allotted work day shall be the prices used during the time liquidated damages are assessed. However, if the posted price for diesel fuel goes down, the item prices shall be adjusted downward accordingly

d. Final Quantities. Upon completion of the work and determination of final pay quantities, an adjusting work order will be prepared to reconcile any difference between estimated quantities previously paid and the final quantities. In this situation, the value for FP used in the price adjustment formula will be the average of all FP's previously used for computing price adjustments.

e. Inspection of Records. The Department reserves the right to inspect the records of the prime contractor and its subcontractors and material suppliers to ascertain actual pricing and cost information for the diesel fuel used in the performance of applicable items of work.

f. Extra Work. When applicable items of work, as specified herein, are added to the contract as Extra Work in accordance with the provisions of Section 110.03, no price adjustment will be made for fluctuations in the cost of diesel fuel consumed in the performance of the extra work, unless otherwise approved by the Engineer. The current price for diesel fuel is to be used when preparing required backup data for extra work to be performed at a negotiated price. For extra work performed on force account basis, reimbursement for material and equipment along with specified overhead and profit markups will be considered to include full compensation for the current cost of diesel fuel.

g. Subcontractors. Any Price Increases or Price Rebates that are calculated based on items of work performed by subcontractors will be added to or deducted from payments due to the Contractor in the appropriate pay period. The Contractor shall then accurately record on the appropriate CN-91 or CN-103 form the additions or deductions into adjusted contract value. The Contractor shall make payment to the subcontractor(s) who actually performed the work in accordance with DelCode Title 17, Chapter 8.

01/18/11

Appendix---Item 763626 Diesel Fuel Cost Adjustment			
Contract:	**T200510602.01**		
		Item No./s	
Category A:	**Earthwork**		
	Excavation & Embankment	202000, 205500, 206500, 207000	
	(total qty must exceed 5000 CY)	208000, 209001, 209002, 209003	
		210000, 212000	
Category B:	**Subbase and Agg.**		
	GABC, Burrow	302007	
	(total qty must exceed 500 T)		
Category C:	**Flexible Bases and Pavements**	401660, 401663, 401665, 401667	
	Hot-mix patching, Hot-mix overlay		
	(total qty must exceed 500 T)	401669, 401711,	
Category D:	**Rigid Bases and Pavements**	501004, 501006, 503009	
	Concrete, P.C.C. Patching		
	(total qty must exceed 5000 CY)		
Category E:	**Structures**	602001, 602002, 602003, 602006	
	Bridges, Large P.C.C. Structures	602007, 602009, 602011, 602012	
		602013, 602014, 602015, 602017,	
		602553, 602557, 602572, 602670	
		604000,605002, 605581, 605607, 605664	
		618071, 618072, 619051, 619052	
		619511	

763632 – REMOVAL OF RAISED PAVEMENT MARKER

Description:

This work consists of removing and disposing of raised pavement markers at locations noted on the Plans and filling in the void with patching material.

Materials:

A cementitious, rapid setting, semi-leveling mortar mix with a gel state consistency shall be used for filling in the voids.

The rapid setting mortar mix shall have a 4-6 minute working time and reach a minimum compressive strength of 3,000 psi within 60 minutes.

The material shall be approved by the Engineer prior to placement.

Construction Methods:

The Contractor shall remove raised pavement markers minimizing damage to the existing pavement. The Contractor may use a back hoe or hand tool to remove the raised pavement marker. The method of removal of the raised pavement marker shall be approved by the Engineer.

Immediately after removing the raised pavement marker, the Contractor shall remove all loose debris from the void, dry the void, and fill the void with the approved patching material. The patching material shall be mixed and placed according to the manufacturer's recommendations.

Method of Measurement:

The quantity of removal of raised pavement markers will be measured as the actual number of each pavement marker removed.

Basis of Payment:

The quantity of removal of pavement markers will be paid for at the Contract unit price of each. Price and payment will constitute full compensation for all labor, equipment, tools, patching materials, disposal of the pavement markers, and incidentals required to complete the work.

11/14/08

763655 - STEEL COST PRICE ADJUSTMENT

.01 Description: The Department will adjust monthly progress payments up or down as appropriate for cost changes in steel used on specific items of work identified in the contract in accordance with this provision.

The following steel items will be eligible for consideration under this provision:

1. structural steel (rolled beams, plate girders, diaphragms, plate bearings, etc.);
2. reinforcing steel (plain & epoxy coated);
3. overhead sign structures;
4. guardrail, posts;
5. standard sign or lighting supports;
6. railing;
7. steel encasement pipe;
8 steel piles (end bearing or friction);
9. steel strand (used for pre-tensioned or post-tensioned finished elements); and
10. sheet piles.

Inventoried materials from the listing of eligible items and fasteners of any kind are specifically excluded for consideration. Fasteners include but are not limited to, bolt, nuts, washers, rivets, and welding rods.

The requirements of this provision shall apply only to material cost changes that occur between the date of bid opening and the date the material is shipped to the fabricator. To be eligible for this price adjustment, the Contractor is required to place purchase order(s) for eligible steel items for price adjustment identified in the contract within 30 days after final execution of the contract by the Department. All items eligible must be submitted and used on the project for any item to be eligible for adjustment.

For steel items to be eligible for adjustment, once shipped to the fabricator, the items shall be specifically stored, labeled, or tagged, recognizable by color marking, and identifiable by project for inspection and audit verification.

This provision allows for price adjustment for embedded steel used for pre-tensioned or post-tensioned precast components where furnishing steel is included in the unit price of the finished bid item. Steel used for post-tensioned or pre-tensioned elements shall be evaluated for price adjustment in the same manner as other steel material eligible under the requirements of this provision except that adjustment shall only apply to the tonnage or poundage of steel strand used in the pre-tensioned or post-tensioned element.

This provision shall only apply to material cost changes of steel that occur between the date of bid opening and the date the material is shipped to the Contractor, subcontractor or supplier/fabricator placing the steel into the finished component.

Submit material price quotes, bid papers, or other documentation satisfactory to the Department within 15 days after the date of the Award letter for the bid items the Contractor is requesting a steel price adjustment. This documentation shall support the completion of the form establishing the average price per pound for the eligible steel bid item. The Contractor must use the format as shown with this provision; no other format for presenting this information will be permitted. Certification is required that all items of documentation are original and were used in the computation of the amount bid for the represented eligible pay items for the month bids were opened. The documentation will be used to support the base line material price ("Base Price") of the steel item only. No adjustment will be made for changes in other components of the contract unit bid price, including, but not limited to, fabrication, shipping, storage, handling, and erection.

Failure to submit specifically required information such as purchase order, price data, bill of lading, material information or other requested information as noted herein will result in the Contractor not being eligible for price adjustment of steel items.

Price adjustment of each qualifying item under consideration will be subject to the following condition:

There must be an increase or decrease in the cost of eligible steel materials in excess of 10% up to a maximum of 60% from the Base Price when compared with the latest published price index ("Price Index") in effect at the time material is shipped to the fabricator.

The Price Index the Department is using is based on The U.S. Department of Labor, Bureau of Labor Statistics, Producers Price Index (PPI) which measures the average price change over time of the specific steel eligible item from the perspective of the seller of goods. The specific PPI to be used to adjust the price for the eligible steel items is shown in the table below. **Please note**: The PPI is subject to revision four months after original publication, therefore, price adjustments and payments will not be made until the index numbers are finalized.

The following table indicates the PPI steel category index items and the corresponding I.D. numbers to which the steel items will be compared:

Steel Item	**Bureau of Labor Statistics PPI Series I. D. Number WPU#**
Reinforcing steel (plain & epoxy coated) Steel Strand (Pre-tensioning & Post-tensioning)	WPU101704 (http://data.bls.gov/pdq/SurveyOutputServlet?years_option=all_years&output_view=data&periods_option=all_periods&output_format=text&reformat=true&request_action=get_data&initial_request=false&data_tool=surveymost&output_type=column&series_id=WPU101704)
Plate girders & rolled beams (Standard & High strength, diaphragms, plate bearings, etc.) Steel piling (H-pile, pipe piles & sheet piles)	Average of WPU1017 & WPU101 (http://data.bls.gov/pdq/SurveyOutputServlet?series_id=WPU1017&data_tool=XGtable & http://data.bls.gov/pdq/SurveyOutputServlet?series_id=WPU101&data_tool=XGtable)
Steel encasement pipe Overhead sign structures, posts, poles, guardrail, sign or lighting supports, & railing	WPU101706 (http://data.bls.gov/pdq/SurveyOutputServlet?years_option=all_years&output_view=data&periods_option=all_periods&output_format=text&reformat=true&request_action=get_data&initial_request=false&data_tool=surveymost&output_type=column&series_id=WPU101706)

Steel Item	Bureau of Labor Statistics PPI Series I. D. Number WPU#
Guardrail	Average of WPU1017 & WPU101707 (http://data.bls.gov/pdq/SurveyOutputServlet?series_id=WPU1017&data_tool=XGtable & http://data.bls.gov/pdq/SurveyOutputServlet?years_option=all_years&output_view=data&periods_option=all_periods&output_format=text&reformat=true&request_action=get_data&initial_request=false&data_tool=surveymost&output_type=column&series_id=WPU101707)

The price adjustment will be determined by computing the percentage of change in index value beyond 10% above or below the index on the bid date to the index value on the date the steel material is shipped to the fabricator (Please see included sample examples). Weights and date of shipment must be documented by a bill of lading provided to the Department. The final price adjustment dollar value will be determined by multiplying this percent increase or decrease in the index (after 10%) by the represented quantity of steel shipped by the Base Price per pound subject to the limitations herein.

A = B x P x Q	
Where:	
A =	Steel price adjustment in lump sum dollars
B =	Average weighted price of steel submitted with bid on project in $/lb
P =	Adjusted percentage change in PPI average from shipping date to bid date minus 10% (0.10) threshold
Q =	Total quantity of steel in pounds shipped to fabricator for the specific project

Delays to the work caused by steel shortages may be justification for a contract time extension but will not constitute grounds for claims for standby equipment, extended office overhead, or other costs associated with such delays.

The need for application of the adjustments herein to extra work will be determined by the Engineer on an individual basis and, if appropriate, will be specified on the Change Order.

This price adjustment is capped at 60%. This means the maximum "P" value for increase or decrease that can be used in the above equation is 50% (60%-10% threshold).

Calculations for price adjustment will be shown separate from the monthly progress estimate and will not be included in the total cost of work for determination of progress or for extension of contract time.

Any apparent attempt to unbalance bids in favor of items subject to price adjustment may result in rejection of the bid proposal.

.02 Method of Measurement:

Price increase/decrease will be computed as follows:

Sample Calculation of a Price Adjustment (increase)			
Project bid on	Tuesday, April 28, 2009		
Project has structural steel in the amount of:		**450,000**	Lbs
Orders placed in timely manner and according to contract.			
Contractor's F.O.B. supplier price for the structural steel in bid:		**$ 0.28**	/lb
Adjusted** BLS Producers Price Index most recently published average at time of bid:			**157.0**
** final change after 4 months			
All steel shipped to fabricator in same month, October 2009.	October-09		
Adjusted BLS Producers Price Index (PPI) most recently published average for month of October:			173.7
Adjustment formula is A = B X P X Q			
Where:	A =	Steel price adjustment in lump sum dollars	
	B = $ 0.28	Average weighted price of steel submitted with bid on project in $/lb = $0.28	
	P = 0.0064	Adjusted percentage change in PPI average from shipping date to bid date minus 10% threshold = (173.7-157.0)/157.0 – 0.10 = 0.0064	
	Q = 450,000	Total quantity of steel shipped to fabricator in October 2004 for this project in lb = 450,000 lb	
	A = $ 802.55	0.28 x 0.0064 x 450,000	
	A = $ 802.55	Lump Sum adjustment paid to Contractor	

Sample Calculation of a Price Adjustment (decrease)			
Project bid on April 27, 2009.			
Project has structural steel.		**450,000**	Lbs
Orders placed in timely manner and according to contract.			
Contractor's F.O.B. supplier price for the structural steel in bid:		**$ 0.28**	/lb
Adjusted** BLS Producers Price Index most recently published average at time of bid:			**173.7**
** final change after 4 months			
All steel shipped to fabricator in same month, October 2009.	October-09		
Adjusted BLS Producers Price Index (PPI) most recently published average for month of October:			**157.0**
Adjustment formula is A = B X P X Q			
Where:	A =	Steel price adjustment in lump sum dollars	
	B = $ 0.28	Average weighted price of steel submitted with bid on project in $/lb = $0.28	
	P = -0.0039	Adjusted percentage change in PPI average from shipping date to bid date minus 10% threshold = (173.7- 157.0)/157.0 – 0.10 = -0.0039	
	Q = 450,000	Total quantity of steel shipped to fabricator in October 2009 for this project in lb = 450,000 lb	
	A = $ (486.01)	0.28 x 0.0039 x 450,000	
	A = $ (486.01)	Lump Sum credit from Contractor	

.03 Basis of Payment: The price adjustments will be made as a lump sum payment for eligible steel products placed and accepted.

UTILITY STATEMENT
STATE CONTRACT NO. T200510602
FAP NO. IM-N059(34)
I-95 & US 202 Interchange
NEW CASTLE COUNTY
November 24, 2010

The following companies maintain facilities within the Contract limits:

Delmarva Power Delivery - Electric Distribution
Verizon Delaware LLC
Level 3 Communications LLC
Delmarva Power Delivery – Gas Distribution
City of Wilmington Department of Public Works - Water
New Castle County Department of Special Services - Sanitary Sewer

The following is a breakdown of the utilities involved, adjustments and/or relocations as required (all stations, offsets, lengths, and calendar days are approximate):

Delmarva Power Delivery – Electric Distribution maintains aerial and underground electric facilities within the project limits. The aerial facilities are not affected by the proposed highway improvements, however; the proposed changes to the underground facilities to be made by Delmarva Power Delivery the along US 202 include, but are not limited to:

Sta. 1011+37 to sta. 1011+77 offset right and sta. 1014+20 to sta. 1014+67 offset right: Delmarva will provide DelDOT's contractor with PVC conduits and conduit spacers. DelDOT's contractor to construct a concrete encased conduit structure. See Item# 602002 – Portland Cement Concrete Masonry, Class B.

Sta. 1011+77 to sta. 1014+20 offset right. Delmarva will provide DelDOT's contractor with fiberglass conduits and transition couplings to install a conduit structure on the new bridge. See special provision Item# 605528 – Utility Support.

DelDOT's contractor should contact Angel Collazo at telephone (302) 454-4370 or angel.collazo@delmarva.com to coordinate the delivery of Delmarva provided material to a suitable location on the job site.

Sta. 1011+27 to sta. 1011+37 offset right and sta. 1014+67 to sta. 1014+77 offset right: Construct concrete encased conduit structures from manholes # 578 and # 579 to tie-in into the conduit structure constructed by DelDOT's contractor. Pull-in conductors and energize the new conductors and remove old cables from the existing (now abandoned) conduits. This work will be done by Delmarva's in-house contractor. Where DelDOT's contractor stops 10 feet short of man hole locations, they will install conduit from that point including breaking into manhole

walls. Delmarva cable crews will be responsible for pulling/splicing/removal of old cable. Delmarva will require sixty (60) working days to complete their work once all conduit work has been completed by DelDOT.

The manhole frames and covers at the following locations will be vertically adjusted after the Department's contractor provides the amount of final vertical adjustment:
Sta. 1007+45 offset right 41'
Sta. 1011+26 offset right 41'
Sta. 1018+60 offset right 42'

One (1) calendar day is required to complete the adjustment to each manhole following twenty-eight (28) calendar days advance notice for scheduling. The Department's contractor shall prevent bituminous material from sealing the manhole covers.

Note: The Department's contractor should contact Angel Collazo (302) 454-4370 or Mark Smith (302) 454-4138 to initiate the process to provide electric service along US 202 for the new ITMS equipment as well as the proposed traffic signal equipment. Refer to transformer # 48787/44108 and # 48774/44214 in the request for the new services.

Verizon Delaware LLC maintains underground tele-communication facilities within the project limits. The proposed changes to these facilities to be made by Verizon along US 202 will take 15 working days and will include, but is not limited to the following:

Sta. 1011+75 to 1014+10 – The bridge will be raised approximately 1/8" and lowered back into the original position after rehab completed. Verizon maintains 10 cement conduits that are very brittle in the bridge that will be impacted. The conduit will be cut near the bridge abutment on both sides of the bridge allowing the bridge to be raised. After the bridge is lowered back into position, Verizon will place split duct where the conduit was cut.

The manhole frames and covers at the following locations will be vertically adjusted after the Department's contractor provides the amount of final vertical adjustment:
Sta. 1214+50 offset right 4'
Sta. 1215+99 offset right 4'
Sta. 1217+30 offset right 4'
Sta. 1010+40 offset left 6'
Sta. 1016+65 offset left 6'

The Department's contractor shall prevent bituminous material from sealing the manhole covers.

Level 3 Communications LLC maintains underground tele-communication facilities within the project limits. The proposed changes to be made by Level 3 Communications to these facilities include, but are not limited to the following:

US 202; Sta. 1217+86 to sta. 1218+87 and sta. 1005+80 to 1010+51 offset left varies from 43' to 90': Relocate conduits and abandon the manhole at sta. 1217+91, offset 48' left to accommodate the excavation for the proposed 24" drain pipe, storm water management basin and bridge abutment footings.

I-95 SB; Sta. 287+85, offset left 65': Relocate conduits to accommodate the excavation for the proposed drainage ditch.

Ramp 3; Sta. 225+40 to 228+66 offset right varies 5' to 32': Relocate conduits and abandon/backfill the manhole at sta. 228+66, offset 5' right to accommodate the excavation for the proposed ramp construction.

Note: The above proposed work is to be performed prior to the start of this project. It is the Contractor's responsibility to verify the status of the proposed relocation work prior to submitting bids.

The manhole frame and cover at US 202 sta. 1019+33, offset 48' right will be vertically adjusted after the Department's contractor provides the amount of final vertical adjustment:

Delmarva Power Delivery – Gas Distribution maintains underground gas facilities within the project limits. These facilities are not affected by the proposed highway improvements.

City of Wilmington Department of Public Works – Water maintains underground water facilities within the project limits. Any adjustments and/or relocations of the City's existing water facilities that are required for the proposed construction of the project will be done by the State's contractor in accordance with the City's standard specifications and as indicated on the plans and outlined elsewhere in these Special Provisions. See special provision Item# 614861 – Structural Plate Arch (Steel) and Item# 750000 – Adjust Water Valve Boxes.

New Castle County Department of Special Services – Sanitary Sewer maintains underground sanitary sewer facilities within the project limits. These facilities are not affected by the proposed highway improvements.

DelTRAC (DelCOMM)

Any adjustments and/or relocations of the DelTRAC's facilities that are required for the proposed construction of the project will be done by the State's contractor in accordance with DelTRAC's standard specifications as indicated on the plans and outlined elsewhere in these Special Provisions.

GENERAL NOTES:

1. **THE UTILITY COMPANIES AND THEIR CONTRACORS DO NOT NORMALLY WORK ON WEEKENDS OR LEGAL HOLIDAYS.**

2. **THE CONTRACTOR'S ATTENTION IS DIRECTED TO SECTION 105.09 UTLITIES, DELAWARE STANDARD SPECIFICATIONS, DATED AUGUST 2001.**

WORKING DAYS PRIOR TO ANY EXCAVATION. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING PROPER CLEARANCES, INCLUDING SAFETY CLEARANCES FROM OVERHEAD UTILITIES FOR CONSTRUCTION EQUIPMENT. THE STATE'S CONTRACTOR IS ADVISED TO CHECK THE SITE FOR ACCESS PURPOSES FOR HIS/HER EQUIPMENT AND, IF NECESSARY, MAKE ARRANGMENTS DIRECTLY WITH UTILITY COMPANIES FOR FIELD ADJUSTMENTS TO PROVIDE ADEQUATE CLEARANCES AT THE CONTRACTOR'S EXPENSE.

3. IT IS UNDERSTOOD AND AGREED THAT THE STATE'S CONTRACTOR HAS CONSIDERED IN HIS BID ALL PERMANENT AND TEMPORARY UTILITY APPURTENANCES IN THEIR PRESENT OR RELOCATED POSITIONS AS SHOWN ON THE PLANS OR DESCRIBED IN THE UTILITY STATEMENT OR ARE READILY DISCERNABLE AND THAT NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR ANY DELAYS, INCONVENIENCES, OR DAMAGE SUSTAINED DUE TO ANY INTERFERENCE FROM THE SAID UTILITY FACILITIES AND APPURTENANCES OR THE OPERATION OF MOVING THEM, EXCEPT THAT THE STATE'S CONTRACTOR MAY BE GRANTED AN EQUITABLE EXTENSION OF TIME IF DETERMINED APPROPRIATE BY THE ENGINEER. THE STATE'S CONTRACTOR IS RESPONSIBLE FOR THE SUPPORT AND PROTECTION OF ALL UTILITIES WHEN EXCAVATING IN THE VICINITY OF SAID UTILITIES.

4. EACH UTILITY COMPANY WILL SUPPLY AN INSPECTOR TO INSURE THEIR FACILITIES AREBEING CONSTRUCTED AND INSTALLED IN ACCORDANCE WITH THEIR SPECIFICATIONS.

5. THE CONTRACTOR WILL CONTACT ANGEL COLLAZO (302) 454-4370 OR DELMARVA ELECTRIC TO DETERMINE IF TEMPORARY BRACING IS REQUIRED PRIOR TO EXCAVATING WITHIN (3) FEET OF AN EXISTING DELMARVA ELECTRIC UTILITY POLE.

6. ALL UTILITIES DEPICTED AT QUALITY LEVEL B (QL B) ON THE UTILITY RELOCATION PLAN SHEETS UNLESS OTHERWISE NOTED.

7. THE APPROPRIATE UTILITY COMPANY IS RESPONSIBLE FOR THE RESTORATION OF DISTURBED AREAS AT LOCATIONS WHERE THE STATE'S CONTRACTOR HAS ALREADY COMPLETED WORK.

8. NEW UTILITY POLES SHALL BE INSTALLED AT LEAST EIGHTEEN (18) INCHES FROM THE FACE OF POLE TO THE ACE OF CURB.

9. IN CONJUNCTION WITH BID PREPARATION AND PRIOR TO STARTING WORK, THE STATE'S CONTRACTOR SHALL CONFIRM WITH ALL RESPECTIVE UTILITY COMPANIES NOTED IN THIS UTILITY STATEMENT TO HAVE ADVANCE UTILITY RELOCATIONS THAT THE ADVANCE

RELOCATIONS HAVE IN FACT BEEN ACCOMPLISHED AS SUMMARIZED HEREIN.

10. DELTRAC IS LISTED WITHIN THE UTILITY STATEMENT FOR INFORMATIONAL PURPOSES. DELTRAC IS NOT RECOGNIZED BY THE DELAWARE PUBLIC SERVICE COMMISSION AS A PUBLIC UTILITY. DELTRAC IS AN ENTITY OF DELDOT.

11. A PROGRESS REPORT OF THE UTILITY ACTIVITIES INCLUDED IN THESE STATEMENTS WILL BE GIVEN TO ALL ATTENDEES IF A MANDATORY PRE-BID MEETING IS HELD.

12. COORDINATION AND COOPERATION AMOUNG THE UTILITY COMPANIES AND THE STATE'S CONTRACTOR ARE OF PRIME IMPORTANCE. THEREFORE, THE CONTRACTOR IS DIRECTED TO CONTACT THE FOLLOWING UTILITY COMPANY REPRESENTATIVES WITH ANY QUESTIONS REGARDING THIS WORK PRIOR TO SUBMITTING BIDS AND WORK SCHEDULES. PROPOSED WORK SCHEDULES SHALL REFLECT THE UTILITY COMPANIES PROPOSED RELOCATIONS AND ADJUSTMENTS.

Name	Company	Phone Number
Angel Collazo	Delmarva Power – Electric Distribution	(302) 454-4370
George Zang	Verizon Delaware LLC	(302) 422-1238
Phil Cabaron	Level 3 Communications LLC	(973) 286-4407
Ted Waugh	Delmarva Power – Gas Distribution	(302) 429-3706
Lawrence Carson	City of Wilmington Department of Public Works – Water	(302) 576-3064
David Clark	New Castle County Special Services-Sewer	(302) 395 -5743

PREPARED AND RECOMMENDED BY:

Roger L. Clark
McCormick Taylor, Inc.

24 Nov 10
Date

APPROVED AS TO FORM:

Project Utility Coordinator
DelDOT

11-29-10
Date

Utility Schedule

Contract # T200510602

I-95 & US 202 Interchange				
	calendar months	calendar months	calendar months	calendar months
Advertise				
Let				
NTP				
Construction				
Verizon				
Repair ducts and adj MH F&C's				
Delmarva Power - Electric				
Relocate conduits & adj MH F&C's				
Level 3				
Relocate conduits & adj MH F&C's				
City of Wilmington - Water				
Install steel plate arch & adj wyb				

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
PO BOX 778
DOVER, DELAWARE 19903

CERTIFICATE OF RIGHT-OF-WAY STATUS

STATE PROJECT NO. T200510602

F.A.P. No. NH-N059(34)

I-95 AND US 202 INTERCHANGE

NEW CASTLE COUNTY

Certificate of Right-of-Way Status – 100%

As required by 23CFR Part 635, all necessary right of way has been acquired in accordance with current State/Federal rules and regulations covering the acquisition of real property.

This is to certify that all project rights of way is currently available in accordance with the project right-of-way plans.

It is further certified that there were no individuals or families displaced by this project. Therefore the provisions of 49 CFR Part 24 is not applicable to the project.

There are no improvements to be removed or demolished as part of this project.

REAL ESTATE SECTION

Carol V. O'Donoghue
Assistant Chief, Real Estate

November 17, 2010

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
800 BAY ROAD
P.O. BOX 778
DOVER, DELAWARE 19903

CAROLANN WICKS, P.E.
SECRETARY

ENVIRONMENTAL REQUIREMENTS
for
State Contract No. T200510602
Federal Aid No.: NH-N059(34)

Contract Title: I-95 & US 202 Interchange
December 20, 2010

In accordance with the procedural provisions for implementing the National Environmental Policy Act of 1969, as amended, the referenced project has been processed through the Department's Environmental Review Procedures and has been classified as a Level D/ Class II Action. As such, a Categorical Exclusion has been prepared to evaluate potential adverse impacts to result from construction of the proposed action (per 23 CFR 771.117 d(1)) and the following special provisions have been developed to mitigate and/or minimize these impacts.

PERMIT REQUIREMENTS:

The construction work that will occur at the I-95 & US 202 Interchange, New Castle County, Delaware requires permit approval from those agencies listed below. It is the responsibility of the contracting agency, the Delaware Department of Transportation, Division of Highways to obtain the necessary permits to ensure that the contractor complies with the requirements and conditions established by the permitting agencies. Copies of the permits must be available on site during all phases of construction activity. Advanced copies of the permits may be obtained from DelDOT Contract Administration, Highway Administration Building, Dover.

Required Permits and Approval Status:

U.S. Army Corps of Engineers
CENAP-OP-R-2009-01354, Nationwide Permit #23
Approved: November 19, 2010

DNREC
SP-034/10, Subaqueous Lands Permit
Approved: September 20, 2010
SPECIFIC REQUIREMENTS:

Compliance with all requirements of the permits is the responsibility of the contractor. The contractor will follow all special conditions or requirements as stated within those permits. The contractor will be subject to penalties, fines, and the risk of shut down as mandated by law if conditions of the permits 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.

STATE OF DELAWARE
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Additional requirements by DelDOT not specified within the permits, but listed below, or on the Environmental Compliance Sheets is also the responsibility of the contractor and is subject to risk of shut down at the contractor's expense.

All work and project staging shall be undertaken in a manner that minimizes the impacts to the mature forests and the riparian buffer within the project limits. Existing cleared areas shall be used for access to the maximum extent possible.

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.
All construction debris, excavated material, brush, rocks, and refuse incidental to such work shall be placed either on shore above the influence of flood waters or on some suitable disposal site approved by the department.

The disposal of trees, brush, and other debris in any stream corridor, wetland surface water or any drainage ditch is prohibited.

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.

The effort shall be made to keep construction debris from entering adjacent waterways, wetlands, ground cover, or drainage areas. Any debris that enters these areas shall be removed immediately. Netting, mats, or establishing confined work areas in stages may be necessary to address these issues.

If routine maintenance of worker equipment and heavy machinery is necessary during the construction period, refuse material is prohibited from being disposed or deposited onto or into the ground. All used oils and filters must be recycled or disposed of properly.

Harmful chemical wash water applied to clean equipment or machinery shall be discouraged. If undertaken, the residue water and/or material must be collected or contained such that it will be disposed of properly. By no means, shall it be deposited or disposed of in waterways, streams, wetlands, or drainage areas.

The contractor shall follow all requirements as indicated in the Environmental Compliance Sheet. It will be the contractor's responsibility, expense, & effort to ensure that workers also follow these requirements. As part of the restrictions, please note the time tables reflected in the contract for the in-stream/water work for endangered species protection.

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
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That the fill material shall be free of oil and grease, debris, wood, general refuse, plaster and other pollutants, and shall contain no broken asphalt.

CULTURAL RESOURCE REQUIREMENTS:

The contractor will submit to the District, the location(s) of permanent disposal sites to be used for the disposition of clean wasted materials resulting from the construction contract. The contractor will submit at the Preconstruction meeting, a location map and a plot plan (sketch or diagram) of where on the property clean wasted material is to be placed. The limits of the site(s) will be physically staked or surveyed on the property. The District will submit the contractor's disposal site location(s) to the State Historic Preservation Office for approval.

The SHPO will determine if a cultural resource survey is required before the site can be approved. If additional survey work is required, it will be the contractor's responsibility to hire a qualified professional to assess the site(s) for the presence or absence of cultural resources (i.e. historic or prehistoric archeological sites). The contractor's consultant will be responsible for producing documentation of the survey results for submission to the SHPO.
If the contractor proposes the use of disposal sites outside the State of Delaware, the contractor must provide written approval from the State Historic Preservation Office of each respective state.

A project's disposal operation will not commence until the SHPO has notified the DelDOT District office that the site location(s) is approved for use.

The use of the disposal site will not result in discharge of materials into the U.S. Army Corps of Engineer or DNREC jurisdictional wetlands or waters. It is the responsibility of the contractor to provide any site surveys or wetland delineations needed to preclude wetland encroachment.

The contractor will be responsible for all sediment and erosion control measures and subsequent approvals required for the disposal site(s) operations.

It is the contractor's responsibility to obtain all other appropriate Federal, State, or local approvals required by law for use of the disposal site(s).
DelDOT and the contractor have developed and will implement a vibration-monitoring plan to monitor the effects of project construction. Specific properties of concern are elements within the Brandywine Park Historic District, the Porter Reservoir, and the dwellings located at Thirteen Rock Manor and One Rock Manor. As part of the measures, the contractor shall acquire the services of a professional engineer or other qualified expert, as appropriate, that is knowledgeable about the effects of construction vibration on historic buildings, to develop this plan. The plan will include a schedule for documenting the baseline conditions of the historic properties that will be monitored.

During construction, if the monitoring indicates that damage is occurring to any historic properties subject to the monitoring plan (i.e. Brandywine Park Historic District, Porter Reservoir, Thirteen Rock Manor, One

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Rock Manor, or others later identified in the monitoring plan), the contractor to cease construction in the immediate area. The contractor along with DelDOT will in consultation with the State Historic Preservation Office and any property owners, acquire the services of a professional engineer and/or architect that is knowledgeable about the effects of construction vibration on historic buildings, to:

a. determine the nature and extent of the damage; and

b. alter any construction methods that may have caused the damage; and

c. develop and implement methods to stabilize and/or repair the damage, in accordance with the recommended approaches in the Secretary of the Interior's Standards and Guidelines.

In addition to the above, please note the Cultural Resource requirements as indicated in notes 3A and 3B in the Environmental Compliance Sheet (EC Sheet).

ENVIRONMENTAL COMPLIANCE SHEET:

As indicated on plans and specifications, the contractor shall pay special attention to specific construction requirements as indicated in the EC Sheet -01.

Specifically, please note the environmental requirements notes 2C (Stream Restoration), 2D (Minimize Tree Removal), 2E (Protection of Resources), and 2F (Plantings).

CANNOT BE USED FOR BIDDING

BID PROPOSAL FORMS

CONTRACT T200510602.01

FEDERAL AID PROJECT NH-N059(34)

CANNOT
BE
USED FOR
BIDDING

CONTRACT ID: T200510602.01 PROJECT(S): NH-N059(34)

All figures must be typewritten.

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	CTS	BID AMOUNT DOLLARS	CTS
SECTION 0001 NON FIXED QUANTITIES						
0010	201000 CLEARING AND GRUBBING	LUMP	LUMP			
0020	202000 EXCAVATION AND EMBANKMENT	89760.000 CY				
0030	202518 SETTLEMENT MONUMENT	52.000 EACH				
0040	205500 ROCK EXCAVATION FOR ROADWAY	12987.000 CY				
0050	206500 ROCK EXCAVATION FOR STRUCTURES AND TRENCHES	4268.000 CY				
0060	207000 EXCAVATION AND BACKFILL FOR STRUCTURES	8288.000 CY				
0070	207501 SHEETING AND SHORING	LUMP	LUMP			
0080	208000 EXCAVATION AND BACKFILLING FOR PIPE TRENCHES	1553.000 CY				
0090	208001 FLOWABLE FILL	232.000 CY				
0100	209001 BORROW, TYPE A	5516.000 CY				

CANNOT BE USED FOR BIDDING

CANNOT
BE
USED FOR
BIDDING

CONTRACT ID: T200510602.01 PROJECT(S): NH-N059(34)

All figures must be typewritten.

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0110	209002 BORROW, TYPE B	2288.000 CY				
0120	209003 BORROW, TYPE C	2000.000 CY				
0130	209006 BORROW, TYPE F	59407.000 CY				
0140	210000 FURNISHING BORROW TYPE "C" FOR PIPE, UTILITY TRENCH, AND STRUCTURE BACKFILL	7921.000 CY				
0150	211000 REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LUMP	LUMP			
0160	211002 REMOVAL OF STRUCTURES AND OBSTRUCTIONS (GUARDRAIL)	16829.000 LF				
0170	211004 REMOVAL OF STRUCTURES AND OBSTRUCTIONS (PIPE)	3403.000 LF				
0180	211509 REMOVAL OF SIGN STRUCTURES	LUMP	LUMP			
0190	212000 UNDERCUT EXCAVATION	3919.000 CY				
0200	250000 SEDIMENT REMOVAL	9192.000 CY				

CANNOT BE USED FOR BIDDING

CANNOT
BE
USED FOR
BIDDING

CONTRACT ID: T200510602.01 PROJECT(S): NH-N059(34)

All figures must be typewritten.

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0210	251000 SILT FENCE	26867.000 LF				
0220	251001 REINFORCED SILT FENCE	1254.000 LF				
0230	252002 INLET SEDIMENT CONTROL, AT GRADE INLET	94.000 EACH				
0240	254000 STONE CHECK DAM	26.000 TON				
0250	255000 SEDIMENT TRAP	76.000 CY				
0260	262000 STILLING WELL	5.000 CY				
0270	266000 SANDBAG DIKES	8.000 CY				
0280	268000 STABILIZED CONSTRUCTION ENTRANCE	907.000 TON				
0290	271000 STORMWATER MANAGEMENT POND	12987.000 CY				
0300	272000 POND OUTLET STRUCTURE, CONCRETE, #1	1.000 EACH				
0310	272503 TRASH RACK	2.000 EACH				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS		UNIT PRICE DOLLARS	CTS	BID AMOUNT DOLLARS	CTS
0320	302007 GRADED AGGREGATE BASE COURSE, TYPE B	14136.000	CY				
0330	302011 DELAWARE NO. 3 STONE	142.000	TON				
0340	302012 DELAWARE NO. 57 STONE	53.000	TON				
0350	401517 STONE MATRIX ASPHALT WEARING SURFACE	8926.000	TON				
0360	401577 PAVER-LAID ULTRATHIN HOT MIX	27094.000	SY				
0370	401660 SUPERPAVE, TYPE B HOT-MIX, 160 GYRATIONS, PG 76-22	11505.000	TON				
0380	401663 SUPERPAVE, BITUMINOUS CONCRETE BASE COURSE, 160 GYRATIONS, PG 64-22	18874.000	TON				
0390	401665 SUPERPAVE, TYPE C HOT-MIX, 160 GYRATIONS, PG 64-22, PATCHING	84.000	TON				
0400	401667 SUPERPAVE, BITUMINOUS CONCRETE BASECOURSE, 160 GYRATIONS, PG 64-22 PATCHING	82.000	TON				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0410	401669 SUPERPAVE, TYPE B HOT-MIX, 160 GYRATIONS, PG 64-22, WEDGE	121.000 TON				
0420	401711 SUPERPAVE, TYPE C HOT-MIX, 160 GYRATIONS, PG 76-22, (NON-CARBONATE STONE)	4891.000 TON				
0430	501004 PORTLAND CEMENT CONCRETE PAVEMENT, 10"	2280.000 SY				
0440	501006 PORTLAND CEMENT CONCRETE PAVEMENT, 12"	10850.000 SY				
0450	503009 PATCHING P.C.C. PAVEMENT	273.000 SY				
0460	601502 TEMPORARY PROTECTIVE SHIELD	LUMP	LUMP			
0470	602001 PORTLAND CEMENT CONCRETE MASONRY, CLASS A	319.000 CY				
0480	602002 PORTLAND CEMENT CONCRETE MASONRY, CLASS B	41.000 CY				
0490	602003 PORTLAND CEMENT CONCRETE MASONRY, ABUTMENT FOOTING, CLASS A	830.000 CY				
0500	602006 PORTLAND CEMENT CONCRETE MASONRY, PIER FOOTING, CLASS B	130.000 CY				

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0510	602007 PORTLAND CEMENT CONCRETE MASONRY, PIER ABOVE FOOTING, CLASS A	73.000 CY				
0520	602009 PORTLAND CEMENT CONCRETE MASONRY, APPROACH SLAB, CLASS A	26.000 CY				
0530	602011 PORTLAND CEMENT CONCRETE MASONRY, SUBSTRUCTURE, CLASS A	208.000 CY				
0540	602012 PORTLAND CEMENT CONCRETE MASONRY, SUBSTRUCTURE, CLASS B	40.000 CY				
0550	602013 PORTLAND CEMENT CONCRETE MASONRY, SUPERSTRUCTURE, CLASS D	1135.000 CY				
0560	602014 PORTLAND CEMENT CONCRETE MASONRY, APPROACH SLAB, CLASS D	518.000 CY				
0570	602015 PORTLAND CEMENT CONCRETE MASONRY, ABUTMENT ABOVE FOOTING, CLASS A	1105.000 CY				
0580	602017 PORTLAND CEMENT CONCRETE MASONRY, PARAPET, CLASS A	217.000 CY				
0590	602553 MECHANICALLY STABILIZED EARTH WALLS, WALL 1	3200.000 SF				

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0600	602557 MECHANICALLY STABILIZED EARTH WALLS, WALL 2	2870.000 SF				
0610	602572 REPAIRING EXISTING P.C.C. STRUCTURES	450.000 LB				
0620	602579 DRILLING HOLES AND INSTALLING DOWELS	1474.000 EACH				
0630	602586 REHABILITATION OF CONCRETE STRUCTURE	59.000 CF				
0640	602611 REPAIR OF CONCRETE STRUCTURES BY EPOXY INJECTION	100.000 LF				
0650	602646 SILICONE ACRYLIC CONCRETE SEALER	39750.000 SF				
0660	602650 PRECAST CAPSTONE, TYPE III	525.000 LF				
0670	602670 MECHANICALLY STABILIZED EARTH WALLS, WALL 3	3250.000 SF				
0680	604000 BAR REINFORCEMENT, EPOXY COATED	826366.000 LB				
0690	605002 STEEL STRUCTURES	LUMP	LUMP			

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0700	605522 URETHANE PAINT SYSTEM, EXISTING STEEL	LUMP	LUMP			
0710	605524 BRIDGE DRAINAGE SYSTEM	LUMP	LUMP			
0720	605525 RELOCATE SIGN SUPPORT STRUCTURE	LUMP	LUMP			
0730	605528 UTILITY SUPPORT	LUMP	LUMP			
0740	605533 CLEANING EXISTING STEEL STRUCTURES, HAZARDOUS BASE, (L.S.)	LUMP	LUMP			
0750	605581 ELASTOMERIC BRIDGE BEARING PAD	36.000 EACH				
0760	605607 JACKING BRIDGE	LUMP	LUMP			
0770	605641 JOINT REPAIR (COMPRESSION SEAL), 1"	190.000 LF				
0780	605657 STRIP SEAL EXPANSION JOINT, 1 1/2"	423.000 LF				
0790	605659 STRIP SEAL EXPANSION JOINT, 3"	100.000 LF				

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0800	605664 STEEL SIGN STRUCTURE	LUMP	LUMP			
0810	605697 POT BEARINGS	15.000 EACH				
0820	608000 COARSE AGGREGATE FOR FOUNDATION STABILIZATION AND SUBFOUNDATION BACKFILL	65.000 TON				
0830	609000 SUBFOUNDATION CONCRETE	2130.000 CY				
0840	611500 STONE MASONRY	1300.000 SF				
0850	612022 REINFORCED CONCRETE PIPE, 18", CLASS IV	4142.000 LF				
0860	612023 REINFORCED CONCRETE PIPE, 24", CLASS IV	1263.000 LF				
0870	612025 REINFORCED CONCRETE PIPE, 30", CLASS IV	452.000 LF				
0880	612026 REINFORCED CONCRETE PIPE, 30", CLASS V	302.000 LF				
0890	612028 REINFORCED CONCRETE PIPE, 48", CLASS IV	54.000 LF				

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0900	612034 REINFORCED CONCRETE PIPE, 36", CLASS IV	39.000	LF				
0910	612216 REINFORCED CONCRETE ELLIPTICAL PIPE, 14"X23", CLASS IV	14.000	LF				
0920	612220 REINFORCED CONCRETE ELLIPTICAL PIPE, 29"X45", CLASS IV	288.000	LF				
0930	612523 CORRUGATED POLYETHYLENE PIPE, TYPE S, 18"	20.000	LF				
0940	612528 CORRUGATED POLYETHYLENE PIPE, TYPE C, 24"	120.000	LF				
0950	612529 PIPE VIDEO INSPECTION	6674.000	LF				
0960	614861 STRUCTURAL PLATE ARCH (STEEL)	62.000	LF				
0970	617003 REINFORCED CONCRETE FLARED END SECTION, 18"	6.000	EACH				
0980	617005 REINFORCED CONCRETE FLARED END SECTION, 24"	2.000	EACH				
0990	617007 REINFORCED CONCRETE FLARED END SECTION, 30"	1.000	EACH				

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1000	617011 REINFORCED CONCRETE FLARED END SECTION, 48"	2.000 EACH				
1010	618071 STEEL H PILES, HP 10 X 57	3460.000 LF				
1020	618072 STEEL H TEST PILES, HP 10 X 57	460.000 LF				
1030	618526 DRILLED SHAFT FOUNDATIONS	258.000 LF				
1040	619051 INSTALL STEEL H PILES, HP 10 X 57	3460.000 LF				
1050	619052 INSTALL STEEL H TEST PILES, HP 10 X 57	460.000 LF				
1060	619511 EXPLORATORY DRILLING	75.000 LF				
1070	619512 PREDRILLING FOR END BEARING PILES	3460.000 LF				
1080	619519 DYNAMIC PILE TESTING BY CONTRACTOR	6.000 EACH				
1090	701010 PORTLAND CEMENT CONCRETE CURB, TYPE 1	1530.000 LF				

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1100	701012 PORTLAND CEMENT CONCRETE CURB, TYPE 3	2139.000 LF				
1110	701500 INTEGRAL PORTLAND CEMENT CONCRETE CURB AND GUTTER, SPECIAL	3558.000 LF				
1120	705001 P.C.C. SIDEWALK, 4"	5968.000 SF				
1130	705519 PATTERNED PORTLAND CEMENT CONCRETE SIDEWALK, 6"	13252.000 SF				
1140	708051 DRAINAGE INLET, 34" X 24"	24.000 EACH				
1150	708052 DRAINAGE INLET, 48" X 30"	32.000 EACH				
1160	708053 DRAINAGE INLET, 48" X 48"	5.000 EACH				
1170	708055 DRAINAGE INLET, 66" X 48"	1.000 EACH				
1180	708056 DRAINAGE INLET, 66" X 66"	8.000 EACH				
1190	708057 DRAINAGE INLET, 72" X 24"	4.000 EACH				

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1200	708058 DRAINAGE INLET, 72" X 48"	10.000 EACH				
1210	708059 DRAINAGE INLET, 72" X 72"	1.000 EACH				
1220	708107 MANHOLE, ROUND	3.000 EACH				
1230	708111 MANHOLE, 48" X 30"	5.000 EACH				
1240	708112 MANHOLE, 48" X 48"	2.000 EACH				
1250	708113 MANHOLE, 66" X 30"	4.000 EACH				
1260	708115 MANHOLE, 66" X 66"	2.000 EACH				
1270	708505 JUNCTION BOX, SPECIAL	2.000 EACH				
1280	708512 DRAINAGE INLET, SPECIAL I	2.000 EACH				
1290	708582 MANHOLE,SPECIAL I	2.000 EACH				

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1300	708583 PERSONAL GRATE FOR PIPE INLET	4.000 EACH				
1310	710001 ADJUSTING AND REPAIRING EXISTING DRAINAGE INLET	34.000 EACH				
1320	710502 ADJUSTING CATCH BASINS	5.000 EACH				
1330	710504 ADJUSTING MANHOLES	5.000 EACH				
1340	712005 RIPRAP, R-4	945.000 SY				
1350	712006 RIPRAP, R-5	30.000 SY				
1360	712007 RIPRAP, R-6	86.000 SY				
1370	712020 RIPRAP, R-4	585.000 TON				
1380	712524 CONCRETE SLOPE PAVING REPAIR, 4"	8.000 SY				
1390	712527 TURF REINFORCING MAT	2855.000 SY				

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1400	713003 GEOTEXTILES, RIPRAP	1957.000 SY				
1410	715001 PERFORATED PIPE UNDERDRAINS, 6"	11747.000 LF				
1420	715500 UNDERDRAIN OUTLET PIPE, 6"	435.000 LF				
1430	716000 CONVERTING EXISTING DRAINAGE INLET TO JUNCTION BOX	1.000 EACH				
1440	720050 GALVANIZED STEEL BEAM GUARDRAIL, TYPE 1-31	14646.000 LF				
1450	720051 GALVANIZED STEEL BEAM GUARDRAIL, TYPE 2-31	588.000 LF				
1460	720506 RELOCATING PORTABLE P.C.C. SAFETY BARRIER	37599.000 LF				
1470	720526 PORTABLE P.C.C. STRUCTURE-MOUNTED SAFETY BARRIER	2352.000 LF				
1480	720529 P.C.C. SAFETY BARRIER PERMANENT, SINGLE FACE	2834.000 LF				
1490	720532 INSTALL PORTABLE IMPACT ATTENUATOR	15.000 EACH				

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1500	720534 FURNISH PORTABLE IMPACT ATTENUATOR	15.000 EACH				
1510	720539 RELOCATE PORTABLE IMPACT ATTENUATOR	41.000 EACH				
1520	720540 DELINEATORS	250.000 EACH				
1530	720544 REFLECTORS, WHITE, CONCRETE	54.000 EACH				
1540	720545 REFLECTORS, YELLOW, CONCRETE	30.000 EACH				
1550	720550 P.C.C. BARRIER, MODIFIED	1196.000 LF				
1560	720551 RELOCATING PORTABLE P.C.C. STRUCTURE MOUNTED SAFETY BARRIER	1850.000 LF				
1570	720567 FURNISH AND MAINTAIN PORTABLE P.C.C. SAFETY BARRIER	8578.000 LF				
1580	720585 GUARDRAIL END TREATMENT ATTENUATOR, TYPE 1-31	9.000 EACH				
1590	720588 GUARDRAIL END TREATMENT ATTENUATOR, TYPE 3-31	1.000 EACH				

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1600	720621 RELOCATING PINNED PORTABLE P.C.C. SAFETY BARRIER	2979.000 LF				
1610	720636 FURNISH AND MAINTAIN PORTABLE P.C.C. PINNED SAFETY BARRIER, DOUBLE FACE	1450.000 LF				
1620	725001 GUARDRAIL TO BARRIER CONNECTION (EXIT TYPE 31)	12.000 EACH				
1630	725002 GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 1-31	6.000 EACH				
1640	725003 GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 2-31	8.000 EACH				
1650	726001 END ANCHORAGE 31	11.000 EACH				
1660	727014 CONSTRUCTION SAFETY FENCE	16700.000 LF				
1670	732002 TOPSOIL, 6" DEPTH	99780.000 SY				
1680	732003 TOPSOIL, 12" DEPTH	32226.000 SY				
1690	734013 PERMANENT GRASS SEEDING, DRY GROUND	99780.000 SY				

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1700	734015 PERMANENT GRASS SEEDING, WET GROUND	1500.000 SY				
1710	734017 TEMPORARY GRASS SEEDING, DRY GROUND	4093.000 SY				
1720	734551 NATIVE GRASS SEEDING: NO MOW MIX	32226.000 SY				
1730	735535 SOIL RETENTION BLANKET MULCH, TYPE 5	7491.000 SY				
1740	737523 PLANTING	LUMP	LUMP			
1750	743003 ARROWPANELS, TYPE C	1684.000 EADY				
1760	743004 FURNISH AND MAINTAIN PORTABLE CHANGEABLE MESSAGE SIGN	2106.000 EADY				
1770	743005 FURNISH AND MAINTAIN PORTABLE LIGHT ASSEMBLY	1684.000 EADY				
1780	743006 PLASTIC DRUMS	78169.000 EADY				
1790	743007 TRAFFIC OFFICERS	3220.000 HOUR	75.00000		241500.00	

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1800	743008 REFLECTOR PANELS	172.000 EACH				
1810	743010 FURNISH AND MAINTAIN TRUCK MOUNTED ATTENUATOR, TYPE II	1684.000 EADY				
1820	743050 FLAGGER, NEW CASTLE COUNTY, STATE	23200.000 HOUR	41.67000		966744.00	
1830	743062 FLAGGER, NEW CASTLE COUNTY, STATE, OVERTIME	4640.000 HOUR	60.42000		280348.80	
1840	743501 WARNING LIGHTS , TYPE B	25141.000 EADY				
1850	743504 WARNING SIGNS	116.000 EACH				
1860	743507 TEMPORARY BARRICADE, TYPE III	17124.000 LFDY				
1870	743525 TEMPORARY WARNING SIGNS	8522.000 EADY				
1880	744505 ADJUST OR REPAIR EXISTING CONDUIT JUNCTION WELL	4.000 EACH				
1890	744506 CONDUIT JUNCTION WELL, TYPE 7, 36" X 60" PRECAST POLYMER CONCRETE	2.000 EACH				

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1900	744519 RELOCATION OF EXISTING JUNCTION WELL	2.000 EACH				
1910	744520 CONDUIT JUNCTION WELL, TYPE 1, 20" X 20" PRECAST CONCRETE	63.000 EACH				
1920	744523 CONDUIT JUNCTION WELL, TYPE 4, 20" X 42 1/2" PRECAST CONCRETE	27.000 EACH				
1930	744525 REMOVAL OF EXISTING JUNCTION WELL	30.000 EACH				
1940	745506 GALVANIZED CONDUIT IN/ON STRUCTURE, 2"	520.000 LF				
1950	745521 SUPPLY OF 4" SDR-13.5 HDPE CONDUIT	474.000 LF				
1960	745524 SUPPLY OF 4" SCHEDULE 80 PVC CONDUIT	6132.000 LF				
1970	745526 SUPPLY OF 3" GALVANIZED STEEL CONDUIT	21501.000 LF				
1980	745527 SUPPLY OF 2 1/2" GALVANIZED STEEL CONDUIT	542.000 LF				
1990	745528 SUPPLY OF 2" GALVANIZED STEEL CONDUIT	5974.000 LF				

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2000	745530 SUPPLY OF 1" GALVANIZED STEEL CONDUIT	222.000 LF				
2010	745532 SUPPLY OF 3" SCHEDULE 40 PVC CONDUIT	120.000 LF				
2020	745542 INSTALLATION OF CONDUIT UNDER EXISTING PAVEMENT-DIRECTIONAL BORE	1297.000 LF				
2030	745543 INSTALLATION OF CONDUIT UNDER EXISTING PAVEMENT-OPEN CUT	82.000 LF				
2040	745544 INSTALLATION OF CONDUIT IN UNPAVED TRENCH	27372.000 LF				
2050	745545 INSTALLATION OF CONDUIT ON WOOD POLE	200.000 LF				
2060	745546 INSTALLATION OF CONDUIT ON STRUCTURE	167.000 LF				
2070	745547 INSTALLATION OF ADDITIONAL CONDUITS IN TRENCH OR OPEN CUT PAVEMENT	5138.000 LF				
2080	745548 INSTALLATION OF ADDITIONAL CONDUITSIN DIRECTIONAL BORE	478.000 LF				
2090	745551 REMOVAL OF CONDUIT FROM WOOD POLE	200.000 LF				

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2100	746511 CABLES, 1/#4 AWG	17528.000 LF				
2110	746512 CABLES, 1/#6 AWG	46040.000 LF				
2120	746513 CABLES, 1/#8 AWG	22946.000 LF				
2130	746514 CABLES, 1/#10 AWG	370.000 LF				
2140	746525 ALUMINUM LIGHTING STANDARDS	134.000 EACH				
2150	746527 CABLES, 1/#2 AWG	5000.000 LF				
2160	746594 LUMINAIRE (HPS), 250 WATT	134.000 EACH				
2170	746598 INSULATED GROUND CABLE , 1/#2	695.000 LF				
2180	746693 SUPPLY OF WOOD POLE, 45', CLASS II	11.000 EACH				
2190	746697 INSTALLATION OF WOOD POLE	18.000 EACH				

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2200	746698 REMOVAL OF WOOD POLE	18.000 EACH				
2210	746717 ELECTRIC SERVICE ON PEDESTAL WITH SERVICE RISER	3.000 EACH				
2220	746774 SUPPLY AND INSTALLATION OF LOOP DETECTOR WIRE	460.000 LF				
2230	746779 SPLICING OF ELECTRICAL CABLE, UNDERGROUND	5.000 EACH				
2240	746817 CABLES, 1/#2/0 AWG	4164.000 LF				
2250	746830 REMOVAL OF CONCRETE POLE BASES AND CABINET FOUNDATIONS	113.000 CY				
2260	746847 POLE BASE, TYPE 3	10.000 EACH				
2270	746852 POLE BASE, TYPE 6	111.000 EACH				
2280	747506 CABINET BASE	2.000 EACH				
2290	747508 LIGHTING CONTROL CENTER - 100 A	3.000 EACH				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
2300	748014 PERMANENT PAVEMENT STRIPING, ALKYD-THERMOPLASTIC, 4"	39.000 LF				
2310	748015 PERMANENT PAVEMENT STRIPING, SYMBOL/LEGEND ALKYD-THERMOPLAST IC	1409.000 SF				
2320	748019 TEMPORARY MARKINGS, PAINT, 4"	34201.000 LF				
2330	748020 TEMPORARY MARKINGS, PAINT, 6"	219566.000 LF				
2340	748026 TEMPORARY MARKINGS, PAINT SYMBOL/LEGEND	373.000 SF				
2350	748502 RAISED/RECESSED PAVEMENT MARKER	992.000 EACH				
2360	748506 PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, 4"	12513.000 LF				
2370	748507 PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, 6"	57741.000 LF				
2380	748509 PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, 12"	9386.000 LF				
2390	748530 REMOVAL OF PAVEMENT STRIPING	117347.000 SF				

CANNOT BE USED FOR BIDDING

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CONTRACT ID: T200510602.01 PROJECT(S): NH-N059(34)

All figures must be typewritten.

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS		UNIT PRICE DOLLARS	CTS	BID AMOUNT DOLLARS	CTS
2400	748535 PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 4"	553.000	LF				
2410	748536 PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK 6"	5313.000	LF				
2420	748537 PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 8"	554.000	LF				
2430	748538 PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 10"	3020.000	LF				
2440	748539 PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 12"	470.000	LF				
2450	748540 PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, BLACK, 16"	470.000	LF				
2460	749500 SIGN PANEL	2048.000	SF				
2470	749502 SIGN PANEL OVERLAY ON EXISTING SIGN	361.000	SF				
2480	749504 INSTALLATION OR REMOVAL OF BREAKAWAY I-BEAM SIGN POSTS	8.000	EACH				

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CONTRACT ID: T200510602.01 PROJECT(S): NH-N059(34)

All figures must be typewritten.

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
2490	749510 INSTALLATION OR REMOVAL OF SIGN ON/OVER HIGHWAY STRUCTURE	6169.000 SF				
2500	749511 INSTALLATION OR REMOVAL OF SIGN ON ROADSIDE I-BEAM STRUCTURE	498.000 SF				
2510	749516 REINFORCED CONCRETE SIGN FOUNDATION, W-6	2.000 EACH				
2520	749517 REINFORCED CONCRETE SIGN FOUNDATION, W-8	4.000 EACH				
2530	749518 REINFORCED CONCRETE SIGN FOUNDATION, W-10	2.000 EACH				
2540	749519 REINFORCED CONCRETE SIGN FOUNDATION, W-12	2.000 EACH				
2550	749521 SUPPLY OF BREAKAWAY I-BEAM SIGN POSTS, W-6	34.000 LF				
2560	749522 SUPPLY OF BREAKAWAY I-BEAM SIGN POSTS, W-8	82.000 LF				
2570	749523 SUPPLY OF BREAKAWAY I-BEAM SIGN POSTS, W-10	49.000 LF				
2580	749524 SUPPLY OF BREAKAWAY I-BEAM SIGN POSTS, W-12	40.000 LF				

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CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
2590	749535 SUPPLY & INSTALLATION OF BOLT KIT FOR BREAKAWAY COUPLING	10.000 EACH				
2600	749536 SUPPLY & INSTALLATION OF HINGE PLATE FOR BREAKAWAY COUPLING	10.000 EACH				
2610	749537 SUPPLY & INSTALLATION OF BREAKAWAY COUPLING SYSTEM	10.000 EACH				
2620	749540 REMOVAL OF OVERHEAD I-BEAM	2.000 EACH				
2630	749550 INSTALLATION OF BREAKAWAY I-BEAM SIGN POSTS	10.000 EACH				
2640	749687 INSTALLATION OR REMOVAL OF TRAFFIC SIGN(S) ON SINGLE SIGN POST	197.000 EACH				
2650	749688 INSTALLATION OF 4" DIAMETER HOLE, LESS THAN OR EQUAL TO 6" DEPTH	5.000 EACH				
2660	749690 INSTALLATION OR REMOVAL OF TRAFFIC SIGNS ON MULTIPLE SIGN POSTS	680.000 SF				
2670	750000 ADJUST WATER VALVE BOXES	1.000 EACH				

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CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
2680	758000 REMOVAL OF EXISTING PORTLAND CEMENTCONCRETE PAVEMENT, CURB, SIDEWALK, ETC.	15182.000 SY				
2690	759502 FIELD OFFICE, SPECIAL I	38.000 EAMO				
2700	760002 PAVEMENT - MILLING, HOT-MIX, STRIP CUT	1468.000 SYIN				
2710	760504 RUMBLE STRIPS, HOT MIX	129109.000 LF				
2720	760506 RUMBLE STRIPS, CONCRETE	304.000 LF				
2730	760507 PROFILE MILLING, HOT-MIX	127115.000 SYIN				
2740	762002 SAW CUTTING, CONCRETE, FULL DEPTH	17235.000 LF				
2750	763000 INITIAL EXPENSE	LUMP	LUMP			
2760	763500 MAINTENANCE OF TRAFFIC	LUMP	LUMP			
2770	763501 CONSTRUCTION ENGINEERING	LUMP	LUMP			

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All figures must be typewritten.

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
2780	763503 TRAINEE	5790.000 HOUR	0.80000		4632.00	
2790	763508 PROJECT CONTROL SYSTEM DEVELOPMENT PLAN	LUMP	LUMP			
2800	763509 CPM SCHEDULE UPDATES AND/OR REVISED UPDATES	36.000 EAMO				
2810	763632 REMOVAL OF RAISED PAVEMENT MARKER	120.000 EACH				
	SECTION 0001 TOTAL					
	TOTAL BID					

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BREAKOUT SHEETS

THE FOLLOWING SHEETS MUST BE COMPLETED AND RETURNED WITH THE PROPOSAL AT THE TIME OF BID. FAILURE TO COMPLETE THE BREAKOUT SHEETS AS REQUIRED WILL RESULT IN THE BID BEING DECLARED NON-RESPONSIVE AND WILL NOT BE CONSIDERED. BREAKOUT SHEETS MUST BE COMPLETED REGARDLESS OF WHETHER BIDDING BY ELECTRONIC MEANS OR TYPEWRITTEN HARD COPY.

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SECTION 1 **BREAKOUT SHEET - 1** **CONTRACT NO. T200510602**

ITEM 207501 - Sheeting and Shoring

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
1	1	LS	Bridge 1-762 For Abutments and Wingwalls	$	$
2	1	LS	Bridge 1-764 For Abutments A, Wingwall B and MSE Wall Type I	$	$
3	1	LS	Bridge 1-763 for MSE Wall Type 2 and Type 3	$	$

TOTAL ITEM 207501 - Sheeting and Shoring $_____

(LUMP SUM BID PRICE FOR ITEM 207501)

CANNOT BE USED FOR BIDDING

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SECTION 1 **BREAKOUT SHEET - 2** **CONTRACT NO. T200510602**

ITEM 211000 - Removal of Structures and Obstructions

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
1	1	LS	Bridge 1-762	$	$
2	1	LS	Bridge 1-764	$	$
3	1	LS	Bridge 1-570	$	$
4	1	LS	Bridge 1-779A (Structural Arch)	$	$

TOTAL ITEM 211000 - Removal of Structures and Obstructions $_____

(LUMP SUM BID PRICE FOR ITEM 211000)

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SECTION 1 **BREAKOUT SHEET - 3** **CONTRACT NO. T200510602**

ITEM 601502 - Temporary Protective Shield

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
1	1	LS	Bridge 1-762	$	$
2	1	LS	Bridge 1-764	$	$
3	1	LS	Bridge 1-570	$	$

TOTAL ITEM 601502 - Temporary Protective Shield $_____

(LUMP SUM BID PRICE FOR ITEM 601502)

CANNOT
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SECTION 1 **BREAKOUT SHEET - 4** **CONTRACT NO. T200510602**

ITEM 605002 - Steel Structures

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
1	1	LS	Bridge 1-762	$	$
2	1	LS	Bridge 1-764	$	$
3	1	LS	Bridge 1-763	$	$
4	1	LS	Bridge 1-570	$	$

TOTAL ITEM 605002 - Steel Structures $_____

(LUMP SUM BID PRICE FOR ITEM 605002)

CANNOT BE USED FOR BIDDING

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SECTION 1 **BREAKOUT SHEET - 5** **CONTRACT NO. T200510602**

ITEM 605664 - Steel Sign Structures

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
1	1	LS	Cantilever Sign SC 1242	$	$
2	1	LS	Cantilever Sign SC 1235	$	$
3	1	LS	Cantilever Sign SC 1042	$	$
4	1	LS	Cantilever Sign SO 1044	$	$
5	1	LS	Cantilever Sign SO 1238	$	$
6	1	LS	Cantilever Sign SO 1035	$	$
7	1	LS	Cantilever Sign SO 1036	$	$
			TOTAL ITEM 605664 - Steel Sign Structures $_____ (LUMP SUM BID PRICE FOR ITEM 605664)		

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SECTION 1 **BREAKOUT SHEET - 6** **CONTRACT NO. T200510602**

ITEM 737523 - PLANTING

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
1	975	EA	FAGUS GRANDIFOLIA 'AMERICAN BEECH', BARE ROOT SEEDLING	$	$
2	326	EA	PRUNUS SEROTINA 'BLACK CHERRY', BARE ROOT SEEDLING	$	$
3	6	EA	PRUNUS SEROTINA 'BLACK CHERRY', 1.75"-2" CAL., B&B	$	$
4	976	EA	CARYA CORDIFORMIS 'BITTERNUT HICKORY', BARE ROOT SEEDLING	$	$
5	326	EA	CERCIS CANADENSIS 'EASTERN REDBUD', BARE ROOT SEEDLING	$	$
6	11	EA	CERCIS CANADENSIS 'EASTERN REDBUD', 5'-6' HT., CONT.	$	$
7	976	EA	QUERCUS RUBRA 'RED OAK', BARE ROOT SEEDLING	$	$
8	975	EA	QUERCUS ALBA 'WHITE OAK', BARE ROOT SEEDLING	$	$
9	8	EA	QUERCUS ALBA, 'WHITE OAK', 1.75"-2." CAL., B&B	$	$
10	22	EA	TILIA AMERICANA 'BASSWOOD', 1.5"-2" CAL., B&B	$	$

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SECTION 1 **BREAKOUT SHEET - 6** **CONTRACT NO. T200510602**

ITEM 737523 - PLANTING

ITEM NO.	APPROX. QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT
11	28	EA	PLATAMUS OCCIDENTALIS 'SYCAMORE', 1.5"-2" CAL., B&B/CONT.	$	$
12	18	EA	CARYA TOMENTOSA 'MOCKERNUT HICKORY', 1.5"-2" CAL., B&B/CONT.	$	$
13	17	EA	NYSSA SYLVATICA 'BLACK GUM', 1.5"-2" CAL., B&B/CONT.	$	$
14	27	EA	QUERCUS PALUSTRIS 'PIN OAK', 1.5"-2" CAL., B&B/CONT.	$	$
15	22	EA	ULMUS AMERICANA 'AMERICAN ELM', 1.5"-2" CAL., B&B/CONT.	$	$
16	36	SY	SHREDDED HARDWOOD BARK MULCH, 3" DEPTH	$	$

TOTAL ITEM 737523 - PLANTING $_____
(LUMP SUM BID PRICE FOR ITEM 737523)

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"ATTENTION"

TO BIDDERS

This Bid Proposal includes breakout sheets. The breakout sheets **MUST ACCOMPANY** the bid proposal at the time of bid. Failure to return completed breakout sheets **WILL RESULT** in the bid proposal being declared non-responsive and **REJECTED** as irregular.

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Diesel Fuel Cost Price Adjustment Option

The Bidder is required to submit this form with his/her Bid Proposal at the time of bid opening. When this form is not provided by the Bidder at the time of Bid, the Option-OUT will be automatically selected and no further option is available to the Contractor and no Diesel Fuel Cost Adjustments will be made.

OPTION-IN

☐ Checking here selects the option to participate in the 763626 - Diesel Fuel Cost Price Adjustment.

OPTION-OUT

☐ Checking here declines the option to participate in the 763626 - Diesel Fuel Cost Price Adjustment.

The undersigned hereby certifies that he/she is authorized to make this Option on behalf of the bidder in compliance with the special provision 763626 - Diesel Fuel Cost Price Adjustment.

Sealed and dated this _____ day of _____ in the year of our Lord two thousand and _____ _____ (20__).

Name of Bidder (Organization)

Corporate Seal

By:

Authorized Signature

Attest

Title

SWORN TO AND SUBSCRIBED BEFORE ME this ____ day of _____, 20___.

Notary Seal

Notary

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CERTIFICATION

Contract No. T200510602.01
Federal Aid Project No. NH-N059(34)

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 prosection or administrative sanctions.

_____

_____

_____

(Insert Exceptions)

DBE Program Assurance:

NOTICE: In accordance with 49 CFR Part 26 the undersigned, a legally authorized representative of the bidder listed below, must complete this assurance.

By its signature affixed hereto, assures the Department that it will attain DBE participation as indicated:

Disadvantaged Business Enterprise _____ percent (blank to be filled in by bidder)

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The foregoing quantities are considered to be approximate only and are given as the basis for comparison of bids. The Department of Transportation may increase or decrease the amount of any item or portion of the work as may be deemed necessary or expedient. Any such increase or decrease in the quantity for any item will not be regarded as a sufficient ground for an increase or decrease in the unit prices, nor in the time allowed for the completion of the work, except as provided in the contract.

Accompanying this proposal is a surety bond or a security of the bidder assigned to the Department of Transportation, for at least ten (10) percentum of total amount of the proposal, which deposit is to be forfeited as liquidated damages in case this proposal is accepted, and the undersigned shall fail to execute a contract with necessary bond, when required, for the performance of said contract with the Department of Transportation, under the conditions of this proposal, within twenty (20) days after date of official notice of the award of the contract as provided in the requirement and specifications hereto attached; otherwise said deposit is to be returned to the undersigned.

I/We are licensed, or have initiated the license application as required by Section 2502, Chapter 25, Title 30, of the Delaware Code.

By submission of this proposal, each person signing on behalf of the bidder, certifies as to its own organization, under penalty of perjury, that to the best of each signer's knowledge and belief:

1. The prices in this proposal have been arrived at independently without collusion, consultation, communication, or Agreement with any other bidder or with any competitor for the purpose of restricting competition.
2. Unless required by law, the prices which have been quoted in this proposal have not been knowingly disclosed and will not knowingly be disclosed by the bidder, directly or indirectly, to any other bidder or competitor prior to the opening of proposals.
3. No attempt has been made or will be made by the bidder to induce any other person, partnership, or corporation to submit or not to submit a proposal for the purpose of restricting competition.

==========

I/We acknowledge receipt and incorporation of addenda to this proposal as follows:

No.	Date	No.	Date	No.	Date	No.	Date	No.	Date

FAILURE TO ACKNOWLEDGE RECEIPT OF ALL ADDENDA AND FINAL QUESTIONS AND ANSWERS WILL RESULT IN THE BID BEING DECLARED NON-RESPONSIVE.

MUST INSERT DATE OF FINAL QUESTIONS AND ANSWERS ON WEBSITE: _____

==========

Sealed and dated this _____ day of _____ in the year of our Lord two thousand and _____ _____ (20___).

_____
Name of Bidder (Organization)

Corporate Seal

By: _____
Authorized Signature

Attest _____

_____
Title

SWORN TO AND SUBSCRIBED BEFORE ME this ____ day of _____, 20____.

Notary Seal

_____
Notary

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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._T200510602.01___, 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

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